



# GOES-R SERIES PRODUCT DEFINITION AND USERS' GUIDE (PUG)

## APPENDIX X: ISO SERIES METADATA

March 23, 2021

Revision 2.3



U.S. Department of Commerce (DOC)  
National Oceanic and Atmospheric Administration (NOAA)  
NOAA Satellite and Information Service (NESDIS)  
National Aeronautics and Space Administration (NASA)

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## APPENDIX X: ISO SERIES METADATA

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Jim Valenti  
NOAA  
GOES-R Ground Segment Project Manager

**11/20/2017**

Date

## CHANGE RECORD

ISSUE	CCR #	DATE	PAGES AFFECTED	DESCRIPTION
Rev. 1.0	CCR-03240	03/02/2017	All	CDRL SE-16 under Government Control. Harris DCN 7035538 PUG APX Rev E has been placed under Gov. GS control as GOES-R Series 416-R-PUG-APX-0350 Rev 1.0.
Rev. 1.1	CCR-03332	10/27/2017	All	CDRL SE-16 under Government Control. Harris DCN 7035538 PUG APX Rev F has been placed under Gov. GS control as GOES-R Series 416-R-PUG-APX-0350 Rev 1.1.
Rev. 2.0	CCR-03461	11/01/2018	All	CDRL SE-16 under Government Control. Harris DCN 7035538 PUG APX Rev G has been placed under Gov. GS control as GOES-R Series 416-R-PUG-APX-0350 Rev 2.0
Rev. 2.1	CCR-03511	08/08/2019	All	CDRL SE-16 under Government Control. Harris DCN 7035538 PUG APX Rev G.1 and G.2 have been placed under Gov. GS control as GOES-R Series 416-R-PUG-APX-0350 Rev 2.1. (Includes SW Baselines DO.07.01 and DO.07.02.)
Rev. 2.2	CCR-03554	12/17/2019	All	CDRL SE-16 under Government Control. Harris DCN 7035538 PUG APX Rev H and H.1 have been placed under Gov. GS control as GOES-R Series 416-R-PUG-APX-0350 Rev 2.2. (Includes SW Baselines DO.08.00.00 and DO.08.01.00.)
Rev. 2.3	CCR-03632	03/23/2021	All	CDRL SE-16 under Government Control. L3Harris DCN 7035538 PUG APX Revs J, J.1 and J.2 have been placed under Gov. GS control as GOES-R Series 416-R-PUG-APX-0350 Rev 2.3. (Includes SW Baselines DO.09.00.00 and DO.09.01.00.)

The document version number identifies whether the document is a working copy, final, revision, or update, defined as follows:

- **Working copy or Draft:** a document not yet finalized or ready for distribution; sometimes called a draft. Use 0.1A, 0.1B, etc. for unpublished documents.
- **Final:** the first definitive edition of the document. The final is always identified as Version 1.0.
- **Revision:** an edition with minor changes from the previous edition, defined as changes affecting less than one-third of the pages in the document. The version numbers for revisions 1.1 through 1.9, 2.1 through 2.9, and so forth. After nine revisions, any other changes to the document are considered an update. A revision in draft, i.e. before being re-baselined, should be numbered as 1.1A, 1.1B, etc.
- **Update:** an edition with major changes from the previous edition, defined as changes affecting more than one-third of the pages in the document. The version number for an update is always a whole number (Version 2.0, 3.0, 4.0, etc).



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# **PRODUCT DEFINITION AND USER'S GUIDE (PUG)**

## **APPENDIX X: ISO SERIES METADATA**

**FOR  
GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE  
R SERIES (GOES-R) CORE GROUND SEGMENT**

**CONTRACT NO: DG133E-09-CN-0094**

**DOCUMENT CONTROL NUMBER: 7035538**

**CDRL SE-16**

**REVISION J.1**

**01 JUNE 2020**

**PREPARED FOR  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NOAA LIAISON OFFICE/NASA GSFC  
GOES-R SERIES CODE 417  
BLDG. 6, RM. C100  
GREENBELT, MD 20771**

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### **NON-EXPORT CONTROLLED**

THESE ITEM(S) / DATA HAVE BEEN REVIEWED IN ACCORDANCE WITH THE INTERNATIONAL TRAFFIC IN ARMS REGULATIONS (ITAR), 22 CFR PART 120.11, AND THE EXPORT ADMINISTRATION REGULATIONS (EAR), 15 CFR 734(3)(b)(3), AND MAY BE RELEASED WITHOUT EXPORT RESTRICTIONS.

# PRODUCT DEFINITION AND USER'S GUIDE (PUG)

## APPENDIX X: ISO SERIES METADATA

### FOR GEOSTATIONARY OPERATIONAL ENVIRONMENTAL SATELLITE R SERIES (GOES-R) CORE GROUND SEGMENT

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**RECORD OF CHANGE**

<b>REVISION</b>	<b>DATE</b>	<b>DESCRIPTION</b>
C	06 December 2013	<p>Post-CDR Interim Release</p> <p>PTR-9218 Delivery_SE-16_Product Definition and User's Guide (PUG) Release Update Rev C</p> <p>1) Co-locate all ISO series metadata into a single document to improve usability of the PUG</p>
C.1	05 December 2014	<p>Post-CDR Interim Release</p> <p>Vol 1, Main:</p> <ul style="list-style-type: none"> <li>Added FITS format section (SUVI)</li> </ul> <p>Vol 2, L0:</p> <ul style="list-style-type: none"> <li>Minor editorial changes</li> </ul> <p>Vol 3, L1b:</p> <ul style="list-style-type: none"> <li>Revised Space Weather and Solar instrument sections</li> <li>Co-located Instrument Calibration Data with instrument section</li> </ul> <p>Vol 4, GRB:</p> <ul style="list-style-type: none"> <li>Revised Space Weather and Solar instrument sections</li> <li>Corrected APID list</li> </ul> <p>Vol 5, L2+:</p> <ul style="list-style-type: none"> <li>Combined Volumes 5A and 5B</li> <li>Added section for Latitude/Longitude grid (Radiation products)</li> <li>Added Appendix for dynamic source data</li> <li>Miscellaneous changes to CMI product</li> </ul> <p>Appendix X, ISO Series Metadata:</p> <ul style="list-style-type: none"> <li>Revised L1b, L2+, Instrument Calibration Data sections</li> </ul> <p>PTR-12388            UMB_Delivery_SE-16_Product Definition and User's Guide (PUG) Release Update Rev C.1</p> <ul style="list-style-type: none"> <li>Incorporates PTR-7028, PTR-7556, PTR-7557, PTR-7553, PTR-8055, PTR-8742, PTR-9027, PTR-9518, PTR-11701</li> <li>Combined Vol 5A and Vol 5B into a single volume</li> <li>Rearranged major sections of the document (consolidated File Naming conventions, consolidated APID lists, etc.), for usability</li> </ul> <p>PTR-7028</p>

REVISION	DATE	DESCRIPTION
		<p>Update Cumulative ERB/PCRB Changes in Next Rev of Document</p> <ul style="list-style-type: none"> <li>• ERB: delete the Rainfall Rate Coefficient Algorithm</li> <li>• PCRB: change GLM Lightning Event Peak L1b/GRB update</li> <li>• PCRB: change Radiation Grid from ABI Grid to Latitude/Longitude</li> </ul> <p>PTR-7556 Deferred Comments from Rev. B.2 Peer Review</p> <ul style="list-style-type: none"> <li>• Incorporate comments deferred from Revision B.2 Peer Review</li> </ul> <p>PTR-7753 SE-16: Updates to PUG Rev C for next Release</p> <ul style="list-style-type: none"> <li>• Fixed MAG L1b OMAS/GRB/PD periodicity</li> </ul> <p>PTR-8055 SE-16 PUG BCR # 127 + BCR #129 + BCR 124 + BCN_120 ATP for NcML/Product Definition for non-ABI Sensors + BCN_149, BCR 115 Update GLM L2 NcML + BCR 119 + BCR #127 and 129 (IPS and Product Set 1 NcML Corrections)</p> <ul style="list-style-type: none"> <li>• BCR#127: incorporated IPS Product NcML corrections</li> <li>• BCR#129: incorporated IPS and Product Set 1 NcML corrections</li> <li>• BCR#124: changed SUVI, SEISS, MAG NcML</li> <li>• BCN_120: NcML/product definition for non-ABI instruments</li> <li>• BCN_149 / BCR#115: updated GLM L2+ NcML definition</li> <li>• BCR#119: changed SUVI GLM INR report design</li> <li>• ECP-9a: added aggregation criteria for Geomagnetic Field, Solar Flux: X-Ray products</li> <li>• BCR#212: incorporated Product Set 2 NcML corrections</li> </ul> <p>PTR-8742 SE-16 PUG - Scheduled Science Instrument Products definitions</p> <ul style="list-style-type: none"> <li>• Updated SUVI, EXIS, SEISS, MAG, GLM product definitions</li> </ul> <p>PTR-9027 SE-16 PUG - Evaluate Customer Comments Against Rev B.2</p> <ul style="list-style-type: none"> <li>• Incorporated customer comments not previously addressed in PUG Rev C</li> </ul> <p>PTR-9518 SE-16 PUG, Evaluate Customer Comments from Rev C</p> <ul style="list-style-type: none"> <li>• Incorporated customer comments against PUG Rev C</li> </ul> <p>PTR-11701 SE-16 PUG - Update for BCR # 227, Non-ABI product Corrections</p>



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REVISION	DATE	DESCRIPTION
D	13 May 2015	<ul style="list-style-type: none"> <li>• Incorporated non-ABI Product NcML corrections</li> </ul> PTR-7557 UMB_Delivery_SE-16_Product Definition and User's Guide (PUG) Release Update Rev D <ul style="list-style-type: none"> <li>• Incorporate customer comments against PUG Rev C.1</li> </ul> PTR-13600 <ul style="list-style-type: none"> <li>• SE-16 PUG - Miscellaneous Corrections</li> </ul> Appendix X <ul style="list-style-type: none"> <li>• New content – L0 and GRB Info ISO Series Metadata</li> </ul> Vol 2, L0 <ul style="list-style-type: none"> <li>• Restructured to be consistent with other volumes</li> </ul> Vol 3, L1b <ul style="list-style-type: none"> <li>• New content – dynamic and semi-static processing parameters</li> </ul> Vol 4, GRB <ul style="list-style-type: none"> <li>• New content – GRB Information</li> </ul> Vol 5, L2+ <ul style="list-style-type: none"> <li>• New content – dynamic and semi-static processing parameters</li> </ul>
D.1	11 August 2015	PTR-14093 <ul style="list-style-type: none"> <li>• Change 132.8 Angstroms wavelength to 131.2 Angstroms in SUVI documentation</li> </ul> PTR-14107 <ul style="list-style-type: none"> <li>• Update various L2 product lineage issues</li> </ul> PTR-13638 <ul style="list-style-type: none"> <li>• Update document for ECP-023 new CONUS center points</li> </ul> PTR-14388 <ul style="list-style-type: none"> <li>• WR 757: SE-16: CMI – Update PUG to change scaling of band 7 to a max brightness temp of 400K</li> </ul>
D.2	24 March 2016	PUG release aligned with PC DO.03.00.00 software baseline.  PTR-14663 <ul style="list-style-type: none"> <li>• SE-16 PUG, Evaluate Customer Comments from Rev D</li> </ul> PTR-15294 <ul style="list-style-type: none"> <li>• SE-16 PUG, Add GRB-INFO-STATIC description</li> </ul> PTR-15324

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REVISION	DATE	DESCRIPTION
		<ul style="list-style-type: none"> <li>• SE-16 PUG - Misc. Updates to Sync with GS File Naming Conventions</li> </ul>
E	15 June 2016	<p>PUG release aligned with PC DO.04.00.00 software baseline.</p> <p>PTR-16585</p> <ul style="list-style-type: none"> <li>• SE-16 PUG - Miscellaneous Corrections</li> </ul> <p>PTR-16442</p> <ul style="list-style-type: none"> <li>• WR 1949: GLM appears to have Timing Artifacts (PUG Update)</li> </ul> <p>PTR-15605</p> <ul style="list-style-type: none"> <li>• WR 813: Space Weather products' enhancements requested by NCEI (SE-16 PUG) <ul style="list-style-type: none"> <li>• Add SEISS MPS-LO energy bounds/levels to differential_flux_energy_band_label variable value</li> </ul> </li> </ul> <p>PTR-15580</p> <ul style="list-style-type: none"> <li>• WR 1697: SE-16 PUG - Rainfall Rate Product DQF Valid Range is Incorrect</li> </ul> <p>PTR-15194</p> <ul style="list-style-type: none"> <li>• WR 1177: SE-16 Modify Product Definition User's Guide for expanded ABI L1b Radiance Limits</li> </ul>
E.1	4 November 2016	<p>PUG release aligned with PC DO.04.02.00 software baseline, except where otherwise noted.</p> <p>PTRDOC-15878      DO.05.00.00</p> <ul style="list-style-type: none"> <li>• WR 1552: SE-16 PUG - ABI L1b Instrument Calibration Data - Number of detector rows discrepancy</li> </ul> <p>PTRDOC-16363</p> <ul style="list-style-type: none"> <li>• WR 2261: SE-16 PUG - Provide documentation for CAL INR data file structures</li> </ul> <p>PTRDOC-16387      DO.05.00.00</p> <ul style="list-style-type: none"> <li>• WR 2218: SE-16 PUG - There are no ABI CCR results in the PM Generated ABI INR Report</li> </ul> <p>PTRDOC-16397      DO.05.00.00</p> <ul style="list-style-type: none"> <li>• WR 1937: SE-16 PUG - GLM L2+ product metadata errors</li> </ul> <p>PTRDOC-16639      DO.05.00.00</p> <ul style="list-style-type: none"> <li>• WR 1698: SE-16 PUG - Sea Surface Temperature Fill Value incorrect</li> </ul> <p>PTRDOC-16911      DO.05.00.00</p>

REVISION	DATE	DESCRIPTION
		<ul style="list-style-type: none"> <li>• WR 2961: SE-16 PUG - Update to clarify Rainfall Rate metadata</li> </ul> <p>PTRDOC-16936</p> <ul style="list-style-type: none"> <li>• WR 2566: SE-16 PUG - Add Derived Motion Winds PQI and Diagnostic Intermediate Products to the PUG</li> </ul> <p>PTRDOC-17008</p> <ul style="list-style-type: none"> <li>• WR 2749: SE-16 PUG - Update to reflect 2 minute EXIS L0 LZSS file aggregation time</li> </ul> <p>PTRDOC-17088</p> <ul style="list-style-type: none"> <li>• WR 2874: SE-16 PUG - Correct File Names of Instrument Calibration Files Produced</li> </ul> <p>PTRDOC-17123</p> <ul style="list-style-type: none"> <li>• WR 1739: SE-16 PUG - SUVI Instrument Calibration File Names</li> </ul> <p>PTRDOC-17254</p> <ul style="list-style-type: none"> <li>• WR 2962: SE-16 PUG - CMI Coefficients update-ADR 143</li> </ul> <p>PTRDOC-17416</p> <ul style="list-style-type: none"> <li>• WR 3058: SE-16 PUG - SUVI scale factors in products do not match scale factors in the PUG</li> </ul> <p>PTRDOC-17661</p> <ul style="list-style-type: none"> <li>• WR 3274: SE-16 PUG - Update to Align with XTCE Database v6.3.005A</li> </ul> <p>PTRDOC-17818      DO.06.00.00</p> <ul style="list-style-type: none"> <li>• WR 2260: SE-16 PUG - Derived Motion Winds (DMW) Wind Direction: Incorrect Direction</li> </ul>
E.2	30 March 2017	<p>PUG release aligned with GOES-R Ground Segment Product Capabilities (PG, PD, PM) software baselines, as follows:</p> <p style="padding-left: 40px;">DO.04.04.00: April 2017</p> <p style="padding-left: 40px;">DO.05.00.00: July 2017</p> <p style="padding-left: 40px;">DO.06.00.00: September 2017 (TBR)</p> <p>PTRDOC-17880      DO.05.00.00      Vol 5, Table 5.1.6.4-1.</p> <ul style="list-style-type: none"> <li>• WR 3383: SE-16 PUG - Changes for Expansion of CMI range to match DO.04 Rad-ADR 154</li> </ul> <p>PTRDOC-17887      DO.04.04.00      Vol 3, Section 5.0.1; Vol 4, Section 7.0.1; Vol 5, Section 5.0.1</p> <ul style="list-style-type: none"> <li>• WR 3483: SE-16 PUG - add explanation/instructions for converting 'seconds since epoch' to standard date/time</li> </ul>

REVISION	DATE	DESCRIPTION
		<p>PTRDOC-17995 DO.06.00.00 Vol 3, Table 5.3.2.5.1-11; Vol 4, Table 7.4.2.5.1-11.</p> <ul style="list-style-type: none"> <li>WR 3438: SE-16 PUG - Fix Incorrect Flag Definition in EXIS Files - ADR 159</li> </ul>
		<p>PTRDOC-18023 DO.06.00.00 Vol 5, Table 4.3.7-2.</p> <ul style="list-style-type: none"> <li>WR 2291: SE-16 PUG - GRIP is not showing full SRB image on GOES WEST</li> </ul>
		<p>PTRDOC-18057 DO.05.00.00 Vol 3, Sections D.7, D.8 and D.9.</p> <ul style="list-style-type: none"> <li>WR 3554: SE-16 PUG - Provide documentation for [CAL] INR data file structures (ABI, GLM, SUVI)</li> </ul>
		<p>PTRDOC-18090 DO.06.00.00 Vol 3, Section 5.1.4.1.</p> <ul style="list-style-type: none"> <li>WR 3433: SE-16 PUG - Include pixels with under-saturated sample contributors in ABI Sample Outlier files</li> </ul>
		<p>PTRDOC-18144 DO.06.00.00 Vol 5, Table 5.1.7.6-2.</p> <ul style="list-style-type: none"> <li>WR 3076: SE-16 PUG: DMW Output File is not CF Compliant-ADR 139 (PUG Changes)</li> </ul>
		<p>PTRDOC-18158 DO.06.00.00 Vol 3, Table 5.3.1.5-2; Vol 4, Table 7.4.1.5.2.</p> <ul style="list-style-type: none"> <li>WR 3078: SE-16 PUG: EXIS - Add total number of valid SPS measurements used - ADR 148</li> </ul>
		<p>PTRDOC-18191 DO.05.00.00 Vol 3, Table 5.3.1.5-2; Vol 4, Tables 7.4.1.5.1 and 7.4.1.5.2.</p> <ul style="list-style-type: none"> <li>WR 3568: SE-16 PUG: Revise EXIS EUVS-C Cadence - ADR 183 (PUG Updates)</li> </ul>
		<p>PTRDOC-18225 DO.05.00.00 Vol 3, Sections D.4 and D.5.</p> <ul style="list-style-type: none"> <li>WR 3324, 2989: SE-16 PUG - Update Documentation for MAG, SEISS CAL INR data file structures</li> </ul>
		<p>PTRDOC-18228 DO.06.00.00 Vol 3, Table 5.3.2.5-2; Vol 4, Table 7.4.2.5.2.</p> <ul style="list-style-type: none"> <li>WR 3571: SE-16 PUG: Add SUVI roll angle to EXIS XRS - ADR 147 (PUG Changes)</li> </ul>
		<p>PTRDOC-18259 DO.06.00.00 Vol 5, Table 5.21.6-2.</p> <ul style="list-style-type: none"> <li>WR 3222: SE-16 PUG - Land L2: FSC Metadata Issues-ADR 167</li> </ul>
		<p>PTRDOC-18406 DO.06.00.00 Vol 3, Table 5.5.1.5-2; Vol 4, Tables 7.6.1.5.1 and 7.6.1.5.2.</p>

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REVISION	DATE	DESCRIPTION
		<ul style="list-style-type: none"> <li>• WR 3429: SE-16 PUG - MAG Add IB and OB measurements in 4 coord frames-ADR 145</li> </ul> <p>PTRDOC-18441 DO.04.04.00 Vol 3, Table 5.1.3.6.3-2; Vol 4, Table 7.1.3.6.1.1-2.</p> <ul style="list-style-type: none"> <li>• WR 3804: SE-16 PUG: Bad Radiance-to-Brightness-Temp Conversion Coeffs</li> </ul> <p>PTRDOC-18608 DO.04.04.00 Vol 5, Table A.2-1, Section E.1.</p> <ul style="list-style-type: none"> <li>• WR 1264: SE-16 PUG: Change DMW Intermediate Product Filename (Data Short Name)</li> </ul> <p>PTRDOC-18646 DO.05.00.00 Vol 3, Tables 5.3.1.5-2, 5.4.4.5-1, 5.4.4.5-2, 5.4.4.5.2-4 and 5.4.6.2-1; Vol 4, Tables 7.4.1.5.1, 7.4.1.5.2, 7.5.4.5.1, 7.5.4.5.1.2-4 and 7.5.4.5.2.</p> <ul style="list-style-type: none"> <li>• WR 3918: SE-16 PUG: Removing Hyphens in EXIS and SEIS Vars and Attrs-ADR 207</li> </ul>
F	16 June 2017	<p>PTRDOC-18154 DO.06.00.00 Vol 3, section 5.0.2; Vol 4, section 7.0.2; Vol 5, section 5.0.2</p> <ul style="list-style-type: none"> <li>• WR 3725: SE-16 PUG - Add description of unsigned integer processing</li> </ul> <p>PTRDOC-18519 DO.06.00.00 Vol 3, Table 5.3.1.5-2, Table 5.4.4.5-2; Vol 5, Table 5.10.6-2</p> <ul style="list-style-type: none"> <li>• WR 3897: SE-16 PUG: Variable missing from XRS and SGPS files- ADR 211</li> </ul> <p>PTRDOC-18813 DO.06.00.00 Vol 3, Table 5.2.1.5.1-2, section 5.2.1.5.2, Table 5.2.1.5.4-5, Table 5.3.1.5-2, Table 5.3.1.5.2-7, Table 5.3.2.5-2, Table 5.3.2.5.1-15, Table 5.4.1.5-2, Table 5.4.1.5.2-9, Table 5.4.2.5-2, Table 5.4.2.5.2-5, Table 5.4.3.5-2, Table 5.4.3.5.2-6, Table 5.4.4.5-2, Table 5.4.4.5.2-6, Table 5.5.1.5-2, Table 5.5.1.5.2-3; Vol 4, Table 7.3.1.5.1.2-8, Table 7.3.1.5.2, Table 7.4.1.5.1.2-7, Table 7.4.1.5.2, Table 7.4.2.5.1.1-15, Table 7.4.2.5.2, Table 7.5.1.5.1.2-9, Table 7.5.1.5.2, Table 7.5.2.5.1.2-5, Table 7.5.2.5.2, Table 7.5.3.5.1.2-6, Table 7.5.3.5.2, Table 7.5.4.5.1.2-6, Table 7.5.4.5.2, Table 7.6.1.5.1.2-3, Table 7.6.1.5.2</p> <ul style="list-style-type: none"> <li>• WR 4164: SE-16 PUG: Space weather eclipse_flag flags do not capture all possible states</li> </ul> <p>PTRDOC-18819 DO.06.00.00 Vol 4, section 4.1, section 4.3</p> <ul style="list-style-type: none"> <li>• WR 4139: SE-16 PUG: GRB Default Modem Configuration - QPSK</li> </ul>

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		<p>PTRDOC-18879 DO.06.00.00 Vol 4, section 2.0, section 5.0, section 6.0, section 6.2.6.3, section 7.1.3.6, section 7.3.1.5</p> <ul style="list-style-type: none"> <li>WR 4179: SE-16 PUG: ABI L1b metadata sent prior to end of scene in GRB</li> </ul> <p>PTRDOC-18890 DO.06.00.00 Vol 4, Table A</p> <ul style="list-style-type: none"> <li>WR 3511: SE-16 PUG: Add statement on CCSDS reserved APIDs to the PUG</li> </ul> <p>PTRDOC-18907 DO.06.00.00 Vol 3, section 5.3.1.1; Vol 4, section 7.4.1.1</p> <ul style="list-style-type: none"> <li>WR 3257: SE-16 PUG: Resolve Time Stamp Error in EXIS Files-ADR 158</li> </ul> <p>PTRDOC-18910 DO.06.00.00 Vol 3, Table 5.3.1.5-2; Vol 4, Table 7.4.1.5.1, Table 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>WR 4205: SE-16 PUG: EXIS EUVS long name corrections-ADR278</li> </ul> <p>PTRDOC-18951 DO.06.00.00 Vol 3, Table 5.6.2.2-1</p> <ul style="list-style-type: none"> <li>WR 3407: SE-16 PUG: GLM Background Image Metadata Differences from PUG</li> </ul> <p>PTRDOC-18955 DO.06.00.00 Vol 1 – 5, Appendix X, several sections and tables</p> <ul style="list-style-type: none"> <li>WR 4263: BCR_591 ATP for ECP-029, SE-16: ECP-029 - Update Product Users Guide (PUG) for Mode 6 functionality</li> </ul> <p>PTRDOC-19131 DO.07.00.00 Vol 3, Table 5.2.1.1-1, Table 5.2.1.5.3-1, Table 5.2.1.5.4-2, Table A.1; Vol 4, Table 7.3.1.1-1, Table 7.3.1.5.1.1-1, Table 7.3.1.5.1.2-2</p> <ul style="list-style-type: none"> <li>WR 4023: SE-16 PUG: SUVI short exposure time - Long term fix - ADR 199</li> </ul> <p>PTRDOC-19350 DO.06.00.00 Vol 3, Table 5.3.1.5.2-3, Table 5.3.2.5.1-3; Vol 4, Table 7.4.1.5.1.2-3, Table 7.4.2.5.1.1-3</p> <ul style="list-style-type: none"> <li>WR 4540: SE-16 PUG: EUVS and EXIS Processing and Data Quality Flag Meanings</li> </ul>
F.1	29 November 2017	<p>PTRDOC-19542 DO.06.00.00 Vol 5, Table 4.3.6, Table 4.3.7-2, Table 4.3.7-3</p> <ul style="list-style-type: none"> <li>WR 4182: SE-16 PUG: Displaced full disk Radiation data, Displaced CONUS radiation data - ADR 241, 242</li> </ul> <p>PTRDOC-18158 DO.06.00.00 Vol 3, Table 5.3.1.5-2; Vol 4, Table 7.4.1.5.1; Vol 4, Table 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>WR 3078: SE-16 PUG: EXIS - Add total number of valid SPS measurements used - ADR 148</li> </ul>

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		<p>PTRDOC-19760 DO.06.00.00 Vol 3, Table D.6-1</p> <ul style="list-style-type: none"> <li>WR 4709: SE-16 PUG: Incorporate GLM CalINR Tech Memo Rev A Changes (GLM CDRL-79 Rev H)</li> </ul> <p>PTRDOC-20567 DO.06.00.00 Vol 3, Table D.2-1</p> <ul style="list-style-type: none"> <li>WR 3812: SE-16 PUG: Incorporate SUVI CalINR Tech Memo Changes - SUVI CDRL-80 Rev G</li> </ul> <p>PTRDOC-18521 DO.06.00.00 Vol 4, Section 4.4.2.1; Vol 4, Figure 4.4.2.1</p> <ul style="list-style-type: none"> <li>WR 3904: SE-16 PUG: GRB primary header SCID mismatch with SANA registry and PUG</li> </ul> <p>PTRDOC-19877 DO.06.00.00 Vol 4, Table 7.2.1.6.2; Vol 5, Table 5.26.6-2</p> <ul style="list-style-type: none"> <li>WR 2691: SE-16 PUG: Abnormally large group areas in GLM L2+ products</li> </ul> <p>PTRDOC-19295 DO.06.00.00 Vol 5, Table 5.1.6.3-2 WR 4466: SE-16 PUG: No downscaling method given in multiband CMI files - ADR 262</p>
F.2	09 May 2018	<p>PTRDOC-19357 DO.06.03.00 Vol 1, Table 2.0; Vol 3, Table 5.3.1.5-2, Table 5.3.1.5.2-8; Vol 4, Table 7.4.1.5.1.2-1, Table 7.4.1.5.1.2-5, Table 7.4.1.5.2, Table 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>WR 4208: SE-16 PUG: EXIS/EUVS Data Quality Flags Conditions</li> </ul> <p>PTRDOC-19843 DO.06.03.00 Vol 5, Tables 5.1.6.3-2 and 5.1.6.4-1</p> <ul style="list-style-type: none"> <li>WR 4883: SE-16 PUG: ABI L2 SCMI Expansion of Valid Range - PRO Rel Type 2</li> </ul> <p>PTRDOC-19919 DO.06.03.00 Vol 3, Table 5.3.1.5-2</p> <ul style="list-style-type: none"> <li>WR 4399: SE-16 PUG: Update PUG for EUVS L1b files have no UNLIMITED dimension</li> </ul> <p>PTRDOC-20181 DO.06.03.00 Vol 3, Table 5.3.1.5-2, Table 5.3.1.5.2-14; Vol 4, Table 7.4.1.5.1, Table 7.4.1.5.1.2-1, Table 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>WR 4080: SE-16 PUG: Add Primary C Active and Secondary C Active flags to EXIS/EUVS-C</li> </ul> <p>PTRDOC- 20304 DO.06.03.00 Vol 3, Table 5.5.1.5-2; Vol 4, Table 7.6.1.5.2</p> <ul style="list-style-type: none"> <li>WR 4759: SE-16 PUG: Change MAG variable name number_samples_per_report-ADR 395 - PRO Rel Type 1</li> </ul> <p>PTRDOC- 20342 DO.06.03.00 Vol 3, Table 5.3.1.5.2-8, Table 5.3.1.5.2-10, Table 5.3.1.5.2-11, Table 5.3.2.5-2; Vol 4, Table 7.4.1.5.1.2-1, Table 7.4.1.5.1.2-5, Table 7.4.1.5.1.2-6</p>

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		<ul style="list-style-type: none"> <li>• WR 5141: SE-16 PUG: EXIS Flag issues-ADR 459-Pro Release Type 2</li> </ul> <p>PTRDOC- 20466 DO.06.03.00 Vol 3, Table 5.3.1.5-2, Table 5.3.2.5-2; Vol 4, Table 7.4.1.5.1, Table 7.4.2.5.1, Table 7.4.2.5.2</p> <ul style="list-style-type: none"> <li>• WR 4598: SE-16 PUG: Update PUG for EXIS _Unsigned attribute change-ADR 355</li> </ul> <p>PTRDOC- 20467 DO.06.03.00 Vol 3, Table 5.3.1.5-2; Vol 4, Table 7.4.1.5.1</p> <ul style="list-style-type: none"> <li>• WR 3568: SE-16 PUG: Revise EXIS EUVS-C Cadence - ADR 183</li> </ul> <p>PTRDOC-20626 DO.06.03.00 Vol 3, Table 5.3.2.5-2; Vol 4, Table 7.4.2.5.1, Table 7.4.2.5.2</p> <ul style="list-style-type: none"> <li>• WR 5096: SE-16 PUG: EXIS XRS Modify irradiance long names-ADR 446-PRO Release Type 1</li> </ul> <p>PTRDOC-20667 DO.06.03.00 Vol 3, Table 5.4.4.5-2, Table D.4-3; Vol 4, Table 7.5.4.5.1, Table 7.5.4.5.2</p> <ul style="list-style-type: none"> <li>• WR 4864: SE-16 PUG: SEISS - Add SGPS Temperatures to L1b product-ADR 405 PRO Rel Type 2</li> </ul> <p>PTRDOC-20873 DO.06.03.00 Vol 3, Table 5.3.1.5-2, Table 5.3.1.5.2-2, Table 5.3.1.5.2-5, Table 5.3.1.5.2-7, Table 5.3.1.5.2-9, Table 5.3.1.5.2-11, Table 5.3.2.5.1-4; Vol 4, Table 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>• WR 4719: SE-16 PUG: EXIS L1b Data Quality Flag Additional Definition Info - ADR 366</li> </ul> <p>PTRDOC- 20965 DO.06.03.00 Vol 3, Table D.3-4, Table D.3-5, Table D.3-6</p> <ul style="list-style-type: none"> <li>• WR 5206: SE-16 PUG: Incorporate EXIS CalINR Tech Memo Rev B Changes - compliance with EXIS CDRL-79 Rev G</li> </ul> <p>PTRDOC-21089 DO.06.03.00 Vol 3, Table 5.3.1.5-2; Vol 4, Table 7.4.1.5.1, Table 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>• WR 5097: SE-16 PUG: EXIS EUVS fix units for line variables - ADR 447</li> </ul> <p>PTRDOC- 21119 DO.06.03.00 Vol 3, Table 5.3.1.5-1, Table 5.3.1.5-2; Vol 4, Table 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>• WR 5334: SE-16 PUG: EXIS EUVS Add bandpasses for lines-ADR 448-PRO Release Type 1</li> </ul> <p>PTRDOC- 21212 DO.06.03.00 Vol 3, Table 5.3.1.5-2, Table 5.3.2.5-2; Vol 4, Table 7.4.1.5.2, Table 7.4.2.5.2</p>



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		<ul style="list-style-type: none"> <li>WR 5688: SE-16 PUG: Change EXIS au_factor range - ADR 543-PRO Release Type 1</li> </ul>
G	16 August 2018	<p>PTRDOC-18254 DO.07.00.00 Vol 5, Section 5.2.1</p> <ul style="list-style-type: none"> <li>WR 2702: SE-16 PUG: ABI Cloud Mask (ACM) Algorithm Metadata Issues</li> </ul> <p>PTRDOC-18906 DO.07.00.00 Vol 3, Table 5.3.1.5-2; Vol 4, Table 7.4.1.5.1</p> <ul style="list-style-type: none"> <li>WR 3569: SE-16 PUG: EXIS - Add high-resolution EUVS data ADR 174</li> </ul> <p>PTRDOC-19627 DO.07.00.00 Volume 3; Volume 4; Volume 5; Appendix X</p> <ul style="list-style-type: none"> <li>WR 4597: SE-16 PUG: L2 CMI Metadata issue - ADR 315</li> </ul> <p>PTRDOC-19832 DO.07.00.00 Vol 4, Table 7.2.1.6.1.1, .2, .3, Table 7.2.1.6.2, Table 7.2.1.6.1.1, .2; Vol 5, Section 5.26.5, Table 5.26.6-2</p> <ul style="list-style-type: none"> <li>WR 4507: SE-16 PUG: Incorporate GLM L2+ time variable changes - ADR 338</li> </ul> <p>PTRDOC-19853 DO.07.00.00 Vol 5, Table 5.17.6-2, Table E.1.2-1</p> <ul style="list-style-type: none"> <li>WR 4186: SE-16 PUG: DMW product format changes</li> </ul> <p>PTRDOC-20321 DO.07.00.00 Vol 3, Table D.2-1</p> <ul style="list-style-type: none"> <li>WR 4921: SE-16 PUG: Incorporate SUVI CalINR Tech Memo Rev B Changes - Contamination Correction</li> </ul> <p>PTRDOC-20456 DO.07.00.00 Vol 3, Table 5.5.1.5-2; Vol 4, Table 7.6.1.5.1.2-1</p> <ul style="list-style-type: none"> <li>WR 5133, 5134: SE-16 PUG: Add MAG L1b GEOF arcjet firing and shadow DQFs-ADR 449, 450</li> </ul> <p>PTRDOC-20777 DO.07.00.00 Vol 3, Section D.7</p> <ul style="list-style-type: none"> <li>WR 5520: SE-16 PUG: Incorporate ABI [Cal] INR Tech Memo Rev 1 Changes</li> </ul> <p>PTRDOC-20819 DO.07.00.00 Vol 5, Table 5.11.2-1, Table 5.11.2-2, Table 5.11.3, Table C.1, Table C.2-1, Table D.1</p> <ul style="list-style-type: none"> <li>WR 4694: SE-16 PUG: VolAsh updates from beta PS-PVR-ADR 388 - PRO Release Type 1</li> </ul> <p>PTRDOC-20866 DO.07.00.00 Vol 4, Table 7.2.1.6.2; Vol 5, Table 5.26.6-2</p> <ul style="list-style-type: none"> <li>WR 4696: SE-16 PUG: Group and flash areas GLM L2 - ADR 382</li> </ul>

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		PTRDOC-20967 DO.07.00.00 Vol 3, Section D.5 <ul style="list-style-type: none"> <li>WR 5133: SE-16 PUG: Incorporate MAG CalINR Tech Memo Rev C Changes - Arcjet firing/not firing flag</li> </ul>
		PTRDOC-21118 DO.07.00.00 Vol 5, Table 5.23.2-1, Table C.1, Table C.2-1, Table D.1 <ul style="list-style-type: none"> <li>WR 5425: SE-16 PUG: Incorrect variable attributes in SST netCDF files-ADR 495-PRO Release Type 1</li> </ul>
		PTRDOC-21210 DO.07.00.00 Vol 5, Table 5.12.6-2, Table C.2-2 <ul style="list-style-type: none"> <li>WR 5337: SE-16 PUG 101-Pressure Level Table is Inverted - ADR 487-PRO Release Type 1</li> </ul>
		PTRDOC-21334 DO.07.00.00 Vol 5, Section 5.23.5 <ul style="list-style-type: none"> <li>WR 4925, 4596: SE-16 PUG: SST Algorithm Changes - ADR 271, 270 - PRO Release Type 1</li> </ul>
		PTRDOC-21335 DO.07.00.00 Vol 5, Table 5.19.6-2 <ul style="list-style-type: none"> <li>WR 4638: SE-16 PUG: Fire Product Mask Value - ADR 349 - PRO Release Type 1</li> </ul>
		PTRDOC-21421 DO.07.00.00 Vol 5, Table 5.9.6.1-4 <ul style="list-style-type: none"> <li>WR 5393: SE-16 PUG: ADP Additional Data Quality Flags - ADR 394 - PRO Release Type 1</li> </ul>
		PTRDOC-21468 DO.07.00.00 Vol 5, Table 5.19.6.1-1 <ul style="list-style-type: none"> <li>WR 5578: SE-16 PUG: L2 Fire Product - Add New Mask Value - ADR 548 - PRO Release Type 1</li> </ul>
		PTRDOC-21469 DO.07.00.00 Vol 5, Table 5.9.2-1 <ul style="list-style-type: none"> <li>WR 5508: SE-16 PUG: ADP Additional Input Data - ADR 496 - PRO Release Type 1</li> </ul>
		PTRDOC-21545 DO.07.00.00 Vol 3 (multiple products); Vol 3, Table D.3-1 <ul style="list-style-type: none"> <li>WR 5370: SE-16 PUG: LUT Filenames not Traceable to Metadata-ADR 267-PRO Release Type 2</li> </ul>
		PTRDOC-21636 DO.07.00.00 Vol 3, Table A.6; Vol 5, Table A.4 <ul style="list-style-type: none"> <li>WR 5213: SE-16 PUG: Update Algorithm Package File Names</li> </ul>
		PTRDOC-21802 DO.07.00.00 Vol 5, Table 5.20.6-2 <ul style="list-style-type: none"> <li>WR 4511: SE-16 PUG: Update LST variable attributes - ADR 340 - PRO Release Type 1</li> </ul>
		PTRDOC-21839 DO.07.00.00 Vol 5, Table 5.10.2-1

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		<ul style="list-style-type: none"> <li>WR 5863: SE-16 PUG: AOD algorithm updates for provisional status - ADR 498 - PRO Release Type 1</li> </ul> PTRDOC-21902 DO.07.00.00 Vol 5, Table 5.2.4, Table 5.2.6-2 <ul style="list-style-type: none"> <li>WR 6199: SE-16 PUG: Percentages for clear/probably clear/probably cloud - ADR 45</li> </ul>
G.1	14 February 2019	PTRDOC-20546 DO.07.01.00 Vol 3, Tables 5.3.1.5-2, 5.3.2.5-2, 5.4.2.5-2, 5.4.3.5-2, 5.4.4.5-2; Vol 4, Tables 7.4.1.5.1, 7.4.1.5.2, 7.4.2.5.1, 7.4.2.5.2, 7.5.2.5.1, 7.5.2.5.2, 7.5.3.5.1, 7.5.3.5.2, 7.5.4.5.1, 7.5.4.5.2 <ul style="list-style-type: none"> <li>WR 4552: SE-16 PUG: Clarifying Space Weather Time Stamp Definitions-ADR 176</li> </ul> PTRDOC-22064 DO.07.01.00 Vol 3, Table 5.3.2.5-2; Vol 4, Table 7.4.2.5.2 <ul style="list-style-type: none"> <li>WR 5859: SE-16 PUG: EXIS roll angle - ADR 590</li> </ul> PTRDOC-22475 DO.07.01.00 Vol 3, Table 5.3.2.5-2; Vol 4, Table 7.4.2.5.2 <ul style="list-style-type: none"> <li>WR 6480: SE-16 PUG: Update valid_range for EXIS/XRS Currents and Irradiances variables - ADR 779</li> </ul> PTRDOC-22579 DO.07.01.00 Vol 3, Table 5.3.1.5-2; Vol 4, Tables 7.4.1.5.1, 7.4.1.5.2 <ul style="list-style-type: none"> <li>WR 3569: SE-16 PUG: EXIS - Add high-resolution EUVS data ADR 174 - Fix Fail</li> </ul>
G.2	08 March 2019	PTRDOC-22481 DO.07.02.00 Vol 3, Tables 5.1.3.6.1-2, 5.1.3.6.2-2, 5.1.3.6.4, D.1-7 Vol 4, Tables 7.1.3.6.1.2, 7.1.3.6.2.1, 7.1.3.6.2.2 Vol 5, Tables 5.1.6.1-2, 5.1.6.2-2, 5.1.6.3-2, 5.1.6.5 <ul style="list-style-type: none"> <li>WR 6582: SE-16 PUG: ABI L1b and L2+ CMI temperature data quality flag (TDQF) - ADR 827</li> </ul> PTRDOC-22268 DO.07.02.00 Vol 3, Table D.1-5 <ul style="list-style-type: none"> <li>WR 6348: SE-16 PUG: Updates for ABI CDRL-80 Rev G and CDRL-79 - ADR 741</li> </ul>
H	14 June 2019	PTRDOC-20431 DO.08.00.00 Vol 3, Tables 5.2.1.5.1-2, 5.2.1.5.2-1 Vol 4, Table 7.3.1.5.2 <ul style="list-style-type: none"> <li>WR 4551: SE-16 PUG: SUVI Radiometric Metadata Update-ADR 311</li> </ul> PTRDOC- 20569 DO.08.00.00

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		<p>Vol 3, Table 5.2.1.5.2-1</p> <ul style="list-style-type: none"> <li>WR 4538: SE-16 PUG: SUVI FITS Headers Do Not Fully Match PUG-ADR 341</li> </ul> <p>PTRDOC- 20610 DO.08.00.00 Vol 5, Section 5.24.1; Table 5.24.6-2; Section 5.25.1; Table 5.25.6-2</p> <ul style="list-style-type: none"> <li>WR 4138: SE-16 PUG: Incorrect Solar Zenith Angle stats in DSR metadata</li> </ul> <p>PTRDOC- 21156 DO.08.00.00 Vol 3, Tables 5.1.4.2-2, 5.1.4.2.1-1, 5.1.4.2.1-3</p> <ul style="list-style-type: none"> <li>WR 6008: SE-16 PUG has inaccurate description of Sample Outlier File product, ADR 593</li> </ul> <p>PTRDOC- 21855 DO.08.00.00 Vol 3, Tables 5.2.1.5.1-2, 5.2.1.5.2-1 Vol 4, Table 7.3.1.5.2</p> <ul style="list-style-type: none"> <li>WR 3012: SE-16 PUG: SUVI FITS headers: feature requests, and points that require clarification</li> </ul> <p>PTRDOC- 21864 DO.08.00.00 Vol 3, Tables 5.3.1.5-2, 5.3.2.5-2, 5.4.1.5-2, 5.4.2.5-2, 5.4.3.5-2, 5.4.4.5-2, 5.5.1.5-2 Vol 4, Tables 7.4.1.5.1, 7.4.1.5.2, 7.4.2.5.1, 7.4.2.5.2, 7.5.1.5.1, 7.5.1.5.2, 7.5.2.5.1, 7.5.2.5.2, 7.5.3.5.1, 7.5.3.5.2, 7.5.4.5.1, 7.5.4.5.2, 7.6.1.5.1, 7.6.1.5.2</p> <ul style="list-style-type: none"> <li>WR 6078: SE-16 PUG: Update MAG, SEISS and EXIS for Leap Seconds - ADR 625 - PRO Release Type 2</li> </ul> <p>PTRDOC- 22028 DO.08.00.00 Vol 3, Table 5.3.1.5-2 Vol 4, Table 7.4.1.5.1, 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>WR 6280: SE-16 PUG: Remove EUVS daily averages - ADR 715 - PRO Type 1</li> </ul> <p>PTRDOC- 22029 DO.08.00.00 Vol 3, Table 5.2.1.5.1-2, 5.4.1.5-2, 5.4.2.5-2, 5.4.3.5-2, 5.4.4.5-2, 5.5.1.5-2 Vol 4, Tables 7.3.1.5.2, 7.5.1.5.2, 7.5.2.5.2, 7.5.3.5.2, 7.5.4.5.2, 7.6.1.5.2</p> <ul style="list-style-type: none"> <li>WR 6235: SE-16 PUG: Reformat SpWx (MAG, SEISS, SUVI) L1b variables with _Unsigned Attribute - ADR 204</li> </ul> <p>PTRDOC- 22087 DO.08.00.00 Vol 3, Table 5.2.1.5.1-2 Vol 4, Table 7.3.1.5.2</p> <ul style="list-style-type: none"> <li>WR 6148: SE-16 PUG: SUVI CSYER1 and CSYER2 Variable Range Error - ADR 712</li> </ul> <p>PTRDOC- 22094 DO.08.00.00 Vol 5, Table 5.11.6-2</p>

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		<ul style="list-style-type: none"> <li>• WR 5959: SE-16 PUG: Volcanic Ash Product - Volcanic ash mass loading has values out of range - ADR 257</li> </ul> <p>PTRDOC- 22095      DO.08.00.00 Vol 5, Table 5.23.6-2</p> <ul style="list-style-type: none"> <li>• WR 5943: SE-16 PUG: Sea Surface Temperature Product - typo in night_solar_zenith_angle_bounds - ADR 53</li> </ul> <p>PTRDOC- 22133      DO.08.00.00 Vol 3, Table D.5-1 Vol 5, Tables 5.11.6-1, 5.19.6.1-1</p> <ul style="list-style-type: none"> <li>• WR 5943: SE-16 PUG: PUG Rev G Errata – ADR 53</li> </ul> <p>PTRDOC- 22228      DO.08.00.00 Vol 3, Tables D.6-1, D.6-2, D.9-4, D.9-7, D.9-8</p> <ul style="list-style-type: none"> <li>• WR 6217: SE-16 PUG: Updates to GLM Cal INR from CDRL 79 Rev J – ADR 728</li> </ul> <p>PTRDOC- 22494      DO.08.00.00 Vol 3, Tables 5.1.3.6.1-1, 5.1.3.6.2-1 Vol 4, Tables 7.1.3.6.2.1, 7.1.3.6.2.2, 7.2.1.6.2, 7.3.1.5.2, 7.4.1.5.2, 7.4.2.5.2, 7.5.1.5.2, 7.5.2.5.2, 7.5.3.5.2, 7.5.4.5.2, 7.6.1.5.2 Vol 5, Table 5.26.6-1</p> <ul style="list-style-type: none"> <li>• WR 6096: SE-16 PUG: LUT Filenames not Traceable to Metadata - ABI GLM - ADR 687 PRO Type2</li> </ul> <p>PTRDOC- 22722      DO.08.00.00 Vol 4, Table 7.2.1.6.2 Vol 5, Table 5.26.6-2</p> <ul style="list-style-type: none"> <li>• WR 6681: SE-16 PUG: GLM L2 Lightning needs _Unsigned on time offsets - ADR 844</li> </ul> <p>PTRDOC- 22854      DO.08.00.00 Vol 5, Table E.1.1-1</p> <ul style="list-style-type: none"> <li>• WR 5414: SE-16 PUG: Time variables in DMW Diagnostic data not set – ADR 344</li> </ul> <p>PTRDOC- 22944      DO.08.00.00 Vol 3, Tables 5.4.2.5.1-2, 5.4.3.5.1-3 Vol 4, Tables 7.5.2.5.1.1-2, 7.5.3.5.1.1-3</p> <ul style="list-style-type: none"> <li>• WR 6854: Update PUG with SEISS MPS Angular Zone Info-ADR 845</li> </ul> <p>PTRDOC- 23103      DO.08.00.00 Vol 3, Section 5.1.2.3; Tables 5.1.2.7-2, 5.1.2.7-3, 5.1.2.7-4, 5.1.2.7-5, 5.1.2.8; Section 5.1.2.9 Vol 4, Section 7.1.2.3; Tables 7.1.2.3-3, 7.1.2.3-4, 7.1.2.3-5, 7.1.2.7-2, 7.1.2.7-3, 7.1.2.7-4, 7.1.2.7-5, 7.1.2.8; Section 7.1.2.9; Table 7.2.1.1-1; Section 7.2.1.3</p>

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		<p>Vol 5, Section 4.2.3; Tables 4.2.3-3, 4.2.3-4, 4.2.3-5, 4.2.7-2, 4.2.7-3, 4.2.7-4, 4.2.7-5, 4.2.8; Section 4.2.9; Table 4.3.7-3; Section 4.3.8; Tables 4.3.8, 5.26.1-1, E.1.2-1</p> <ul style="list-style-type: none"> <li>WR 5573: SE-16 PUG: Change GOES-East nominal satellite subpoint in metadata-ADR 540-PRO Release Type 1</li> </ul> <p>PTRDOC- 23380 DO.08.00.00 Vol 2, Tables 4.1.1, 4.2.1, 4.4.1, 4.5.1, 4.6.1</p> <ul style="list-style-type: none"> <li>WR 5512: SE-16 PUG: Space Weather APIDs - ADR 523</li> </ul>
H.1	24 September 2019	<p>PTRDOC-22111 DO.08.01.00 Vol 3, Tables 5.5.1.5-2, 5.5.1.5.2-1, D.5-1 Vol 4, Tables 7.6.1.5.1, 7.6.1.5.1.2-1, 7.6.1.5.2</p> <ul style="list-style-type: none"> <li>WR 6136: SE-16 PUG: MAG Product Updates for arcjet firing – ADR 610</li> </ul> <p>PTRDOC-22368 DO.08.01.00 Vol 3, Tables 5.2.1.5.2-1, 5.2.1.5.3-1, D.2-1 Vol 4, Tables 7.3.1.5.1.1-1, 7.3.1.5.2</p> <ul style="list-style-type: none"> <li>WR 6347: SE-16 PUG: Updates for SUVI Dynamic Scale and Offset - ADR 588</li> </ul> <p>PTRDOC-22631 DO.08.01.00 Vol 3, Table 5.2.1.5.2-1 Vol 4, Table 7.3.1.5.2</p> <ul style="list-style-type: none"> <li>WR 5924: SE-16 PUG: SUVI Image Serial Number – ADR 614</li> </ul> <p>PTRDOC-22706 DO.08.01.00 Vol 3, Table D.5-1</p> <ul style="list-style-type: none"> <li>WR 6579: SE-16 PUG: Update Mag Shadow Flag Alg to Rev A - ADR 821</li> </ul> <p>PTRDOC-22749 DO.08.01.00 Vol 3, Section D.2; Tables 5.2.1.5.1-2, 5.2.1.5.2-1, 5.2.1.5.4-4, 5.2.1.5.4-5, D.2-1 Vol 4, Tables 7.3.1.5.1.2-6, 7.3.1.5.1.2-7, 7.3.1.5.2</p> <ul style="list-style-type: none"> <li>WR 6345: SE-16 PUG: SUVI Remove Automated Contamination – ADR 714</li> </ul> <p>PTRDOC-22800 DO.08.01.00 Vol 3, Tables D.2-1, D.2-1</p> <ul style="list-style-type: none"> <li>WR 6643: SE-16 PUG: Update SUVI Cal INR Structure for CDRL-80 Rev J Changes – ADR 690</li> </ul> <p>PTRDOC-22956 DO.08.01.00 Vol 3, Tables 5.2.1.5.1-2, 5.2.1.5.4-1, D.2-1 Vol 4, Tables 7.3.1.5.1.2-1, 7.3.1.5.2</p>

REVISION	DATE	DESCRIPTION
		<ul style="list-style-type: none"> <li>• WR 6709: SE-16 PUG: Update SUVI DQF and Cal INR Structure for Despiking – ADR 309</li> </ul> <p>PTRDOC-22996 DO.08.01.00 Vol 3, Sections 5.2.1.2, 5.3.1.2, 5.3.2.2, 5.4.1.2, 5.4.2.2, 5.4.3.2, 5.4.4.2, 5.5.1.2; Tables 5.2.1.5.1-2, 5.3.1.5-2, 5.3.2.5-2, 5.4.1.5-2, 5.4.2.5-2, 5.4.3.5-2, 5.4.4.5-2, 5.5.1.5-2 Vol 4, Tables 7.3.1.5.2, 7.4.1.5.2, 7.4.2.5.2, 7.5.1.5.2, 7.5.2.5.2, 7.5.3.5.2, 7.5.4.5.2, 7.6.1.5.2</p> <ul style="list-style-type: none"> <li>• WR 6065: SE-16 PUG: Revise algorithm_container attributes (EXIS, SEISS, MAG and SUVI L1b) – ADR 612</li> </ul> <p>PTRDOC-23056 DO.08.01.00 Vol 3, Table 5.3.2.5-2 Vol 4, Tables 7.4.2.5.1, 7.4.2.5.2</p> <ul style="list-style-type: none"> <li>• WR 6734: SE-16 PUG: XRS packet count - ADR 795</li> </ul> <p>PTRDOC-23061 DO.08.01.00 Vol 3, Tables 5.3.1.5-2, 5.3.1.5.2-3 Vol 4, Tables 7.4.1.5.1.2-2, 7.4.1.5.2</p> <ul style="list-style-type: none"> <li>• WR 6279: SE-16 PUG: EXIS/EUVS CaseNumber flag meanings - ADR 713 - PRO Type 1</li> </ul> <p>PTRDOC-23136 DO.08.00.01 Vol 3, Sections 5.1.3.3, 5.1.3.5; Tables D.1-2, D.1-4, D.1-7, D.1-10 Vol 4, Sections 7.1.3.3, 7.1.3.5</p> <ul style="list-style-type: none"> <li>• WR 6907: SE-16 PUG: ABI Predictive Calibration Algorithm - ADR 893</li> </ul> <p>PTRDOC-23355 DO.08.01.00 Vol 3, Table D.3-6</p> <ul style="list-style-type: none"> <li>• WR 6735: SE-16 PUG: EXIS/EUV/EUVS-C Cal INR LUT Change - ADR 862</li> </ul> <p>PTRDOC-23532 DO.08.01.00 Vol 4, Section 7.1.3.6.2.3; Tables 7.1.3.6.2.3, Table A, Table A.1-2</p> <ul style="list-style-type: none"> <li>• WR 7127: SE-16 PUG: Document Focal Plane Temperatures in GRB feed - ADR 963</li> </ul> <p>PTRDOC-23801 DO.08.00.02 Vol 3, Table D.1-7</p> <ul style="list-style-type: none"> <li>• WR 7202: SE-16 PUG: ABI Predictive Calibration Algorithm Changes for CDRL-80 Rev J - ADR 979</li> </ul>
J	13 February 2020	<p>PTRDOC-19210 DO.09.00.00 Vol 3, Tables 5.1.3.6.x-1 Vol 4, Tables 7.1.3.6.2.1, 7.1.3.6.2.2, 7.2.1.6.2 Vol 5, Tables 5.1.6.x-1, 5.2.6-2, 5.2.6.1-2, 5.19.6-2, 5.20.6-2, 5.25.6-2</p>

01 June 2020

REVISION	DATE	DESCRIPTION
		<ul style="list-style-type: none"> <li>• WR 3674: SE-16 PUG: Some L2+ Products Not CF Compliant-ADR 179</li> </ul> <p>PTRDOC-22415 DO.09.00.00 Vol 5, Tables 5.24.2-2, 5.24.6-2, 5.25.6-2</p> <ul style="list-style-type: none"> <li>• WR 5862: SE-16 PUG: Updates for SRB Products (DSR and RSR) - ADR 497</li> </ul> <p>PTRDOC-23057 DO.09.00.00 Vol 5, Table 5.9.2-2, 5.9.6-2</p> <ul style="list-style-type: none"> <li>• WR 6680: SE-16 PUG: ADP updates needed for Provisional status - ADR 735 - PRO Type 1</li> </ul> <p>PTRDOC-23134 DO.09.00.00 Vol 3, Tables A.5, A.6 Vol 4, Sections C.1, C.2 Vol 5, Tables A.3-1, A.3-2, A.4</p> <ul style="list-style-type: none"> <li>• WR 6658: SE-16 PUG: Update Algorithm Version for consistency - ADR 836 - PRO Release Type 1</li> </ul> <p>PTRDOC-23153 DO.09.00.00 Vol 5, Tables 5.10.6-2, 5.20.6-2</p> <ul style="list-style-type: none"> <li>• WR 6142: SE-16 PUG: Input data container issue for AOD and LST - ADR 697 - PRO Type 1</li> </ul> <p>PTRDOC-23157 DO.09.00.00 Vol 3, Section 5.1.2.3, Tables 5.1.2.7-2, 5.1.2.7-3, 5.1.2.7-4, 5.1.2.7-5, 5.1.2.8 Vol 4, Section 3.0, Section 7.1.2.3, Tables 7.1.2.7-2, 7.1.2.7-3, 7.1.2.7-4, 7.1.2.7-5, 7.1.2.8, 7.2.1.1-1 Vol 5, Section 4.2.3, Tables 4.2.7-2, 4.2.7-3, 4.2.7-4, 4.2.7-5, 4.2.8, 4.3.7-3, 4.3.8, 5.26.1-1</p> <ul style="list-style-type: none"> <li>• WR 6966: SE-16 PUG: Change GOES-West nominal satellite subpoint in metadata-ADR 830-PRO Release Type 1</li> </ul>
J.1	01 June 2020	<p>PTRDOC-22538 DO.09.01.00 Vol 3, Section 5.4.2.2, Table 5.4.2.5-2, Table 5.4.2.5.2-1 Vol 4, Section 7.5.2.2, Table 7.5.2.5.1.2-1, Table 7.5.2.5.2</p> <ul style="list-style-type: none"> <li>• WR 5800: SE-16 PUG: Make Arc Jet Flag available for SEISS MPS-Lo – ADR 449/596</li> </ul> <p>PTRDOC-23279 DO.09.01.00 Vol 3, Table 5.4.2.5-2, Table 5.4.2.5.2-1, Table 5.4.2.5.2-3, Table 5.4.3.5-2, Table 5.4.3.5.2-1, Table 5.4.3.5.2-4 Vol 4, Table 7.5.2.5.1.2-1, Table 7.5.2.5.1.2-3, Table 7.5.2.5.2, Table 7.5.3.5.1.2-1, Table 7.5.3.5.1.2-4, Table 7.5.3.5.2</p> <ul style="list-style-type: none"> <li>• WR 6845: SE-16 PUG: SEISS MPS-HI and MPS-LO IFC Leakage Changes - ADR 780</li> </ul> <p>PTRDOC-23680 DO.09.01.00 Vol 3, Table D.3-3, Table D.3-4, Table D.3-5</p>



01 June 2020

REVISION	DATE	DESCRIPTION
		<ul style="list-style-type: none"> <li>• WR 6944: SE-16 PUG: EXIS/EUVS Dark Current Correction - ADR 898</li> </ul> <p>PTRDOC-23907 DO.09.01.00 Vol 5, Table 5.9.2-2, Table 5.9.6-2</p> <ul style="list-style-type: none"> <li>• WR 6083: SE-16 PUG: L2 ADP Metadata for DQFs for sun-glint and invalid satellite zenith angles - ADR 643</li> </ul> <p>PTRDOC-23918 DO.09.01.00 Vol 5, Table 5.11.1, Table 5.11.6-2</p> <ul style="list-style-type: none"> <li>• WR 6731: SE-16 PUG: Volcanic Ash Product - Volcanic ash mass loading statistics have incorrect valid_range - ADR 694</li> </ul> <p>PTRDOC-23919 DO.09.01.00 Vol 5, Table E.1.1-1, Table E.1.2-1</p> <ul style="list-style-type: none"> <li>• WR 7134: SE-16 PUG: Derived Motion Winds Products - add latitude and longitude variables - ADR 556</li> </ul> <p>PTRDOC-23922 DO.09.01.00 Vol 5, Table 5.9.6-2</p> <ul style="list-style-type: none"> <li>• WR 6893: SE-16 PUG: Aerosol Detection Product - increase size of DQF variable - ADR 871 - OCCR 1594</li> </ul> <p>PTRDOC-24073 DO.09.01.00 Vol 3, Table 5.3.1.5-2, Table 5.3.2.5-2, Table 5.4.1.5-2, Table 5.4.2.5-2, Table 5.4.3.5-2, Table 5.4.4.5-2, Table 5.5.1.5-2</p> <ul style="list-style-type: none"> <li>• WR 7292: SE-16 PUG: Move Leap Second Comments for MAG, SEISS and EXIS - ADR 1002</li> </ul> <p>PTRDOC-24108 DO.09.01.00 Vol 3, Table 5.1.6.2-2</p> <ul style="list-style-type: none"> <li>• WR 6907: SE-16 PUG: ABI Predictive Calibration: Instrument Calibration Data File Updates - ADR 893</li> </ul> <p>PTRDOC-24190 DO.09.01.00 Vol 3, Table 5.1.3.6.1-2, Table 5.1.3.6.2-2 Vol 4, Table 7.1.3.6.2.1, Table 7.1.3.6.2.2, Table 7.1.3.6.2.3 Vol 5, Table 5.1.6.1-2, Table 5.1.6.2-2</p> <ul style="list-style-type: none"> <li>• WR 6659: SE-16 PUG: ABI output gain setting info - ADR 831</li> </ul> <p>PTRDOC-24579 DO.09.01.00 Vol 5, Table 5.10.2-1, Table 5.10.6-2, Table C.1</p> <ul style="list-style-type: none"> <li>• WR 7081: SE-16 PUG: L2+ FSC Product Metadata Corrections - ADR 819</li> </ul>

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## 1.0 INTRODUCTION

### 1.1 Scope

The Product Definition and User's Guide (PUG) document provides product descriptions and formats for all data and products produced and made available to users by the Geostationary Operational Environmental Satellite R Series (GOES-R) Core Ground Segment (GS), developed under contract DG133E-09-CN-0094. This includes the Level 0 products, Level 1b products, GOES-R Rebroadcast (GRB), and Level 2+ products. This also includes ISO series metadata, instrument calibration data, and semi-static source data and algorithm packages.

This is an appendix to the PUG containing a detailed description of the ISO series metadata.

## 2.0 ISO SERIES METADATA OVERVIEW

GOES-R metadata is designed to serve two purposes:

- To support long-term archive and facilitate data discovery, evaluation, retrieval, use and reuse.
- To provide supplemental information for further processing, algorithm development, diagnostic and anomaly resolution and better understanding of each dataset.

For each Level 0, Level 1b, and Level 2+ product, ABI sample outlier data, instrument calibration data, and Level 1b and Level 2+ semi-static source data and algorithm packages, metadata is provided in an ISO-compliant XML product series (i.e., collection) level file. This metadata is in addition to the embedded native metadata existing in the GOES-R product and data files and is used to discover, display, exploit and further process the data. The ISO series metadata contains a set of "quasi-static" metadata elements that describe a collection of instances of a product or data. Their format, content, and citations to documents and points of contact are provided. Note that a complete ISO metadata record is produced by combining the series metadata with metadata in the product and data files using the ncISO functionality available at the NOAA Data Centers.

To present ISO Series Metadata in a readable format, each ISO xml file was transformed to text using a tool provided by NOAA National Geophysical Data Center (NGDC). The deeply nested xml format is flattened and includes only the specific fields containing metadata values. This presentation format provides links to the definitions of every ISO 19115 Universal Modeling Language (UML) class object and code list via a NOAA Enterprise Data Management (EDM) web site.

For example, given the following subset of ISO Series Metadata:

**acquisitionInformation:** ([MI\\_AcquisitionInformation](#))

**operation:** ([MI\\_Operation](#))

**description:** The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and provides ...

If the reader hovers their mouse over ([MI\\_AcquisitionInformation](#)), presses Ctrl+Click and is connected to the Internet, the NOAA EDM web page for that ISO UML class will display:

MI AcquisitionInformation - NOAA Environm...

page discussion view source history

## MI AcquisitionInformation

MI\_AcquisitionInformation

1	instrument	0..*
2	operation	0..*
3	platform	0..*
4	acquisitionPlan	0..*
5	objective	0..*
6	acquisitionRequirement	0..*

AcquisitionDetails.png

Legend

- yellow: mandatory
- green: conditional
- blue: optional

ISO Legend

Possible Parent Elements

- ISO Acquisition Details
- Documentation Spirals#Acquisition\_Information

Categories: ISO Explorer | 19115-2

Further and complete details are available on the web site by clicking keywords (such as “Operation”) on the page and subsequent pages:

MI Operation - NOAA Environmental Data Mana...

page discussion view source history

## MI Operation

MI\_Operation

1	description	0..1
2	citation	0..1
3	identifier	1
4	status	1
5	type	0..1
6	parentOperation	1
7	platform	0..*
8	objective	0..*
9	plan	0..1
10	significantEvent	0..*

AcquisitionDetails.png

Legend

- yellow: mandatory
- green: conditional
- blue: optional

ISO Legend

Possible Parent Elements

Go to: Enterprise Metadata Management Architecture Home

The filename conventions for ISO series metadata are located in paragraph 6.0, ISO Series Metadata Filename Conventions.

### 3.0 LEVEL 0 PRODUCT ISO SERIES METADATA

#### 3.1 ABI Level 0 Product ISO Series Metadata

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**parentIdentifier:**  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI L0 Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L0-ISO-SERIES\_c20171311116000.xml

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**citation:** (CI\_Citation)

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**alternateTitle:** Data short name (DSN): ABI-L0

**date:**

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** Advanced Baseline Imager (ABI) L0 data is comprised of unprocessed science data packets and telemetry packets. All science data and most telemetry data is sourced by the ABI instrument. L0 data includes select spacecraft telemetry in addition to instrument telemetry. ABI L0 data also includes orbit and attitude data and angular rate telemetry data (OAR), containing orbit ephemeris and satellite position.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

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**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode)

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea



**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
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**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** abi\_space\_packet\_data  
**attributeType:**  
**descriptor:** GOES-R Advanced Baseline Imager (ABI) L0 CCSDS Space Packets  
**units:**  
**scaleFactor:**  
**offset:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors  
**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**lineage:** (LI\_Lineage)  
**processStep:** (LE\_ProcessStep)  
**description:** Advanced Baseline Imager (ABI) front-end processing starts on the

spacecraft where space packets are multiplexed placing multiple packets in each transfer frame. Forward error correction (FEC) coding (Low-Density Parity Check - LDPC) occurs and the packets are downlinked. The data is received, forward error correction decode is performed. In the event of an uncorrectable error the transfer frame is discarded. Error-free space packets are then extracted from the transfer frames. ABI science data arrives at the ground system from the spacecraft in a compressed format. The data is decompressed then packaged for delivery to external interfaces.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L0

---

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of

meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-16

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16

for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-17

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to

weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

### 3.2 GLM Level 0 Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f82fc080-a560-11e4-bcd8-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:**  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for GLM L0 Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_GLM-L0-ISO-SERIES\_c20171311119000.xml

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R Geostationary Lightning Mapper (GLM) Aggregated L0 Data Packets

**alternateTitle:** Data short name (DSN): GLM-L0  
**date:**  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** GLM-L0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** Geostationary Lightning Mapper (GLM) L0 data is comprised of unprocessed science data packets and telemetry packets. All science data and most telemetry data is sourced by the GLM instrument. L0 data includes select spacecraft telemetry in addition to instrument telemetry.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > SENSOR COUNTS  
**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > SENSOR COUNTS  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**language:** eng; USA

**characterSet:** (MD\_CharacterSetCode) utf8

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:**

**TimePeriod:**

**beginPosition:** 2017-05-11

**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** glm\_space\_packet\_data

**attributeType:**

**descriptor:** GOES-R Geostationary Lightning Mapper (GLM) L0 CCSDS Space Packets

**units:**

**scaleFactor:**

**offset:**

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**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** Geostationary Lightning Mapper (GLM) front-end processing starts on the spacecraft where space packets are multiplexed placing multiple packets in each transfer frame. Forward error correction (FEC) coding (Low-Density Parity Check - LDPC) occurs and the packets are downlinked. The data is received, forward error correction decode is performed. In the event of an uncorrectable error the transfer frame is discarded. Error-free space packets are then extracted from the transfer frames. GLM science data arrives at the ground system from the spacecraft in a compressed format. The data is decompressed then packaged for delivery to external interfaces.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L0

---

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

---



**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://science.nasa.gov/missions/goes-r/>**date:****code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and

the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:** GOES-16 GLM instrument\_id (serial number)

**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper is a single-channel, near-infrared optical transient detector that detects the momentary changes in an optical scene, indicating the presence of lightning. GLM measures total lightning activity continuously over the Americas and adjacent ocean regions with near uniform spatial resolution of approximately 10 km. GLM provides early predictions of intensifying storms and severe weather events. It also provides data for long-term climate studies. The instrument aids forecasting of weather events that could affect aviation safety and efficiency. GLM is unique both in how it operates and in the information it collects. While ground-based sensors only provide cloud-to-ground lightning coverage, GLM provides total lightning activity detection with both cloud-to-ground and cloud-to-cloud coverage. Also, ground-based systems can only provide coverage over land. GLM identifies growing, active and potentially destructive thunderstorms in areas over both land and oceans. The instrument collects information such as the frequency and location of lightning events to detect the intensification of thunderstorms and tropical cyclones, which are often accompanied by increased lightning activity.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:****code:** GOES-17 GLM instrument\_id (serial number)**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper is a single-channel, near-infrared optical transient detector that detects the momentary changes in an optical scene, indicating the presence of lightning. GLM measures total lightning activity continuously over the Americas and adjacent ocean regions with near uniform spatial resolution of approximately 10 km. GLM provides early predictions of intensifying storms and severe weather events. It also provides data for long-term climate studies. The instrument aids forecasting of weather events that could affect aviation safety and efficiency. GLM is unique both in how it operates and in the information it collects. While ground-based sensors only provide cloud-to-ground lightning coverage, GLM provides total lightning activity detection with both cloud-to-ground and cloud-to-cloud coverage. Also, ground-based systems can only provide coverage over land. GLM identifies growing, active and potentially destructive thunderstorms in areas over both land and oceans. The instrument collects information such as the frequency and location of lightning events to detect the intensification of thunderstorms and tropical cyclones, which are often accompanied by increased lightning activity.

### 3.3 SUVI Level 0 Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 1a47ee90-a561-11e4-bcd8-0800200c9a66**language:** eng**characterSet:** (MD\_CharacterSetCode) utf8**parentIdentifier:****hierarchyLevel:** (MD\_ScopeCode) series**hierarchyLevelName:** ISO Series Metadata for SUVI L0 Product Collection**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** GOES-R@noaa.gov**role:** (CI\_RoleCode) originator**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_SUVI-L0-ISO-SERIES\_c20171311122000.xml

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R Solar Ultraviolet Imager (SUVI) Aggregated L0 Data Packets

**alternateTitle:** Data short name (DSN): SUVI-L0

**date:**

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** SUVI-L0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** Solar Ultraviolet Imager (SUVI) L0 data is comprised of unprocessed science data packets and telemetry packets. All science data and most telemetry data is sourced by the SUVI instrument. L0 data includes select spacecraft telemetry in addition to instrument telemetry.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > SENSOR COUNTS  
**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > SENSOR COUNTS  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** suvi\_space\_packet\_data  
**attributeType:**  
**descriptor:** GOES-R Solar Ultraviolet Imager (SUVI) L0 CCSDS Space Packets  
**units:**  
**scaleFactor:**  
**offset:**

---

**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors  
**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**lineage:** (LI\_Lineage)  
**processStep:** (LE\_ProcessStep)  
**description:** Solar Ultraviolet Imager (SUVI) front-end processing starts on the spacecraft where space packets are multiplexed placing multiple packets in each transfer frame. Forward error correction (FEC) coding (Low-Density Parity Check - LDPC) occurs and the packets are downlinked. The data is received, forward error correction decode is performed. In the event of an uncorrectable error the transfer frame is discarded. Error-free space packets are then extracted from the transfer frames. SUVI science data arrives at the ground system from the spacecraft in a compressed format. The data is decompressed then packaged for delivery to external interfaces.  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)  
**role:** (CI\_RoleCode) processor  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)  
**role:** (CI\_RoleCode) processor  
**output:** (LE\_Source)  
**processedLevel:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** NOAA Processing Levels  
**date:** (CI\_Date)  
**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)  
**contactInfo:** (CI\_Contact)  
**onlineResource:** (CI\_OnlineResource)  
**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)  
**role:** (CI\_RoleCode) publisher

**code:** L0

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and

XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/suvi.html>

**date:**

**code:** GOES-16 SUVI instrument\_id (serial number)

**type:** Solar Ultraviolet Imager

**description:** The Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. SUVI observes and characterizes complex active regions of the Sun, solar flares, and the eruptions of solar filaments which may give rise to coronal mass ejections. Depending on the size and the trajectory of solar eruptions, the possible effects to near-Earth space and Earth's magnetosphere, referred to as space weather, can cause geomagnetic storms which disrupt power utilities, communication and navigation systems, and may cause radiation damage to orbiting satellites and the International Space Station. SUVI observations of solar flares and solar eruptions provide an early warning of possible impacts to Earth's space environment and enable better forecasting of potentially disruptive events on the ground.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.



**instrument:** (MI\_Instrument)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov/spacesegment/suvi.html>  
**date:**  
**code:** GOES-17 SUVI instrument\_id (serial number)  
**type:** Solar Ultraviolet Imager

**description:** The Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. SUVI observes and characterizes complex active regions of the Sun, solar flares, and the eruptions of solar filaments which may give rise to coronal mass ejections. Depending on the size and the trajectory of solar eruptions, the possible effects to near-Earth space and Earth's magnetosphere, referred to as space weather, can cause geomagnetic storms which disrupt power utilities, communication and navigation systems, and may cause radiation damage to orbiting satellites and the International Space Station. SUVI observations of solar flares and solar eruptions provide an early warning of possible impacts to Earth's space environment and enable better forecasting of potentially disruptive events on the ground.

### 3.4 EXIS Level 0 Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 542948c0-a561-11e4-bcd8-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:**  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for EXIS L0 Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions

for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_EXIS-L0-ISO-SERIES\_c20171311118000.xml

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R Extreme Ultraviolet and X-Ray Irradiance Sensors (EXIS) Aggregated L0 Data Packets

**alternateTitle:** Data short name (DSN): EXIS-L0

**date:**

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** EXIS-L0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Extreme Ultraviolet and X-ray Irradiance Sensors detect solar soft X-ray irradiance and solar extreme ultraviolet spectral irradiance in the 5-127 nm range. The X-Ray Sensor (XRS) monitors solar flares that can disrupt communications and degrade navigational accuracy, affecting satellites, astronauts, high latitude airline passengers, and power grid performance. The Extreme Ultraviolet (EUV) Sensor monitors solar variations that directly affect satellite drag/tracking and ionospheric changes, which impact communications and navigation operations. This information is critical to understanding the outer layers of the Earth's atmosphere. L0 data includes select spacecraft telemetry in addition to instrument telemetry.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > SENSOR  
COUNTS  
**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > SENSOR  
COUNTS  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,  
M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M.  
Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** exis\_space\_packet\_data  
**attributeType:**  
**descriptor:** GOES-R EUV and X-Ray Irradiance Sensors (EXIS) L0 CCSDS Space

## Packets

**units:**  
**scaleFactor:**  
**offset:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors  
**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**lineage:** (LI\_Lineage)  
**processStep:** (LE\_ProcessStep)  
**description:** Extreme Ultraviolet and X-Ray Irradiance Sensors (EXIS) front-end processing starts on the spacecraft where space packets are multiplexed placing multiple packets in each transfer frame. Forward error correction (FEC) coding (Low-Density Parity Check - LDPC) occurs and the packets are downlinked. The data is received, forward error correction decode is performed. In the event of an uncorrectable error the transfer frame is discarded. Error-free space packets are then extracted from the transfer frames. EXIS science data arrives at the ground system from the spacecraft in a compressed format. The data is decompressed then packaged for delivery to external interfaces.  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)  
**role:** (CI\_RoleCode)  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)  
**role:** (CI\_RoleCode) processor  
**output:** (LE\_Source)  
**processedLevel:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** NOAA Processing Levels  
**date:** (CI\_Date)  
**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L0

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode)

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/exis.html>

**date:**

**code:** GOES-16 EXIS instrument\_id (serial number)

**type:** EUV and X-Ray Irradiance Sensors (EXIS)

**description:** The Extreme Ultraviolet and X-ray Irradiance Sensors detect solar soft X-ray irradiance and solar extreme ultraviolet spectral irradiance in the 5-127 nm range. The X-Ray Sensor (XRS) monitors solar flares that can disrupt communications and degrade navigational accuracy, affecting satellites, astronauts, high latitude airline passengers, and power grid performance. The Extreme Ultraviolet Sensor monitors solar variations that directly affect satellite drag/tracking and ionospheric changes, which impact communications and navigation operations. This information is critical to understanding the outer layers of the Earth's atmosphere. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information

Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/exis.html>

**date:**

**code:** GOES-17 EXIS instrument\_id (serial number)

**type:** EUV and X-Ray Irradiance Sensors (EXIS)

**description:** The Extreme Ultraviolet and X-ray Irradiance Sensors detect solar soft X-ray irradiance and solar extreme ultraviolet spectral irradiance in the 5-127 nm range. The X-Ray Sensor (XRS) monitors solar flares that can disrupt communications and degrade navigational accuracy, affecting satellites, astronauts, high latitude airline passengers, and power grid performance. The Extreme Ultraviolet Sensor monitors solar variations that directly affect satellite drag/tracking and ionospheric changes, which impact communications and navigation operations. This information is critical to understanding the outer layers of the Earth's atmosphere. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array.

### 3.5 SEISS Level 0 Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 85e0f200-a561-11e4-bcd8-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:**

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for SEISS L0 Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_SEIS-L0-ISO-SERIES\_c20171311121000.xml

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** GOES-R Space Environment In-Situ Suite (SEISS) Aggregated L0 Data Packets  
**alternateTitle:** Data short name (DSN): SEIS-L0  
**date:**  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** SEIS-L0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** Space Environment In-Situ Suite (SEISS) L0 data is comprised of unprocessed  
science data packets and telemetry packets. All science data and most telemetry data is sourced  
by the SEISS instrument. L0 data includes select spacecraft telemetry in addition to instrument  
telemetry.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910



**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > SENSOR  
COUNTS  
**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > SENSOR  
COUNTS  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,  
M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M.  
Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** seiss\_space\_packet\_data

**attributeType:**

**descriptor:** GOES-R Space Environment In-Situ Suite (SEISS) L0 CCSDS Space

## Packets

**units:**  
**scaleFactor:**  
**offset:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors  
**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**lineage:** (LI\_Lineage)  
**processStep:** (LE\_ProcessStep)  
**description:** Space Environment In-Situ Suite (SEISS) front-end processing starts on the spacecraft where space packets are multiplexed placing multiple packets in each transfer frame. Forward error correction (FEC) coding (Low-Density Parity Check - LDPC) occurs and the packets are downlinked. The data is received, forward error correction decode is performed. In the event of an uncorrectable error the transfer frame is discarded. Error-free space packets are then extracted from the transfer frames. SEISS science data arrives at the ground system from the spacecraft in a compressed format. The data is decompressed then packaged for delivery to external interfaces.  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)  
**role:** (CI\_RoleCode) processor  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)  
**role:** (CI\_RoleCode) processor  
**output:** (LE\_Source)  
**processedLevel:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** NOAA Processing Levels  
**date:** (CI\_Date)  
**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L0

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:** GOES-16 SEISS instrument\_id (serial number)

**type:** Space Environment In-Situ Suite

**description:** The Space Environment In-Situ Suite is comprised of four sensors that will monitor proton, electron, and heavy ion fluxes at geosynchronous orbit. The information provided by SEISS is critical for assessing the electrostatic discharge (ESD) risk and radiation hazard to astronauts and satellites. In addition to hazard assessment, the information from SEISS can be used to warn of high flux events, mitigating any damage to radio communication. The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). Data from SEISS will drive solar radiation storm portion of NOAA space weather scales and other alerts and warnings and will improve energetic particle forecasts.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission

(HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:** GOES-17 SEISS instrument\_id (serial number)

**type:** Space Environment In-Situ Suite

**description:** The Space Environment In-Situ Suite is comprised of four sensors that will monitor proton, electron, and heavy ion fluxes at geosynchronous orbit. The information provided by SEISS is critical for assessing the electrostatic discharge (ESD) risk and radiation hazard to astronauts and satellites. In addition to hazard assessment, the information from SEISS can be used to warn of high flux events, mitigating any damage to radio communication. The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). Data from SEISS will drive solar radiation storm portion of NOAA space weather scales and other alerts and warnings and will improve energetic particle forecasts.

### 3.6 Magnetometer Level 0 Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 389e80c0-a561-11e4-bcd8-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:**

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for MAG L0 Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_MAG-L0-ISO-SERIES\_c20171311120000.xml

---

**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** GOES-R Magnetometer (MAG) Aggregated L0 Data Packets  
**alternateTitle:** Data short name (DSN): MAG-L0  
**date:**  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** MAG-L0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** Magnetometer (MAG) L0 data is comprised of unprocessed science data packets  
and telemetry packets. All science data and most telemetry data is sourced by the MAG  
instrument. L0 data includes select spacecraft telemetry in addition to instrument telemetry.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD

**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > SENSOR  
COUNTS  
**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > SENSOR  
COUNTS  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,  
M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M.  
Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** mag\_space\_packet\_data  
**attributeType:**

**descriptor:** GOES-R Magnetometer (MAG) L0 CCSDS Space Packets

**units:**

**scaleFactor:**

**offset:**

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**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** Magnetometer (MAG) front-end processing starts on the spacecraft where space packets are multiplexed placing multiple packets in each transfer frame. Forward error correction (FEC) coding (Low-Density Parity Check - LDPC) occurs and the packets are downlinked. The data is received, forward error correction decode is performed. In the event of an uncorrectable error the transfer frame is discarded. Error-free space packets are then extracted from the transfer frames. MAG science data arrives at the ground system from the spacecraft in a compressed format. The data is decompressed then packaged for delivery to external interfaces.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)



**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L0

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from

geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/mag.html>

**date:**

**code:** GOES-16 MAG instrument\_id (serial number)

**type:** Magnetometer

**description:** The GOES-R Magnetometer provides measurements of the space environment magnetic field that controls charged particle dynamics in the outer region of the magnetosphere. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements are important for providing alerts and warnings to many customers, including satellite operators and power utilities. GOES Magnetometer data are also important in research, being among the most widely used spacecraft data by the national and international research community. The GOES-R Magnetometer products are an integral part of the National Oceanic and Atmospheric Administration (NOAA) space weather operations, providing information on the general level of geomagnetic activity and permitting detection of sudden magnetic storms. In addition, measurements will be used to validate large-scale space environment models that are used in operations. The MAG requirements are similar to the tri-axial fluxgates that have previously flown. GOES-R requires measurements of three components of the geomagnetic field with a resolution of 0.016 nT and response frequency of 2.5 Hz.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning

detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/mag.html>

**date:**

**code:** GOES-17 MAG instrument\_id (serial number)

**type:** Magnetometer

**description:** The GOES-R Magnetometer provides measurements of the space environment magnetic field that controls charged particle dynamics in the outer region of the magnetosphere. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements are important for providing alerts and warnings to many customers, including satellite operators and power utilities. GOES Magnetometer data are also important in research, being among the most widely used spacecraft data by the national and international research community. The GOES-R Magnetometer products are an integral part of the National Oceanic and Atmospheric Administration (NOAA) space weather operations, providing information on the general level of geomagnetic activity and permitting detection of sudden magnetic storms. In addition, measurements will be used to validate large-scale space environment models that are used in operations. The MAG requirements are similar to the tri-axial fluxgates that have previously flown. GOES-R requires measurements of three components of the geomagnetic field with a resolution of 0.016 nT and response frequency of 2.5 Hz.

## 4.0 LEVEL 1B PRODUCT AND DATA ISO SERIES METADATA

### 4.1 Level 1b Products

#### 4.1.1 Radiances Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** a70be540-c38b-11e0-962b-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 1b Radiances Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L1b-ISO-SERIES\_c20171311123000.xml

**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 10848

**resolution:**

**Distance:** 1

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 10848

**resolution:**

**Distance:** 1

**cellGeometry:** (MD\_CellGeometryCode) area

**transformationParameterAvailability:** true

**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** Full Disk; ABI Channels 1, 3, 5

**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 3000

**resolution:**

**Distance:** 1

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 5000

**resolution:**

**Distance:** 1  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS; ABI Channels 1, 3, 5

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 1000  
**resolution:**  
**Distance:** 1  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 1000  
**resolution:**  
**Distance:** 1  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale; ABI Channels 1, 3, 5

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 21696  
**resolution:**  
**Distance:** 0.5  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 21696  
**resolution:**  
**Distance:** 0.5  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk; ABI Channel 2

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 6000  
**resolution:**  
**Distance:** 0.5  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 10000  
**resolution:**  
**Distance:** 0.5  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS; ABI Channel 2

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 2000  
**resolution:**  
**Distance:** 0.5  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 2000  
**resolution:**  
**Distance:** 0.5  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale; ABI Channel 2

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2

**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk; ABI Channels 4 and 6 - 16

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 1500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 2500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS; ABI Channels 4 and 6 - 16

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale; ABI Channels 4 and 6 - 16

---

**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)

**title:** Product Definition and Users Guide (PUG) Volume 3: Level 1b Products

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R ABI Level 1b Radiances Product

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C01

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C02

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C03

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C04

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C05

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C06

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C07

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C08

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C09

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C10

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C11

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C12

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C13

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C14

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C15

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM1-M3C16

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C01

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C02

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C03

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C04

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C05

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C06

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C07

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C08

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C09

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C10

**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C11

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**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C15  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadM2-M3C16  
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**alternateTitle:** Data short name (DSN): ABI-L1b-RadC-M3C04  
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**alternateTitle:** Data short name (DSN): ABI-L1b-RadC-M3C07  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadC-M3C08  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadC-M3C09  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadC-M3C10  
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**alternateTitle:** Data short name (DSN): ABI-L1b-RadC-M4C08  
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**alternateTitle:** Data short name (DSN): ABI-L1b-RadC-M4C16  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C01  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C02  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C03  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C04  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C05  
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**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C07  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C08  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C09  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C10  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C11  
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**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C13

**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C14  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C15  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M3C16  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C01  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C02  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C03  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C04  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C05  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C06  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C07  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C08  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C09  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C10  
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**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C13  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C14  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C15  
**alternateTitle:** Data short name (DSN): ABI-L1b-RadF-M4C16  
**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L1b-Rad\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The ABI instrument samples the radiance of the Earth in sixteen spectral bands using several arrays of detectors in the instrument's focal plane. Single reflective band ABI L1b Radiance Products (channels 1 - 6 with wavelengths 0.47, 0.64, 0.87, 1.38, 1.61, 2.25 microns, respectively) are digital maps of outgoing radiance values at the top of the atmosphere for visible and near-IR bands. Single emissive band ABI L1b Radiance Products (channels 7 - 16 with wavelengths 3.89, 6.17, 6.93, 7.34, 8.44, 9.61, 10.33, 11.19, 12.27, 13.27 microns, respectively) are digital maps of outgoing radiance values at the top of the atmosphere for IR bands. Detector

samples are compressed, packetized and down-linked to the ground station as Level 0 data for conversion to calibrated, geo-located pixels (Level 1b Radiance data). The detector samples are decompressed, radiometrically corrected, navigated and resampled onto an invariant output grid, referred to as the ABI fixed grid.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > VISIBLE RADIANCE

**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > INFRARED RADIANCE

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** toa\_outgoing\_radiance\_per\_unit\_wavelength

**keyword:** toa\_outgoing\_radiance\_per\_unit\_wavenumber

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
  **distance:**  
    **Distance:** .5  
**spatialResolution:** (MD\_Resolution)  
  **distance:**  
    **Distance:** 1  
**spatialResolution:** (MD\_Resolution)  
  **distance:**  
    **Distance:** 2  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
  **temporalElement:** (EX\_TemporalExtent)  
    **extent:**  
      **TimePeriod:**  
        **beginPosition:** 2017-05-11  
        **endPosition:** now  
**extent:** (EX\_Extent)  
  **geographicElement:** (EX\_GeographicDescription)  
    **geographicIdentifier:** (MD\_Identifier)  
      **code:** Full Disk - GOES-East  
  **geographicElement:** (EX\_GeographicBoundingBox)  
    **westBoundLongitude:** -156.2995  
    **eastBoundLongitude:** 6.2995  
    **southBoundLatitude:** -81.3282  
    **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
  **geographicElement:** (EX\_GeographicDescription)  
    **geographicIdentifier:** (MD\_Identifier)  
      **code:** Full Disk - GOES-West  
  **geographicElement:** (EX\_GeographicBoundingBox)  
    **westBoundLongitude:** 141.7005  
    **eastBoundLongitude:** -55.7005  
    **southBoundLatitude:** -81.3282  
    **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
  **geographicElement:** (EX\_GeographicDescription)  
    **geographicIdentifier:** (MD\_Identifier)  
      **code:** CONUS - GOES-East  
  **geographicElement:** (EX\_GeographicBoundingBox)  
    **westBoundLongitude:** -152.109282  
    **eastBoundLongitude:** -52.946879  
    **southBoundLatitude:** 14.571340  
    **northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
  **geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** Rad  
**attributeType:**  
**descriptor:** ABI L1b Radiances per pixel (channels 1 - 6)  
**units:**  
**DerivedUnit:**  
**identifier:** mW m-2 sr-1 um-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** Rad  
**attributeType:**  
**descriptor:** ABI L1b Radiances per pixel (channels 7 - 16)  
**units:**  
**DerivedUnit:**  
**identifier:** mW m-2 sr-1 (cm-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**

**derivationUnitTerm:**


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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 1b Radiances data quality flags

**units:**

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**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Statistics are provided for minimum, maximum, mean and standard deviation radiance value of valid pixels; counts of: missing pixels samples, pixels that exceed saturation limit, pixels below undersaturation limit, and pixels with each data quality flag value in the product image; and percent of uncorrectable L0 errors.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** Raw data downlink is received by the Antenna system which processes the data through signal processing equipment to Intermediate Frequency. Forward error correction is performed. If FEC fails, those packets are dropped. Good packets are input to L0 processing. In L0 processing packets are uncompressed, extracted and byte-aligned (L1a). L1b processing extracts the L1a data, performs radiometric and geometric correction on the data to create L1b data.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** NESDIS/OSPO at RBU (Remote Backup Unit, Fairmont, WV)  
**role:** (CI\_RoleCode) processor  
**output:** (LE\_Source)

**description:** Advanced Baseline Imager (ABI) L1b data is a pixel array of resampled, radiometrically corrected, Earth located imagery with associated per-pixel quality flag array. End-products are unique to an ABI scene (Full Disk, CONUS or Mesoscale) and ABI channel (1 - 16).

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L1b

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of

Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3



concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

#### 4.1.2 Level 1b SUVI Solar Imagery: Extreme Ultraviolet Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f5816f57-fd6d-11e3-a3ac-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for Level 1b SUVI Solar Imagery: Extreme Ultraviolet Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_SUVI-L1b-SUVI-ISO-SERIES\_c20171311126000.xml

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** GOES-R Level 1b SUVI Solar Imagery: Extreme Ultraviolet Product ISO Series Metadata  
**alternateTitle:** Data short name (DSN): SUVI-L1b-Fe093  
**alternateTitle:** Data short name (DSN): SUVI-L1b-Fe131  
**alternateTitle:** Data short name (DSN): SUVI-L1b-Fe171  
**alternateTitle:** Data short name (DSN): SUVI-L1b-Fe195  
**alternateTitle:** Data short name (DSN): SUVI-L1b-Fe284  
**alternateTitle:** Data short name (DSN): SUVI-L1b-He303  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision

**code:** SUVI-L1b-\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Solar Ultraviolet Imager (SUVI) Level 1b Solar Imagery: X-Ray product contains an image of the Sun at one of six wavelengths with different exposure times, and metadata required for exploitation and higher level processing. This product also contains an array containing a quality flag for each pixel in the solar image.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**resourceFormat:** (MD\_Format)

**name:** FITS

**version:** 3.0

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR IMAGERY

**keyword:** ATMOSPHERE > ATMOSPHERIC RADIATION > SOLAR RADIATION

**keyword:** SPECTRAL/ENGINEERING > ULTRAVIOLET WAVELENGTHS > ULTRAVIOLET RADIANCE

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > CORONA

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > CORONA HOLES

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > CORONAL MASS EJECTIONS

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR ACTIVE REGIONS

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR FLARES  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR  
 PROMINENCES/SOLAR FILAMENTS  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR  
 ULTRAVIOLET EMISSIONS  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SUN SPOTS  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,  
 M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M.  
 Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** RAD  
**attributeType:**  
**descriptor:** Level 1b SUVI Solar Imagery: Extreme Ultraviolet data  
**units:**  
**DerivedUnit:**  
**identifier:** W m<sup>-2</sup> sr<sup>-1</sup>  
**derivationUnitTerm:**  
**derivationUnitTerm:**

**derivationUnitTerm:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF**attributeType:****descriptor:** Level 1b SUVI Solar Imagery: Extreme Ultraviolet data quality flags**units:**

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**dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)**description:** SUVI is a solar imager capable of operation in the soft EUV to EUV wavelength range. It provides full-disk solar images at high cadence around the clock, except for brief periods during satellite eclipse. The operational goals of the SUVI are to image the solar emissions and temperatures within the EUV spectrum, to locate coronal holes for the forecasting of recurring geomagnetic activity, to locate solar flares for the forecasting of energetic particle events, to assess active region complexity for solar flare forecasting, and to determine the signatures of Coronal Mass Ejections (CME). The ground processing algorithm applies several correction and calibration processes in order to generate the photon fluxes for the final L1b product.**processor:** (CI\_ResponsibleParty)**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)**role:** (CI\_RoleCode) processor**processor:** (CI\_ResponsibleParty)**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**description:** The Solar Ultraviolet Imager (SUVI) Level 1b Solar Imagery: X-Ray product contains an image of the Sun at one of six wavelengths with different exposure times, and metadata required for exploitation and higher level processing. This product also contains an array containing a quality flag for each pixel in the solar image.

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L1b

---

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit

storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/suvi.html>

**date:**

**code:** GOES-16 SUVI instrument\_id (serial number)

**type:** Solar Ultraviolet Imager - SUVI

**description:** The GOES-R Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. The SUVI observes full disk solar images around the clock.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from

geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/suvi.html>

**date:**

**code:** GOES-17 SUVI instrument\_id (serial number)

**type:** Solar Ultraviolet Imager - SUVI

**description:** The GOES-R Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. The SUVI observes full disk solar images around the clock.



### 4.1.3 Solar Flux: Extreme Ultraviolet Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f7087580-e5a8-11e3-ac10-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for EXIS Level 1b Solar Flux: Extreme Ultraviolet Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_EXIS-L1b-SFEU-ISO-SERIES\_c20171311123000.xml

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** EXIS Level 1b Solar Flux: Extreme Ultraviolet Product ISO Series Metadata  
**alternateTitle:** Data short name (DSN): EXIS-L1b-SFEU  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** EXIS-L1b-SFEU  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Extreme Ultraviolet (EUV) solar flux product consists of a solar irradiance spectrum covering the wavelength range from 5 nm to 127 nm. The Extreme Ultraviolet Sensor and X-ray Irradiance Sensors (EXIS) instrument does not directly measure the entire spectrum over this wavelength range. Instead, the ground processing algorithm computes the solar spectrum using a proxy model based on the set of measurements obtained from the XRS-A channel (0.05-0.4 nm), the XRS-B channel (0.1-0.8 nm) and the three channels from the EUV sensor. The ground processing algorithm will produce this spectrum with a spectral resolution of 5 nm over the entire wavelength range with one 10 nm exception being the 117 - 127 nm wavelength bin.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** SPECTRAL/ENGINEERING > ULTRAVIOLET WAVELENGTHS > ULTRAVIOLET FLUX

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR IRRADIANCE

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR ULTRAVIOLET EMISSIONS

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,

M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:**

**TimePeriod:**

**beginPosition:** 2017-05-11

**endPosition:** now

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** irradianceSpectrum

**attributeType:**

**descriptor:** irradiance spectrum for wavelengths between 5 and 127 nm calculated using a proxy model based on inputs from XRS A and B channels, and EUVS A, B, and C channels

**units:**

**DerivedUnit:**

**identifier:** W m<sup>-2</sup> nm<sup>-1</sup>

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The ground processing algorithm (GPA) converts the raw data from all of the photodiodes for both XRS channels from digital numbers into electrical current using the integration time and the total diode gain factor, composed of the pre-flight temperature calibration value, the in-flight temporal calibration factor, and the gain linearity factor. The GPA calculates and removes the dark diode current, caused by the radiation background, the thermal contribution from the diode material and the temperature-dependent electrical offset from the measured current. The GPA sums the four currents for the solar maximum quadrant diode set. The GPA converts the solar minimum and the solar maximum currents to irradiance values using the instrument responsivity and the field-of-view correction generated from the EXIS Solar Position Sensor (SPS) pointing data and determines the primary irradiance for each channel based on a calibration threshold value. The GPA computes the 1-AU correction factor to the X-Ray fluxes to support the generation of higher-level products at a later time. The GPA also has a requirement to calculate the XRS ratio, XRS-A and XRS-B primary irradiances for use in the EUV solar flux end product processing.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**description:** The Extreme Ultraviolet (EUV) solar flux product consists of a solar irradiance spectrum covering the wavelength range from 5 nm to 127 nm. The Extreme Ultraviolet Sensor and X-ray Irradiance Sensors (EXIS) instrument does not directly measure the entire spectrum over this wavelength range. Instead, the ground processing algorithm computes the solar spectrum using a proxy model based on the set of measurements obtained from the XRS-A channel (0.05-0.4 nm), the XRS-B channel (0.1-0.8 nm) and the three channels from the EUV sensor. The ground processing algorithm will produce this spectrum with a spectral resolution of 5 nm over the entire wavelength range.

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Proc](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Proc)

essing\_Levels

**role:** (CI\_RoleCode) publisher

**code:** L1b

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support,

process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/exis.html>

**date:**

**code:** GOES-16 EXIS serial number

**type:** Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

**description:** The EXIS contains two primary sensors, the Extreme Ultraviolet Sensor (EUVS) and the X-Ray Sensor (XRS), which will help scientists monitor activity on the Sun. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array. The instrument also includes the Sun Positioning Sensor (SPS).

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/exis.html>

**date:**

**code:** GOES-17 EXIS serial number

**type:** Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

**description:** The EXIS contains two primary sensors, the Extreme Ultraviolet Sensor (EUVS) and the X-Ray Sensor (XRS), which will help scientists monitor activity on the Sun. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array. The instrument also includes the Sun Positioning Sensor (SPS).

#### 4.1.4 Solar Flux: X-Ray Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f7087581-e5a8-11e3-ac10-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for EXIS Level 1b Solar Flux: X-Ray Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_EXIS-L1b-SFXR-ISO-SERIES\_c20171311124000.xml

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** EXIS Level 1b Solar Flux: X-Ray Product ISO Series Metadata

**alternateTitle:** Data short name (DSN): EXIS-L1b-SFXR

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** EXIS-L1b-SFXR

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The solar flux X-Ray product consists of two irradiance measurements within the X-Ray spectrum of the Sun. The algorithm generates this product using XRS measurements of the solar flux in two channels: XRS-A covering 0.05-0.4 nm and XRS-B covering 0.1-0.8 nm. In order to span the full dynamic range of the X-Ray radiation over the approximate 11-year solar cycle, each channel of the XRS uses both a solar minimum photodiode and a solar maximum quadrant photodiode set. The solar minimum diode performs well during periods of low solar activity, but can saturate during high solar activity. The set of quadrant photodiodes provides good coverage of the X-Ray solar flux during high activity and flares, but may bottom-out during low activity. In addition, the individual signals in the quadrant provide a means for estimating the location of flares on the solar disk. The product data will contain a flag to indicate whether the solar minimum or solar maximum photodiodes correspond to the primary irradiance measurement for each channel. The X-Ray solar flux product also includes a set of quality flags to assess the state and health of the instrument, product metadata indicating the measurement details and quality of the product data, and intermediate data required for the generation of higher-level products.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF



**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SPECTRAL/ENGINEERING > X-RAY > X-RAY FLUX  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR IRRADIANCE  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ACTIVITY > SOLAR X-RAY EMISSIONS  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > X-RAY FLUX  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** irradiance\_xrsa1  
**attributeType:**  
**descriptor:** irradiance at wavelengths between 0.05 and 0.4 nm calculated from XRS-A solar minimum channel (photodiode)  
**units:**

**DerivedUnit:**  
**identifier:** W m-2  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** irradiance\_xrsa2  
**attributeType:**  
**descriptor:** irradiance at wavelengths between 0.05 and 0.4 nm calculated from XRS-A solar maximum channel (quadrant photodiode)  
**units:**  
**DerivedUnit:**  
**identifier:** W m-2  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** irradiance\_xrsb1  
**attributeType:**  
**descriptor:** irradiance at wavelengths between 0.1 and 0.8 nm calculated from XRS-B solar minimum channel (photodiode)  
**units:**  
**DerivedUnit:**  
**identifier:** W m-2  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** irradiance\_xrsb2  
**attributeType:**  
**descriptor:** irradiance at wavelengths between 0.1 and 0.8 nm calculated from XRS-B solar maximum channel (quadrant photodiode)  
**units:**  
**DerivedUnit:**  
**identifier:** W m-2  
**derivationUnitTerm:**  
**derivationUnitTerm:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The ground processing algorithm (GPA) converts the raw data from all of the photodiodes for both XRS channels from digital numbers into electrical current using the integration time and the total diode gain factor, composed of the pre-flight temperature calibration value, the in-flight temporal calibration factor, and the gain linearity factor. The GPA calculates and removes the dark diode current, caused by the radiation background, the thermal contribution from the diode material and the temperature-dependent electrical offset from the measured current. The GPA sums the four currents for the solar maximum quadrant diode set. The GPA converts the solar minimum and the solar maximum currents to irradiance values using the instrument responsivity and the field-of-view correction generated from the EXIS Solar Position Sensor (SPS) pointing data and determines the primary irradiance for each channel based on a calibration threshold value. The GPA computes the 1-AU correction factor to the X-Ray fluxes to support the generation of higher-level products at a later time. The GPA also has a requirement to calculate the XRS ratio, XRS-A and XRS-B primary irradiances for use in the EUV solar flux end product processing.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**description:** The solar flux X-Ray product consists of two irradiance measurements within the X-Ray spectrum of the Sun. The algorithm generates this product using XRS measurements of the solar flux in two channels: XRS-A covering 0.05-0.4 nm and XRS-B covering 0.1-0.8 nm. In order to span the full dynamic range of the X-Ray radiation over the approximate 11-year solar cycle, each channel of the XRS uses both a solar minimum photodiode and a solar maximum quadrant photodiode set. The solar minimum diode performs well during periods of low solar activity, but can saturate during high solar activity. The set of quadrant photodiodes provides good coverage of the X-Ray solar flux during high activity and flares, but may bottom-out during low activity. In addition, the individual signals in the quadrant provide a means for estimating the location of flares on the solar disk. The product data will contain a flag to indicate whether the solar minimum or solar maximum photodiodes correspond to the primary irradiance measurement for each channel. The X-Ray solar flux product also includes a set of quality flags to assess the state and health of the instrument, product metadata indicating the measurement details and quality of the product data, and intermediate data required for the

generation of higher-level products.

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L1b

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:****code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov/spacesegment/exis.html>**date:****code:** GOES-16 EXIS serial number**type:** Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

**description:** The EXIS contains two primary sensors, the Extreme Ultraviolet Sensor (EUVS) and the X-Ray Sensor (XRS), which will help scientists monitor activity on the Sun. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array. The instrument also includes the Sun Positioning Sensor (SPS).

**platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and

XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/exis.html>

**date:**

**code:** GOES-17 EXIS serial number

**type:** Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

**description:** The EXIS contains two primary sensors, the Extreme Ultraviolet Sensor (EUVS) and the X-Ray Sensor (XRS), which will help scientists monitor activity on the Sun. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array. The instrument also includes the Sun Positioning Sensor (SPS).

#### 4.1.5 Energetic Heavy Ions Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f7087582-e5a8-11e3-ac10-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for SEISS Level 1b Energetic Heavy Ions

Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_SEIS-L1b-EHIS-ISO-SERIES\_c20171311124000.xml

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R SEISS Level 1b Energetic Heavy Ions Product ISO Series Metadata

**alternateTitle:** Data short name (DSN): SEIS-L1b-EHIS

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** SEIS-L1b-EHIS

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The GOES-R L1b Energetic Heavy Ions Product consists of heavy ion differential fluxes derived from in situ measurements of heavy ion count rates. Differential fluxes are produced for Hydrogen (H), Helium (He), Carbon-Nitrogen-Oxygen (CNO) mass group, Neon-Sulfur (Ne-S) mass group, Chlorine-Nickel (Cl-Ni) mass group, and Beryllium to Copper (Be-Cu) 26 elements group. For each mass and element group, the fluxes are produced for five energy bands, and one angular zone. The 5 energy bands are evenly spaced logarithmically spanning from 10 to 200 MeV/nucleon for H and He. The energy range for ions heavier than He is species-dependent and normalized such that, when focused into a beam and directed into a block of silicon, it corresponds to the same stopping range as He. The one angular zone has a central, anti-earthward look-angle (-Z direction in spacecraft body-reference-frame coordinates), and a 60 degree field-of-view. The product also contains processing and data quality metadata, satellite state and location information, and data required for the generation of level 2 products.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

---

**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS > ELECTRIC FIELDS/ELECTRIC CURRENTS  
**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS > ION CHEMISTRY/IONIZATION  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > HEAVY NUCLEI FLUX  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > ION FLUX  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** H5MinuteDifferentialFluxes  
**attributeType:**  
**descriptor:** Hydrogen (H) differential flux for each energy band  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 (MeV nuc-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** He5MinuteDifferentialFluxes  
**attributeType:**  
**descriptor:** Helium (He) differential flux for each energy band  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 (MeV nuc-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** CNO5MinuteDifferentialFluxes  
**attributeType:**  
**descriptor:** Carbon-Nitrogen-Oxygen (CNO) mass group differential flux for each  
energy band  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 (MeV nuc-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**

**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** NeS5MinuteDifferentialFluxes  
**attributeType:**  
**descriptor:** Neon-Sulfur (Ne-S) mass group differential flux for each energy band  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 (MeV nuc-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** ClNi5MinuteDifferentialFluxes  
**attributeType:**  
**descriptor:** Chlorine-Nickel (Cl-Ni) mass group differential flux for each energy band  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 (MeV nuc-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** BeCu5MinuteDifferentialFluxes  
**attributeType:**  
**descriptor:** Beryllium to Copper (Be-Cu) differential flux for each element's energy  
bands  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 (MeV nuc-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**

**derivationUnitTerm:****derivationUnitTerm:**


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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors  
**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**lineage:** (LI\_Lineage)  
**processStep:** (LE\_ProcessStep)  
**description:** SEISS EHIS L1b Calibration Algorithm (SECA) uses the EHIS data to produce heavy ion differential fluxes in the energy range from 10 to 200 MeV/nucleon. Differential fluxes are produced for Hydrogen (H), Helium (He), the C-N-O group, the Ne-S group and the Fe group. For each mass group, the fluxes are produced for five energy bands, and one angular zone. The 5 energy bands are evenly spaced logarithmically and range from 10 to 200 MeV/nuc (for H and He). The energy range for ions heavier than He is species-dependent and corresponds to the same stopping range (in Si) as He. The one angular zone has a central look-angle which is anti-earthward (-Z direction), and has a 60 degree field-of-view.  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)  
**role:** (CI\_RoleCode) processor  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)  
**role:** (CI\_RoleCode) processor  
**output:** (LE\_Source)  
**description:** The GOES-R Energetic Heavy Ions L1b Space and Solar End-Product consists of fluxes of heavy ions derived from in situ measurements of heavy ion count rates. These measurements are retrieved from the Energetic Heavy Ion Sensor (EHIS) which is one of the 5 scientific sensor units comprising the GOES-R Space Environment In Situ Suite (SEISS) to produce heavy ion differential fluxes in the energy range from 10 to 200 MeV/nucleon. Differential fluxes are produced for Hydrogen (H), Helium (He), the C-N-O group, the Ne-S group and the Fe group. For each mass group, the fluxes are produced for five energy bands, and one angular zone. The 5 energy bands are evenly spaced logarithmically and range from 10 to 200 MeV/nuc (for H and He). The energy range for ions heavier than He is species-dependent and corresponds to the same stopping range (in Si) as He. The one angular zone has a central look-angle which is anti-earthward (-Z direction), and has a 60 degree field-of-view.

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L1b

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov/spacesegment/seiss.html>**date:****code:** GOES-16 SEISS EHS serial number**type:** SEISS Energetic Heavy Ion Sensor (EHIS)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support,

process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:** GOES-17 SEISS EHS serial number

**type:** SEISS Energetic Heavy Ion Sensor (EHIS)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

#### 4.1.6 Magnetospheric Electrons and Protons: Low Energy Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f7087583-e5a8-11e3-ac10-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for SEISS Level 1b Magnetospheric Electrons and Protons: Low Energy Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_SEIS-L1b-MPSL-ISO-SERIES\_c20171311124000.xml

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R SEISS Level 1b Magnetospheric Electrons and Protons: Low Energy Product ISO Series Metadata

**alternateTitle:** Data short name (DSN): SEIS-L1b-MPSL

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** SEIS-L1b-MPSL

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The GOES-R Low Energy Magnetospheric Electrons and Protons L1b Space and Solar End-Product consists of fluxes of relatively low energy electrons and ions derived from in situ measurements of electron and ion count rates. These measurements are retrieved from the Magnetospheric Particle Sensor Low (MPS-LO) sensor which is one of the 5 scientific sensor units comprising the GOES-R Space Environment In Situ Suite (SEISS). The MPS-LO fluxes are reported for two species (electrons and ions), 15 energy bands and 14 angular zones.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS  
 > ELECTRIC FIELDS/ELECTRIC CURRENTS  
**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS  
 > ION CHEMISTRY/IONIZATION  
**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS  
 > SOLAR WIND  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX >  
 ELECTRON FLUX  
**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > ION  
 FLUX  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M.  
 Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T.  
 Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DiffElectronFluxes  
**attributeType:**  
**descriptor:** differential electron flux at specific energy bands for each zone's primary electron data  
 channels



**units:****DerivedUnit:****identifier:** cm-2 sr-1 s-1 keV-1**derivationUnitTerm:****derivationUnitTerm:****derivationUnitTerm:****derivationUnitTerm:****derivationUnitTerm:****dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DiffIonFluxes**attributeType:****descriptor:** differential ion flux at specific energy bands for each zone's primary ion data channels**units:****DerivedUnit:****identifier:** cm-2 sr-1 s-1 keV-1**derivationUnitTerm:****derivationUnitTerm:****derivationUnitTerm:****derivationUnitTerm:****derivationUnitTerm:**

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**dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)**description:** The SEISS MPS-LO L1b Calibration Algorithm (SMLCA) produces the MPS-LO electron and ion fluxes. The MPS-LO raw count rates are first corrected for the dead-time effect using a simple formula. For the out-of-band contamination correction, MPS-LO employs two shielded background channels. Only high-energy particles can penetrate the shielding and be counted in these background channels. These high-energy particles are assumed to also be contaminating the open-aperture channels. Counts from the background channels are first scaled by background removal coefficients, and then subtracted from the dead-time-corrected, open-aperture channel count rates to remove contamination. Finally, the dead-time corrected, and contamination-free count rates are normalized by the geometrical factor and energy band pass value to obtain directional-differential fluxes.**processor:** (CI\_ResponsibleParty)**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)  
**role:** (CI\_RoleCode) processor  
**output:** (LE\_Source)

**description:** The GOES-R Low Energy Magnetospheric Electrons and Protons L1b Space and Solar End-Product consists of fluxes of relatively low energy electrons and ions derived from in situ measurements of electron and ion count rates. These measurements are retrieved from the Magnetospheric Particle Sensor Low (MPS-LO) sensor which is one of the 5 scientific sensor units comprising the GOES-R Space Environment In Situ Suite (SEISS). The MPS-LO fluxes are reported for two species (electrons and ions), 15 energy bands and 14 angular zones.

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration  
 (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

vels

**role:** (CI\_RoleCode) publisher

**code:** L1b

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>  
**date:**  
**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:** GOES-16 SEISS MPS\_Lo serial number

**type:** Magnetospheric Particle Sensor – Low Energy Range (MPS-Lo)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space

Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:** GOES-17 SEISS MPS\_Lo serial number

**type:** SEISS Magnetospheric Particle Sensor – Low Energy Range (MPS-Lo)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

#### 4.1.7 Magnetospheric Electrons and Protons: Medium and High Energy Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f7087584-e5a8-11e3-ac10-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for SEISS Level 1b Magnetospheric Electrons and Protons: Medium and High Energy Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2  
 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_SEIS-L1b-MPSH-ISO-SERIES\_c20171311125000.xml

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** GOES-R SEISS Level 1b Magnetospheric Electrons and Protons: Medium and High Energy Product ISO Series Metadata  
**alternateTitle:** Data short name (DSN): SEIS-L1b-MPSH  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** SEIS-L1b-MPSH  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** The GOES-R Magnetospheric Electrons and Protons: Medium and High Energy Product consists of fluxes of medium and high energy electrons and protons derived from in situ measurements of electron and proton count rates. Differential and integral electron fluxes are reported at eleven energy bands in five angular zones. Ten of the energy bands are evenly spaced logarithmically spanning from 50 keV to 4 MeV with differential electron flux being reported. The eleventh energy band collects electrons with energies greater than 2 MeV with electron integral flux being reported. In addition,

differential proton fluxes are reported at eleven energy bands in the same five angular zones. The eleven proton energy bands are evenly spaced logarithmically and range from 80 keV to 12 MeV. Collectively, the five angular zones, each with a 30 degree field-of-view, span a total angular range of 170 degrees in the Y-Z arranged north to south with the central zone having an anti-earthward look-angle and are parallel to the minus Z-axis (in spacecraft body-reference-frame coordinates). With respect to the earth, the zones are arranged from north to south with the central zone pointing anti-earthward. In addition, the product contains ionizing radiation doses in two energy ranges, 50 keV to 1 MeV and 1 MeV to 10 MeV, obtained from a pair of Low and High Linear Energy Transfer dosimeters, respectively. The product also contains processing and data quality metadata, satellite state and location information, and data required for the generation of level 2 products.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS > ELECTRIC FIELDS/ELECTRIC CURRENTS

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > ELECTRON FLUX

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > PROTON FLUX

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE PROPERTIES > ENERGY DEPOSITION

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science

Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DiffElectronFluxes  
**attributeType:**  
**descriptor:** differential electron flux at specific energy bands for each telescope's ten primary data channels  
**units:**  
**DerivedUnit:**  
**identifier:** cm<sup>-2</sup> sr<sup>-1</sup> s<sup>-1</sup> keV<sup>-1</sup>  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**

**aName:** IntgElectronFluxes

**attributeType:**

**descriptor:** integral electron flux at energy band > 2000 keV for each telescope's primary data channel E11

**units:**

**DerivedUnit:**

**identifier:** cm-2 sr-1 s-1

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DiffProtonFluxes

**attributeType:**

**descriptor:** differential proton flux at specific energy bands for each telescope's eleven primary data channels

**units:**

**DerivedUnit:**

**identifier:** cm-2 sr-1 s-1 keV-1

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)



**description:** The SEISS MPS-HI L1b Calibration Algorithm (SMHCA) produces the MPS-HI electron and proton fluxes. The MPS-HI raw count rates are first corrected for the dead-time effect using a simple formula. The proton count rates are assumed to be free from out-of-band contamination, based on pre-flight ground calibration activities. For the electron out-of-band contamination correction, the SMHCA will use data from the SEISS SGPS-X sensor unit (in particular, from Telescope 3) to correct the highest energy channels. Finally, the dead-time corrected, and contamination-free count rates for both protons and electrons are normalized by geometrical factors to obtain differential fluxes for the differential channels, and integral fluxes for the integral channels.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**description:** The GOES-R Medium and High Energy Magnetospheric Electrons and Protons L1b Space and Solar End-Product consists of fluxes of medium and high energy electrons and protons derived from in situ measurements of electron and proton count rates. These measurements are retrieved from the Magnetospheric Particle Sensor High (MPS-HI) sensor which is one of the 5 scientific sensor units comprising the GOES-R Space Environment In Situ Suite (SEISS). The MPS-HI electron fluxes are reported for eleven energy bands and five angular zones. Ten of the energy bands are evenly spaced logarithmically and range from 50 keV to 4 MeV. Differential fluxes are reported for these bands. The eleventh energy channel collects electrons with energies greater than 2 MeV. Integral flux is reported for this channel. The MPS-HI proton fluxes are also reported for eleven energy bands and five angular zones. However, all eleven of the proton energy bands are evenly spaced logarithmically and range from 80 keV to 12 MeV (i.e. there is no integral channel for the protons). Differential fluxes are reported for all eleven proton channels.

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)  
**role:** (CI\_RoleCode) publisher  
**code:** L1b

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**metadataMaintenance:** (MD\_MaintenanceInformation)  
**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded  
**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)  
**operation:** (MI\_Operation)  
**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>  
**date:**  
**code:**  
**status:** (MD\_ProgressCode) onGoing  
**parentOperation:**  
**platform:** (MI\_Platform)  
**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:** GOES-16 SEISS MPS\_Hi serial number

**type:** Magnetospheric Particle Sensor – High Energy Range (MPS-Hi)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere,

solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:** GOES-17 SEISS MPS\_Hi serial number

**type:** Magnetospheric Particle Sensor – High Energy Range (MPS-Hi)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

#### 4.1.8 Solar and Galactic Protons Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 67e28dc8-4a39-11e4-9e35-164230d1df67

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for SEISS Level 1b Solar and Galactic Protons Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** GOES-R@noaa.gov**role:** (CI\_RoleCode) originator**dateStamp:** 2017-05-11**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
for imagery and gridded data**metadataStandardVersion:** ISO 19115-2:2009(E)**dataSetURI:** OR\_SEIS-L1b-SGPS-ISO-SERIES\_c20171311125000.xml**identificationInfo:** (MD\_DataIdentification)**citation:** (CI\_Citation)**title:** GOES-R SEISS Level 1b Solar and Galactic Protons Product ISO Series Metadata**alternateTitle:** Data short name (DSN): SEIS-L1b-SGPS**date:** (CI\_Date)**date:** 2017-05-11**dateType:** (CI\_DateTypeCode) creation**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** gov.nesdis.noaa**date:** (CI\_Date)**date:** 2014**dateType:** (CI\_DateTypeCode) revision**code:** SEIS-L1b-SGPS**citedResponsibleParty:** (CI\_ResponsibleParty)**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
and Information Services, NOAA, U.S. Department of Commerce**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** goes-r@noaa.gov**role:** (CI\_RoleCode) originator**abstract:** The GOES-R Solar and Galactic Protons L1b Space and Solar End-Product consists of fluxes of very high energy protons derived from in situ measurements of proton count rates. These measurements are retrieved from the two Solar and Galactic Proton Sensor (SGPS) sensor units, which are two of the 5 scientific sensor units comprising the GOES-R Space Environment In Situ Suite (SEISS). SGPS data is measured by two sensor units: SGPS-X and

SGPS+X. One sensor unit faces east, while the other faces west. Their respective positions reverse upon execution, by the spacecraft, of the yaw flip maneuver. There are three telescopes on each of the sensor units. The three telescopes all have the same central look direction. Proton fluxes are produced for every primary energy band of each of the three telescopes for each sensor unit. Each telescope has a unique number of energy bands spanning a unique energy range. For each sensor unit, there are a total of 13 primary, differential energy bands spanning 1 to 500 MeV, and one primary, integral channel for > 500 MeV particles. Differential proton fluxes are produced from the 13 primary, differential channels. An integral proton flux is produced from the one primary, integral channel.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS > ELECTRIC FIELDS/ELECTRIC CURRENTS

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > ALPHA PARTICLE FLUX

**keyword:** SUN-EARTH INTERACTIONS > SOLAR ENERGETIC PARTICLE FLUX > PROTON FLUX

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** T1\_DifferentialProtonFluxes  
**attributeType:**  
**descriptor:** differential proton flux at specific energy bands for telescope 1's primary proton data channels on each of the two sensor units  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 keV-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** T2\_DifferentialProtonFluxes  
**attributeType:**  
**descriptor:** differential proton flux at specific energy bands for telescope 2's primary proton data channels on each of the two sensor units  
**units:**  
**DerivedUnit:**  
**identifier:** cm-2 sr-1 s-1 keV-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**

**aName:** T3\_DifferentialProtonFluxes

**attributeType:**

**descriptor:** differential proton flux at specific energy bands for telescope 3's primary proton data channels on each of the two sensor units

**units:**

**DerivedUnit:**

**identifier:** cm-2 sr-1 s-1 keV-1

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** T3P11\_IntegralProtonFlux

**attributeType:**

**descriptor:** integral proton flux at energy band > 500 MeV for telescope 3's primary integral data channel P11 on each of the two sensor units

**units:**

**DerivedUnit:**

**identifier:** cm-2 sr-1 s-1

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The SEISS SGPS L1b Calibration Algorithm (SSCA) CSU produces proton fluxes for protons possessing the high energies indicative of their solar or galactic origins. SGPS data is measured by two sensor units: SGPS-X and SGPS+X. One sensor unit faces east, while the other faces west. Their respective positions reverse upon execution, by the spacecraft,



of the yaw flip maneuver. The SEISS SGPS L1b Calibration Algorithm (SSCA) produces the SGPS proton fluxes. Events (charged particles hitting a set of detectors) are not counted during those times when the instrument's processor is occupied with other tasks. This time interval, when events are not being counted, is known as "dead" time. The overall effect of having a dead time limitation is that the measured count rate is lower than the true count rate. Another instrumental limitation is that the measured count rate can be contaminated by charged particles of the wrong species, and/or having an energy outside of the desired energy range, and/or arriving at the detector from outside of the desired FOV. Collectively, this is known as "out-of-band" contamination. The SSCA will correct for these instrumental limitations.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**description:** The GOES-R Solar and Galactic Protons L1b Space and Solar End-Product consists of fluxes of very high energy protons derived from in situ measurements of proton count rates. These measurements are retrieved from the two Solar and Galactic Proton Sensor (SGPS) sensor units, which are two of the 5 scientific sensor units comprising the GOES-R Space Environment In Situ Suite (SEISS). SGPS data is measured by two sensor units: SGPS-X and SGPS+X. One sensor unit faces east, while the other faces west. Their respective positions reverse upon execution, by the spacecraft, of the yaw flip maneuver. There are three telescopes on each of the sensor units. The three telescopes all have the same central look direction. Proton fluxes are produced for every primary energy band of each of the three telescopes for each sensor unit. Each telescope has a unique number of energy bands spanning a unique energy range. For each sensor unit, there are a total of 13 primary, differential energy bands spanning 1 to 500 MeV, and one primary, integral channel for > 500 MeV particles. Differential proton fluxes are produced from the 13 primary, differential channels. An integral proton flux is produced from the one primary, integral channel.

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L1b

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**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://science.nasa.gov/missions/goes-r/>**date:****code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning

detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:** GOES-16 SEISS SGPS serial numbers

**type:** Solar and Galactic Proton Sensor - SGPS

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:****code:** GOES-17 SEISS SGPS serial numbers**type:** Solar and Galactic Proton Sensor - SGPS

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

#### 4.1.9 Geomagnetic Field Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f5816f50-fd6d-11e3-a3ac-0800200c9a66**language:** eng**characterSet:** (MD\_CharacterSetCode) utf8**parentIdentifier:** n/a**hierarchyLevel:** (MD\_ScopeCode) series**hierarchyLevelName:** ISO Series Metadata for Magnetometer Level 1b Geomagnetic Field Product Collection**contact:** (CI\_ResponsibleParty)**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** GOES-R@noaa.gov**role:** (CI\_RoleCode) originator**dateStamp:** 2017-05-17**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data**metadataStandardVersion:** ISO 19115-2:2009(E)**dataSetURI:** OR\_MAG-L1b-GEOF-ISO-SERIES\_c20171371644000.xml**identificationInfo:** (MD\_DataIdentification)**citation:** (CI\_Citation)**title:** GOES-R Magnetometer Level 1b Geomagnetic Field Product ISO Series Metadata**alternateTitle:** Data short name (DSN): MAG-L1b-GEOF**date:** (CI\_Date)

**date:** 2017-05-17  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** MAG-L1b-GEOF  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** The Geomagnetic Field product consists of the estimated ambient magnetic field in four coordinate reference frames, Earth Polar Normal, J2000 Earth-Centered Inertial, and the spacecraft's Body Reference Frame and Attitude Control Reference Frame. The product also includes the compensated (calibrated and misalignment corrected) magnetic field in the native reference frame for both the inboard and outboard magnetometers. Furthermore, the product includes inboard and outboard magnetometer status flags, processing and data quality metadata, satellite state and location information, and data required for the generation of level 2 products.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE DYNAMICS > MAGNETIC FIELDS/MAGNETIC CURRENTS  
**keyword:** SUN-EARTH INTERACTIONS > IONOSPHERE/MAGNETOSPHERE

## DYNAMICS &gt; MAGNETIC STORMS

**type:** (MD\_KeywordTypeCode) theme**thesaurusName:** (CI\_Citation)**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords**date:** (CI\_Date)**date:** 2012-10**dateType:** (CI\_DateTypeCode) revision**edition:** Version 7.0.0.0**citedResponsibleParty:** (CI\_ResponsibleParty)**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea**role:** (CI\_RoleCode) author**resourceConstraints:** (MD\_SecurityConstraints)**useLimitation:** Unrestricted**classification:** (MD\_ClassificationCode) unclassified**language:** eng**characterSet:** (MD\_CharacterSetCode) utf8**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation**extent:** (EX\_Extent)**temporalElement:** (EX\_TemporalExtent)**extent:****TimePeriod:****beginPosition:** 2017-05-17**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** IB\_Data**attributeType:****descriptor:** Compensated InBoard magnetometer data (x, y, z)**units:****DerivedUnit:****identifier:** nT**derivationUnitTerm:****derivationUnitTerm:****dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** OB\_Data**attributeType:**

**descriptor:** Compensated OutBoard magnetometer data (x, y, z)

**units:**

**DerivedUnit:**

**identifier:** nT

**derivationUnitTerm:**

**derivationUnitTerm:**

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The ground processing algorithm (GPA) for the magnetometer is required to convert the instrument raw data in scaled nanotesla (nT) to the three orthogonal components of the geomagnetic field in units of nT. The MAG L1b Algorithm applies calibration parameters to magnetometer data, performs the gradiometer calculations, and outputs the measured ambient magnetic field.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L1b

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from



geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/mag.html>

**date:**

**code:** GOES-16 MAG serial number

**type:** Magnetometer

**description:** The GOES-R Magnetometer provides measurements of the space environment magnetic field that controls charged particle dynamics in the outer region of the magnetosphere. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements are important for providing alerts and warnings to many customers, including satellite operators and power utilities. GOES Magnetometer data are also important in research, being among the most widely used spacecraft data by the national and international research community. The GOES-R Magnetometer products will be an integral part of the National Oceanic and Atmospheric Administration (NOAA) space weather operations, providing information on the general level of geomagnetic activity and permitting detection of sudden magnetic storms. In addition, measurements will be used to validate large-scale space environment models that are used in operations. The MAG requirements are similar to the tri-axial fluxgates that have previously flown. GOES-R requires measurements of three components of the geomagnetic field with a resolution of 0.016 nT and response frequency of 2.5 Hz.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning

detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/mag.html>

**date:**

**code:** GOES-17 MAG serial number

**type:** Magnetometer

**description:** The GOES-R Magnetometer will provide measurements of the space environment magnetic field that controls charged particle dynamics in the outer region of the magnetosphere. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements are important for providing alerts and warnings to many customers, including satellite operators and power utilities. GOES Magnetometer data are also important in research, being among the most widely used spacecraft data by the national and international research community. The GOES-R Magnetometer products will be an integral part of the National Oceanic and Atmospheric Administration (NOAA) space weather operations, providing information on the general level of geomagnetic activity and permitting detection of sudden magnetic storms. In addition, measurements will be used to validate large-scale space environment models that are used in operations. The MAG requirements are similar to the tri-axial fluxgates that have previously flown. GOES-R requires measurements of three components of the geomagnetic field with a resolution of 0.016 nT and response frequency of 2.5 Hz.

## 4.2 Level 1b Data

### 4.2.1 GRB Information ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** d60ed140-3a8a-11e3-aa6e-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for GRB Information Packets Dataset Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
 for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_GRB-INFO-ISO-SERIES\_c20171311122000.xml

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** GOES-R GRB Information Dataset  
**alternateTitle:** Data short name (DSN): GRB-INFO-ACQ  
**alternateTitle:** Data short name (DSN): GRB-INFO-GLMP  
**alternateTitle:** Data short name (DSN): GRB-INFO-MSG  
**alternateTitle:** Data short name (DSN): GRB-INFO-NPRF  
**alternateTitle:** Data short name (DSN): GRB-INFO-SCH  
**alternateTitle:** Data short name (DSN): GRB-INFO-STAT  
**alternateTitle:** Data short name (DSN): GRB-INFO-SUVP  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** GRB-INFO-\*  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
 and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator

**abstract:** GRB information (GRB-INFO) provides data related to the operations, health and performance of the GOES-R series flight and ground system, and includes the following types of information: Satellite acquisition data; Mission schedule; Flight system status, ABI Image Navigation and Registration (INR) performance data, GLM INR performance data, SUVI INR performance data, and Operator message. Each of these types of GRB INFO exists as xml documents in separate CCSDS Space Packets.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** GRB INFO

**keyword:** GRB INFO PACKETS

**keyword:** GRB Information Packets

**keyword:** GOES Rebroadcast

**type:**

**thesaurusName:**

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** GOES > Geostationary Operational Environmental Satellites

**keyword:** GOES-R > Geostationary Operational Environmental Satellite R

**type:**

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodeau

**role:** (CI\_RoleCode) author

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode)

**language:** eng; USA

**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MD\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** GRB-INFO-ACQ  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** GRB INFO State, Position, and Velocity Vectors  
**attributeType:**  
**descriptor:** Satellite Acquisition Data contains the latitude and longitude of the satellite sub-point at 30 minute intervals. This data is used by ground terminals to acquire and lock on the GRB RF downlink signal. Nominally, the satellite acquisition data is updated daily, and spans the subsequent seven day period. The frequency of update and time-span associated with the satellite acquisition data may change. Note that the more time that has passed since the generation of the satellite acquisition data, the greater the error in the satellite's predicted location.

---

**contentInfo:** (MD\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** GRB-INFO-SCH  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** GRB INFO Schedule and Operations  
**attributeType:**  
**descriptor:** Mission Schedule contains a tailored set of scheduled operations and maintenance tasks that affect the ability of the GOES-R system to produce products, or the quality of the products. These tasks typically involve commanding the spacecraft or an instrument to perform an operation. The scheduled time frame associated with each task is included. This data indirectly provides GRB users with notification that product degradation and delivery interruptions will be occurring in the hours and days ahead due to planned satellite maintenance activities. Nominally, the mission schedule is updated daily, and spans the subsequent seven day period. The frequency of update and time-span associated with the mission schedule may change.

---

**contentInfo:** (MD\_CoverageDescription)

**attributeDescription:**

**RecordType:** GRB-INFO-STAT

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** GRB INFO Health and Status

**attributeType:**

**descriptor:** Flight System Status contains a configurable set of parameters, and their values and status that summarize the health and performance of the flight system. Parameters associated with the (1) communications, (2) command and data handling, (3) guidance, navigation, and control, (4) electrical power, (5) propulsion, (6) mechanical, (7) thermal control, or (8) instrument satellite subsystems, or aggregates thereof may be included. Nominally, the flight system status is updated daily. The frequency of update associated with the flight system status may change.

---

**contentInfo:** (MD\_CoverageDescription)

**attributeDescription:**

**RecordType:** GRB-INFO-NPRF

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** GRB INFO ABI INR Performance

**attributeType:**

**descriptor:** ABI INR Performance Data contains statistics that summarize the ABI image navigation and registration (INR) performance associated with the GOES-R system. In addition to monitoring INR performance of the ABI and overarching GOES-R system, this data is used by GRB users to assess the mapping accuracy of ABI Level 1b and Level 2+ product data. These statistics are calculated using ABI Level 1b Radiances product images and landmarks. The image to map, band to band (channel to channel) and within frame statistics derived using landmarks are available for those ABI bands that can see the earth's surface (i.e., ABI bands 1-3, 5-7, 11, and 13-16). The individual band statistics are aggregates, specifically 3-sigma values (i.e., sum of the absolute value of the mean value and three times the standard deviation), using measurements taken from individual images over a configurable sliding time window. Nominally, this sliding time window is set to 24 hours with the ABI INR performance data being updated daily. The sliding time window and frequency of update associated with the ABI INR performance data may change. As a result, if the sliding time window is configured to minutes up to several hours, and the ABI INR performance data is updated at a similar frequency, it is possible that at certain times during the day, no statistics are reported for the reflective bands (i.e., ABI bands 1-6) due to their inability to operate effectively at night.

---

**contentInfo:** (MD\_CoverageDescription)

**attributeDescription:**

**RecordType:** GRB-INFO-GLMP

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** GRB INFO GLM INR Performance

**attributeType:**

**descriptor:** GLM INR Performance Data contains statistics that summarize the GLM INR performance associated with the GOES-R system. In addition to monitoring INR performance of the GLM and overarching GOES-R system, this data is used by GRB users to assess the mapping accuracy of the GLM Level 2+ Lightning Detection product data. These statistics are calculated using a background image observed by the GLM and downlinked periodically and landmarks. The statistics are aggregates, specifically 3-sigma values (i.e., sum of mean value and three times the standard deviation), using measurements taken from individual images over a configurable sliding time window. Nominally, this sliding time window is set to 24 hours, and the GLM INR performance data is updated daily. The sliding time window and frequency of update associated with the GLM INR performance data may change. As a result, if the sliding time window is configured to minutes up to several hours, and the GLM INR performance data is updated at a similar frequency, it is possible that at certain times during the day, no statistics are reported because of the inability of the GLM to generate satisfactory background images at night.

---

**contentInfo:** (MD\_CoverageDescription)

**attributeDescription:**

**RecordType:** GRB-INFO-SUVP

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** GRB INFO SUVI INR Performance

**attributeType:**

**descriptor:** SUVI INR Performance Data contains statistics that summarize the SUVI INR performance associated with the GOES-R system. In addition to monitoring INR performance of the SUVI and overarching GOES-R system, this data is used by GRB users to assess the mapping accuracy of Level 1b SUVI Solar Imagery: EUV product data. These statistics are calculated using metadata fields in the SUVI Level 1b product that contain the location of the sun's center, which are based on information received from the Guide Telescope, and the SUVI Level 1b one second exposure 195.1 angstrom solar image, which is best for locating the edge of the solar disk. The statistics are aggregates using measurements taken from individual images over a configurable fixed time window. Nominally, this fixed time window is set to 20 minutes with the SUVI INR performance data being updated daily. The fixed time window and frequency of update associated with the SUVI INR performance data may change.

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**contentInfo:** (MD\_CoverageDescription)

**attributeDescription:**

**RecordType:** GRB-INFO-MSG

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** Operator Message

**attributeType:**

**descriptor:** Operator Message contains a free-text message from a GOES-R system operator that has relevance to GRB users. The message may contain information about planned and unplanned product or service interruptions and anomalies, other anomalous conditions in the GOES-R ground or flight system, and product or service restoration information.

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode)

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)



**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:**

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on the GOES-R Series for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-R Series ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:**

**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper (GLM) is an optical transient detector and imager operating in the near-IR that maps total lightning (in-cloud and cloud-to-ground) activity with near uniform spatial resolution of approximately 8 km continuously day and night over the Americas and adjacent ocean regions. The GLM provides early indication of storm intensification and severe weather events, improved tornado warning lead time, and data for long-term climate variability studies. The GLM provides information to identify growing, active, and potentially destructive thunderstorms over land as well as ocean areas.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/suvi.html>

**date:**

**code:**

**type:** Solar Ultraviolet Imager - SUVI

**description:** The GOES-R Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. By observing the Sun, SUVI will be able to compile full disk solar images around the clock.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System will acquire and disseminate environmental data from a near-equatorial Earth orbit at geostationary altitude. This includes the Earth's surface and atmosphere, solar activity, and geosynchronous space environment. The major functions of the GOES-R System are to support the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) support terrestrial and oceanographic Data Collection Platforms (DCPs), (2) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (3) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:**

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-R Series for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten

infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-R Series ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:**

**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper (GLM) is an optical transient detector and imager operating in the near-IR that maps total lightning (in-cloud and cloud-to-ground) activity with near uniform spatial resolution of approximately 10 km continuously day and night over the Americas and adjacent ocean regions. The GLM will provide early indication of storm intensification and severe weather events, improved tornado warning lead time of up to 20 minutes or more, and data for long-term climate variability studies. The GLM will provide information to identify growing, active, and potentially destructive thunderstorms over land as well as ocean areas.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/suvi.html>

**date:**

**code:**

**type:** Solar Ultraviolet Imager - SUVI

**description:** The GOES-R Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. By observing the Sun, SUVI will be able to compile full disk solar images around the clock.

#### 4.2.2 Sample Outlier Data ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 21798500-3a7a-11e3-aa6e-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Sample Outlier Data File Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_SOF-ISO-SERIES\_c20171311307000.xml

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** ABI Sample Outlier Data File  
**alternateTitle:** Data short name (DSN): ABI-L1b-SOF  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** ABI-L1b-SOF  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** An outlier is an ABI fixed grid pixel in a specific band whose ABI L1b radiance value is outside of the product's measurement range because some of its constituent detector samples have radiance values indicating over-saturation. An ABI Sample Outlier Data file is a netCDF-4 file created for each ABI Radiance product image containing at least one outlier. A separate file created for each band, and in the case of band 2, a separate file is created for each of the five data paths. The band 2 data paths provide a partitioning of the high data volume associated with its 0.000014 radian horizontal spatial resolution to support concurrent processing in the instrument and ground system. An ABI Sample Outlier Data File contains resampled outlier radiance values, their corresponding Data Quality Flag, and the ABI fixed grid location of the resampled outlier. It also contains the source sample data received from the ABI, an ABI image chip (4 x 4 samples) for each resampled outlier pixel, along with a Data Quality Flag and the ABI fixed grid location for each of the 16 samples. This file is used to assess the impact of resampling saturated samples on product quality.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > VISIBLE RADIANCE

**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > SENSOR COUNTS

**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > INFRARED RADIANCE

**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > SENSOR COUNTS

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,

M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** OutlierPixel  
**attributeType:**  
**descriptor:** Resampled pixel radiance value (channels 1 - 6)  
**units:**  
**DerivedUnit:**  
**identifier:** mW m-2 ster-1 um-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** OutlierPixel  
**attributeType:**

**descriptor:** ABI L1b Radiances per pixel (channels 7 - 16)

**units:**

**DerivedUnit:**

**identifier:** mW m-2 sr-1 (cm-1)-1

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** OutlierSamples

**attributeType:**

**descriptor:** The samples - 4x4 pixels - contributing to OutlierPixel. At least one is an outlier (channels 1 - 6)

**units:**

**DerivedUnit:**

**identifier:** mW m-2 ster-1 um-1

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** OutlierSamples

**attributeType:**

**descriptor:** The samples - 4x4 pixels - contributing to OutlierPixel. At least one is an outlier (channels 7 - 16)

**units:**

**DerivedUnit:**

**identifier:** mW m-2 sr-1 (cm-1)-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** OutlierPixelDQF  
**attributeType:**  
**descriptor:** resampled outlier pixel data quality flag per pixel  
**units:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** OutlierSampleDQFs  
**attributeType:**  
**descriptor:** outlier sample radiance value data quality flags  
**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_QuantitativeAttributeAccuracy)  
**nameOfMeasure:** Product summary statistics  
**evaluationMethodDescription:** Start and end time of the scene in seconds since J2000 epoch (2000-01-01 12:00:00).  
**result:**  
**lineage:** (LI\_Lineage)  
**processStep:** (LE\_ProcessStep)  
**description:** An outlier is an ABI fixed grid pixel in a specific band whose ABI L1b radiance value is outside of the product's measurement range because some of its constituent



detector samples have radiance values indicating over-saturation. An ABI Sample Outlier Data file is a netCDF-4 file created for each ABI Radiances product image containing at least one outlier.

**processor:** (CI\_ResponsibleParty)  
**organisationName:** NESDIS/OSPO at WCDAS (Wallops Command and Data Acquisition Station, Chincoteague, VA)  
**role:** (CI\_RoleCode) processor  
**processor:** (CI\_ResponsibleParty)  
**organisationName:** NESDIS/OSPO at RBU (Remote Backup Unit, Fairmont, WV)  
**role:** (CI\_RoleCode) processor  
**output:** (LE\_Source)  
**processedLevel:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** NOAA Processing Levels  
**date:** (CI\_Date)  
**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)  
**contactInfo:** (CI\_Contact)  
**onlineResource:** (CI\_OnlineResource)  
**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)  
**role:** (CI\_RoleCode) publisher  
**code:** L1b

---

**metadataMaintenance:** (MD\_MaintenanceInformation)  
**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded  
**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)  
**operation:** (MI\_Operation)  
**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The

GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System will acquire and disseminate environmental data from a near-equatorial Earth orbit at geostationary altitude. This includes the Earth's surface and atmosphere, solar activity, and geosynchronous space environment. The major functions of the GOES-R System are to support the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) support terrestrial and oceanographic Data Collection Platforms (DCPs), (2) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (3) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn

tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System will acquire and disseminate environmental data from a near-equatorial Earth orbit at geostationary altitude. This includes the Earth's surface and atmosphere, solar activity, and geosynchronous space environment. The major functions of the GOES-R System are to support the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) support terrestrial and oceanographic Data Collection Platforms (DCPs), (2) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (3) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 4.2.3 Instrument Calibration Data

(MI\_Metadata)

**fileIdentifier:** fbd4e2a0-3749-11e3-aa6e-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for GOES-R Instrument Calibration Data Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_CAL-ISO-SERIES\_c20171311356000.xml

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R Instrument Calibration Data

**alternateTitle:** Data short name (DSN): SAT-INST-CAL-EPH

**alternateTitle:** Data short name (DSN): ABI-INST-CAL-ENG

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**alternateTitle:** Data short name (DSN): SEIS-INST-CAL  
**alternateTitle:** Data short name (DSN): SEIS-INST-CAL-ENG  
**alternateTitle:** Data short name (DSN): SUVI-INST-CAL-ENG  
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**alternateTitle:** Data short name (DSN): SUVI-INST-CAL-IMG-303  
**alternateTitle:** Data short name (DSN): SUVI-INST-CAL-DARK  
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**alternateTitle:** Data short name (DSN): MAG-INST-CAL-MAN  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** \*-INST-CAL-\*  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** The Instrument Calibration Data product contains the data needed to evaluate,

monitor, and trend sensor performance. ABI instrument calibration data contains engineering data (hourly generation), calibration data by timeline ID, and lunar data for each channel 1 - 16. This includes component temperatures, noise (NEDR - Noise Equivalent Delta Radiance, NEDT - Noise Equivalent Delta Temperature), calibration coefficients, blackbody counts, space view counts, Radiometric Platinum Resistance Thermometer (PRT) counts, Lunar scan, star catalog scan data, solar calibration target counts, and time and ephemeris data. Information for other instruments to be added.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** SPECTRAL/ENGINEERING > VISIBLE WAVELENGTHS > SENSOR COUNTS

**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS > SENSOR COUNTS

**keyword:** SPECTRAL/ENGINEERING > PLATFORM CHARACTERISTICS > ORBITAL CHARACTERISTICS

**keyword:** SPECTRAL/ENGINEERING > PLATFORM CHARACTERISTICS > ATTITUDE CHARACTERISTICS

**keyword:** SPECTRAL/ENGINEERING > SENSOR CHARACTERISTICS

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2013

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodeau

**role:** (CI\_RoleCode) author

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) geoscientificInformation  
**extent:** (EX\_Extent)  
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         **extent:**  
             **TimePeriod:**  
                 **beginPosition:** 2017-05-11  
                 **endPosition:** now

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**contentInfo:** (MI\_CoverageDescription)  
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**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
     **MemberName:**  
         **aName:** ehis\_relative\_hcr\_priority\_counts  
     **attributeType:**  
         **descriptor:** difference between Priority 3 (Hydrogen) and Priority 1 (Heavy Ions)  
 measured hardware coincident count rate for non-prime and prime condition. value should always  
 be positive  
     **units:**  
         **DerivedUnit:**  
             **identifier:** count (3 s)-1  
             **derivationUnitTerm:**  
         **scaleFactor:**  
         **offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
     **MemberName:**  
         **aName:** ehis\_hcr\_priority\_count\_rate  
     **attributeType:**  
         **descriptor:** measured hardware coincident count rate for the three EHS priority  
 categories in non-prime and prime conditions  
     **units:**  
         **DerivedUnit:**  
             **identifier:** count (3 s)-1  
             **derivationUnitTerm:**  
         **scaleFactor:**  
         **offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
     **MemberName:**  
         **aName:** ehis\_relative\_pec\_counts  
     **attributeType:**



**descriptor:** percent of pulse height analysis event counts that are valid for the three EHS priority categories

**units:**

**DerivedUnit:**

**identifier:** percent

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** ehis\_dead\_time\_corrections

**attributeType:**

**descriptor:** energetic heavy ions count rate multiplicative dead-time correction factor for EHS

**units:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** ehis\_rear-entry\_contamination\_corrections

**attributeType:**

**descriptor:** rear-entry multiplicative contamination correction factor for each of the three EHS priority categories

**units:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** mps-hi\_electron\_singles\_channel\_count\_rate

**attributeType:**

**descriptor:** measured electron singles channel count rate for each MPS-HI electron telescopes' logical detectors

**units:**

**DerivedUnit:**

**identifier:** count s-1

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** mps-hi\_proton\_singles\_channel\_count\_rate

**attributeType:**

**descriptor:** measured proton singles channel count rate for each MPS-HI proton

telescopes' logical detectors

**units:**

**DerivedUnit:**

**identifier:** count s-1

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** mps-hi\_electron\_dead\_time\_corrections

**attributeType:**

**descriptor:** electron count rate dead-time correction factor in divisor form for each MPS-

HI electron telescope

**units:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** mps-hi\_proton\_dead\_time\_corrections

**attributeType:**

**descriptor:** proton count rate dead-time correction factor in divisor form for each MPS-

HI proton telescope

**units:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** mps-lo\_electron\_background\_channel\_count\_rate

**attributeType:**

**descriptor:** average electron background channel count rate for each MPS-LO sensor

head

**units:**

**DerivedUnit:**

**identifier:** count s-1

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** mps-lo\_ion\_background\_channel\_count\_rate

**attributeType:**

**descriptor:** average ion background channel count rate for each MPS-LO sensor head

**units:**

**DerivedUnit:**  
**identifier:** count s-1  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** mps-lo\_electron\_dead\_time\_corrections  
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**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** mps-lo\_ion\_dead\_time\_corrections  
**attributeType:**  
**descriptor:** ion count rate dead-time correction factor in divisor form for each MPS-LO angular zone's energy bands  
**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** sgps-x\_singles\_channel\_count\_rate  
**attributeType:**  
**descriptor:** measured singles channel count rate for each SGPS-X telescope's detectors  
**units:**  
**DerivedUnit:**  
**identifier:** count s-1  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** sgps+x\_singles\_channel\_count\_rate  
**attributeType:**  
**descriptor:** measured singles channel count rate for each SGPS+X telescope's detectors  
**units:**  
**DerivedUnit:**  
**identifier:** count s-1  
**derivationUnitTerm:**

**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** sgps-x\_proton\_dead\_time\_corrections  
**attributeType:**  
**descriptor:** proton count rate dead-time correction factor in divisor form for each SGPS-X telescope  
**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** sgps+x\_proton\_dead\_time\_corrections  
**attributeType:**  
**descriptor:** proton count rate dead-time correction factor in divisor form for each SGPS+X telescope  
**units:**  
**scaleFactor:**  
**offset:**  
**rangeElementDescription:** (MI\_RangeElementDescription)  
**name:** SEISS Instrument Calibration Data  
**definition:** (EHIS) The EHIS data consists of the HCR priority count rate, which is the measured hardware coincident count rate for the three EHIS priority categories in both non-prime and prime conditions (i.e., Non-Prime\_P1, Non-Prime\_P2, Non-Prime\_P3, Prime\_P1, Prime\_P2, and Prime\_P3). The relative PEC counts are the percent of pulse height analysis event counts that are valid for the three EHIS priority categories, P1-Heavy\_Ions, P2-Helium, and P3-Hydrogen. The dead-time corrections data represent the energetic heavy ions count rate multiplicative dead-time correction factor for EHIS. Finally, the rear-entry contamination corrections represent the rear-entry multiplicative contamination correction factor for each of the three EHIS priority categories. (SGPS) The SGPS data consists of the SGPS-X singles channel count rate, the SGPS+X singles channel count rate, the SGPS-X proton dead time corrections, and the SGPS+X proton dead time corrections. The data structures representing SGPS-X and SGPS+X singles channel count rates are both dependent upon the three SGPS telescopes, the three SGPS detectors, and the number of time samples. Both the SGPS-X dead time correction data and the SGPS+X dead time correction data are dependent on the number of SGPS telescopes, as well as the number of time samples. (MPS-Hi) The MPS-Hi data consists of the electron singles channel count, the proton singles channel count, the electron dead-time correction and the proton dead-time correction. The electron and proton singles channel counts are a function of the five MPS-HI telescopes, the four MPS-HI electron detectors, and the number of time samples. The MPS-HI electron and proton dead-time corrections are both a function of the number of MPS-HI telescopes and time samples. (MPS-Lo) The MPS-LO data consists of: the average electron background channel count rate for each of the two (R and L) sensor heads; the average ion background channel count rate for each of the two sensor heads; the electron count rate dead-time correction factor (in divisor form) for each MPS-LO angular zone; and the ion count rate dead-

time correction factor (in divisor form) for each MPS-LO angular zone. The electron and ion background channel count rates are array structures sized according to the two MPS-LO sensor heads, and the time samples. The dead-time correction data are sized according to the sixteen MPS-LO angular zones, fifteen MPS-LO energy steps, and the time samples.

**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** SU\_Telemetry

**attributeType:**

**descriptor:** EXIS instrument telemetry item value

**units:**

**scaleFactor:**

**offset:**

**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** EXIS Instrument Calibration Engineering

**definition:** EXIS telemetry data

**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** mag\_dqf

**attributeType:**

**descriptor:** magnetometer data quality flags

**units:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** ib\_mag\_status

**attributeType:**

**descriptor:** inbound magnetometer status flags

**units:**

**scaleFactor:**

**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** ob\_mag\_status  
**attributeType:**  
**descriptor:** outbound magnetometer status flags  
**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** ib\_mag\_x\_coord, ib\_mag\_y\_coord, ib\_mag\_z\_coord  
**attributeType:**  
**descriptor:** inboard magnetometer raw x, y and z measurements  
**units:**  
**DerivedUnit:**  
**identifier:** count  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** ob\_mag\_x\_coord, ob\_mag\_y\_coord, ob\_mag\_z\_coord  
**attributeType:**  
**descriptor:** outboard magnetometer raw x, y and z measurements  
**units:**  
**DerivedUnit:**  
**identifier:** count  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** MAG Instrument Calibration Data

**definition:** The Magnetometer calibration data represents the level 0 instrument inboard and outboard measurement data, and corresponding status information, for a time period of one second collected during a calibration maneuver. This information consists of magnetometer data quality flags, inboard and outboard status flags, and inboard and outboard raw sensor measurements in x,y,z coordinates. The time of the Magnetometer observation is provided, expressed in seconds since the J2000 epoch starting from 1 January 2000 at 12:00:00. Each instance of the Magnetometer data quality flag indicates whether the 10 samples of the raw x,y,x inboard and outboard data are of good quality or is a missing value. The data quality flag is a vector that consists of 10 elements, in which each element has a unique flag value. In addition, the MAG Instrument Calibration Data file includes an inboard magnetometer status flag and an outboard magnetometer status flag, in which each such status flag is a 10 element vector.

**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** SU\_Telemetry**attributeType:****descriptor:** MAG instrument telemetry item value**units:****scaleFactor:****offset:****rangeElementDescription:** (MI\_RangeElementDescription)**name:** MAG Instrument Calibration Engineering**definition:** MAG telemetry data**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** filterwheel1\_position**attributeType:****descriptor:** forward filter wheel setting**units:****scaleFactor:****offset:****dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** filterwheel2\_position**attributeType:****descriptor:** aft filter wheel setting**units:****scaleFactor:****offset:****dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:**

**aName:** readout\_side  
**attributeType:**  
**descriptor:** flags indicating the CCD readout configuration  
**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** image  
**attributeType:**  
**descriptor:** SUVI miscellaneous calibration frame data (in digital numbers)  
**units:**  
**DerivedUnit:**  
**identifier:** count  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DQF  
**attributeType:**  
**descriptor:** SUVI miscellaneous calibration frame data quality flags  
**units:**  
**scaleFactor:**  
**offset:**  
**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** SUVI Instrument Frame Calibration Data

**definition:** The SUVI miscellaneous calibration frame product is intended to represent data obtained during the calibration activities concerning CCD flat fields, light transfer measurements, visible light images, EXIS cross calibration, and focus checks. CCD flat fields are obtained bi-annually. Light transfer measurements are obtained quarterly and during eclipses. Visible light images are obtained at least daily, as are EXIS cross calibration measurements. Finally, the focus check is performed annually, at a minimum. These on-orbit calibration operations can be accomplished during normal operations using designated calibration slots in the four minute SUVI imaging sequence. The start time of the calibration frame product is expressed in seconds since 1 January 2000 at 12:00 UTC. The SUVI miscellaneous calibration frame product provides information concerning the wavelength of the image frame, expressed in units of Angstroms. Information is also included that describes the active position of each of the two filter wheels. The readout configuration of the CCD is provided. Finally, a raw data downlink CCSDS APID variable is included indicating that the SUVI miscellaneous calibration frame has been received. The calibration data file consists of an image array and an array of data quality flags (DQF). The image and DQF arrays are sized such that the extent is 1292 rows by 1330 columns. The data in the image array is expressed in terms of units of digital numbers (i.e., counts) and is of type short, with a valid range of 0 to 16383. The data quality flag is represented by an array in which each element is a byte data type.



**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** image**attributeType:****descriptor:** SUVI dark frame calibration data (in digital numbers)**units:****DerivedUnit:****identifier:** count**derivationUnitTerm:****scaleFactor:****offset:****dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF**attributeType:****descriptor:** SUVI dark frame calibration data quality flags**units:****scaleFactor:****offset:****rangeElementDescription:** (MI\_RangeElementDescription)**name:** SUVI Instrument Dark Frame Calibration Data

**definition:** The SUVI dark frame calibration product is intended to measure the inherent bias and noise in the camera electronics, and to map permanently bad (i.e. hot) pixels. Such frames are taken as a standard exposure with the camera shutter closed. Ideally, a median dark frame is created for each exposure every four hours. The start time of the calibration frame product is expressed in seconds since 1 January 2000 at 12:00 UTC. The SUVI miscellaneous calibration frame product provides information concerning the readout configuration of the CCD. A raw data downlink CCSDS APID variable is included which indicates that the SUVI miscellaneous calibration frame has been received. The dark frame calibration data file consists of an image array and an array of data quality flags (DQF). The image and DQF arrays are sized such that the extent is 1292 rows by 1330 columns. The data in the image array is expressed in terms of units of digital numbers (i.e., counts). It is of type short, with a valid range of 0 to 16383. The data quality flag is represented by an array in which each element is a byte data type.

**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:**

**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
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     **aName:** SU\_Telemetry  
   **attributeType:**  
**descriptor:** SUVI instrument telemetry item value  
**units:**  
**scaleFactor:**  
**offset:**  
**rangeElementDescription:** (MI\_RangeElementDescription)  
   **name:** SUVI Instrument Calibration Engineering  
   **definition:** SUVI telemetry data  
**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
   **RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
   **MemberName:**  
     **aName:** ict  
   **attributeType:**  
**descriptor:** infrared calibration target data digital numbers for emissive bands  
**units:**  
   **DerivedUnit:**  
     **identifier:** count  
     **derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
   **MemberName:**  
     **aName:** ict\_nedn  
   **attributeType:**  
**descriptor:** infrared calibration target calculated noise equivalent change in radiance (NEdN) for detectors of emissive bands over single calibration sampling period  
**units:**  
   **DerivedUnit:**  
     **identifier:** mW m<sup>-2</sup> sr<sup>-1</sup> (cm<sup>-1</sup>)-1  
     **derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)

**sequenceIdentifier:**  
**MemberName:**  
  **aName:** ict\_nedt  
  **attributeType:**  
**descriptor:** infrared calibration target calculated noise equivalent differential temperature (NEdT) for detectors of emissive bands over single calibration sampling period  
**units:**  
  **DerivedUnit:**  
    **identifier:** K  
    **derivationUnitTerm:**  
  **scaleFactor:**  
  **offset:**  
**dimension:** (MD\_Band)

**sequenceIdentifier:**  
**MemberName:**  
  **aName:** sct  
  **attributeType:**  
**descriptor:** solar calibration target data digital numbers for reflective bands  
**units:**  
  **DerivedUnit:**  
    **identifier:** count  
    **derivationUnitTerm:**  
  **scaleFactor:**  
  **offset:**  
**dimension:** (MD\_Band)

**sequenceIdentifier:**  
**MemberName:**  
  **aName:** sct\_nedn  
  **attributeType:**  
**descriptor:** solar calibration target calculated noise equivalent change in radiance (NEdN) for detectors of reflective bands over single calibration sampling period  
**units:**  
  **DerivedUnit:**  
    **identifier:** W m<sup>-2</sup> sr<sup>-1</sup> um<sup>-1</sup>  
    **derivationUnitTerm:**  
  **scaleFactor:**  
  **offset:**  
**dimension:** (MD\_Band)

**sequenceIdentifier:**  
**MemberName:**  
  **aName:** sct\_signal\_to\_noise  
  **attributeType:**  
**descriptor:** solar calibration target calculated signal to noise ratio for detectors of reflective bands over single calibration sampling period calibration sampling period  
**units:**  
  **scaleFactor:**  
  **offset:**

**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** spacelook  
**attributeType:**  
**descriptor:** space look calibration data digital numbers for reflective and emissive  
bands calibration sampling period  
**units:**  
**DerivedUnit:**  
**identifier:** count  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** spacelook\_nedn  
**attributeType:**  
**descriptor:** space look calibration calculated noise equivalent change in radiance  
(NEdN) for detectors of reflective and emissive bands over single calibration sampling period  
**units:**  
**DerivedUnit:**  
**identifier:** W m<sup>-2</sup> sr<sup>-1</sup> um<sup>-1</sup> for reflective bands, mW m<sup>-2</sup> sr<sup>-1</sup> (cm<sup>-1</sup>)-1 for emissive  
bands  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** spacelook\_nedt  
**attributeType:**  
**descriptor:** space look calibration calculated noise equivalent differential temperature  
(NEdT) for detectors of emissive bands over single calibration sampling period over single  
calibration sampling period  
**units:**  
**DerivedUnit:**  
**identifier:** K  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** starlook  
**attributeType:**  
**descriptor:** calibrated star look radiance for detectors over single calibration sampling

period for applicable bands calibration sampling period over single calibration sampling period

**units:**

**DerivedUnit:**

**identifier:** W m<sup>-2</sup> sr<sup>-1</sup> um<sup>-1</sup>

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** starlook\_dqf

**attributeType:**

**descriptor:** calibrated detector star look radiance data quality flags for applicable bands period over single calibration sampling period

**units:**

**scaleFactor:**

**offset:**

**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** ABI Instrument Calibration Data

**definition:** The ABI instrument calibration product files contain data representative of the ABI Space Look, Infrared Calibration Target (ICT) (i.e., blackbody), Star Look Target, and Solar Calibration Target (SCT) (i.e., solar look target). These observations are dependent on the ABI band and the individual detectors. There are three types of Space Look observations. There is the Space Look associated with the beginning of a Mode 3, Mode 4 and Mode 6 timeline. Data from these observations are used in conjunction with the ICT observations to compute the gain coefficient of each detector of an ABI emissive band. There is also an SCT Space Look, which is essentially just a longer duration Space Look obtained at the time of the SCT observation to facilitate the computation of reflective band gain coefficients. The product data contain information on the ICT, SCT and Space Look, both in terms of the discrete measurement values, as well as in terms of the statistical metrics derived from them. The ICT statistical data are min, max, mean and standard deviation of the ICT detector samples for each detector of the ABI emissive channel of interest. Similarly, the SCT data contain min, max, mean and standard deviation of the SCT detector data for each detector of the ABI reflective channel of interest. ICT data are collected at the very beginning of the ABI Mode 3 timeline and the ABI Mode 4 timeline. This is followed by a Space Look observation. Such pairs of observations, taking into account the ABI scan mirror radiometric properties obtained at these times, leads to the computation of detector gain coefficient values. The remaining Space Look observations during a Mode 3 or Mode 4 sequence always precede a swath scan of the Earth. The ABI cal data products include the raw ICT counts, and the associated statistical metrics (min, max, mean, standard deviation). In addition, metrics quantifying detector sensitivity are included in the form of ICT NEdN values, and ICT NEdT values for each detector. SCT data are collected during the ABI diagnostic mode. Such observations occur daily or weekly in the very beginning of the GOES-R mission, gradually tapering off in frequency to several times per year as the end of mission life of GOES-R approaches. Each SCT observation is accompanied by an SCT Space Look, an extended duration version of the Space Look observation obtained during normal mode operations. The ABI cal data products include the raw SCT counts, and the associated statistical metrics (min, max, mean, standard deviation). In addition, metrics quantifying detector sensitivity are included

in the form of SCT SNR values, and SCT NEdN values for each detector. Space Look data are provided for the ABI channel of interest. In normal mode operation, a Space Look observation takes place at the beginning of an ABI Mode 3 and Mode 4 observation in conjunction with the ICT observation. Subsequent Space Look observations are collected at the beginning of each Full Disk scan of the Earth. Along with the raw Space Look data, the ABI calibration files contain associated statistical metrics in the form of min, max, mean and standard deviation per detector for the ABI channel of interest. In addition, metrics quantifying detector sensitivity are provided in the form of Space Look NEdN and Space Look NEdT, where the latter metric is associated with emissive bands, only. Star look data are collected for ABI reflective channels during Mode 3, Mode 4 and Mode 6 operations. Nominally, six star scene observations are obtained during each such mode. There are a total of seven ABI star scene ID types. Star scene ID values of 4 through 9 represent one star scene for each reflective channel. Star scene ID 10 is reserved for a star scene observation associated with an emissive channel. The star look data is represented in the calibration product file in terms of calibrated radiances, data quality flags, and computed gain coefficients.

**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** radiance

**attributeType:**

**descriptor:** lunar scan calibrated sample radiance values

**units:**

**DerivedUnit:**

**identifier:** W m<sup>-2</sup> sr<sup>-1</sup> um<sup>-1</sup> for reflective bands, mW m<sup>-2</sup> sr<sup>-1</sup> (cm<sup>-1</sup>)-1 for emissive

bands

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** radiance\_dqf

**attributeType:**

**descriptor:** lunar scan calibrated sample radiance value data quality flags

**units:**

**scaleFactor:**

**offset:**

**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** ABI Instrument Calibration Lunar Scan

**definition:** Lunar scan data is an off-earth mesoscale scene, and collected as part of an

ABI Mode 3 or Mode 6 timeline when the Moon is in the field of regard of the ABI instrument. The apparent size of the Moon in the field of regard of the ABI subtends a size suitable for coverage using the ABI mesoscale scene type consisting of two swaths. This data is collected for all ABI bands. Lunar scan data samples are radiometrically calibrated. The Moon's surface is scanned for calibration purposes only. Separate files are created for each band and each occurrence of an ABI Mode 3 or Mode 6 timeline, which correspond to fifteen and 10 minutes, respectively. In the case of band 2, five different files are created, one for each of the data paths. The band 2 data paths provide a partitioning of the high data volume associated with its 0.000014 radian horizontal spatial resolution to support concurrent processing in the instrument and ground system.

**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** SU\_Telemetry

**attributeType:**

**descriptor:** ABI instrument telemetry item value

**units:**

**scaleFactor:**

**offset:**

**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** ABI Instrument Calibration Engineering

**definition:** ABI telemetry data

**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** image

**attributeType:**

**descriptor:** GLM native background image (in digital numbers)

**units:**

**DerivedUnit:**

**identifier:** count

**derivationUnitTerm:**

**scaleFactor:**

**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** image\_dqf  
**attributeType:**  
**descriptor:** GLM native background image data quality flags  
**units:**  
**scaleFactor:**  
**offset:**  
**rangeElementDescription:** (MI\_RangeElementDescription)  
**name:** GLM Instrument Calibration  
**definition:** The GLM generates a background image periodically, interleaved with the detection of events in support of detecting false events, and instrument calibration. A background image is a scene composed of the background from all detector elements in the focal plane.  
**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** SU\_Telemetry  
**attributeType:**  
**descriptor:** GLM instrument telemetry item value  
**units:**  
**scaleFactor:**  
**offset:**  
**rangeElementDescription:** (MI\_RangeElementDescription)  
**name:** GLM Instrument Calibration Engineering  
**definition:** GLM telemetry data  
**rangeElement:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** attitudeTimes  
**attributeType:**  
**descriptor:** time of the attitude observation (Q0, Q1, Q2, and Q3) in seconds since J2000



epoch (2000-01-01 12:00:00)

**units:**

**DerivedUnit:**

**identifier:** seconds since 2000-01-01 12:00:00

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** orbitTimes

**attributeType:**

**descriptor:** time of the orbit observation (x, y, z, theta\_x, theta\_y, theta\_z) in seconds since J2000 epoch (2000-01-01 12:00:00)

**units:**

**DerivedUnit:**

**identifier:** seconds since 2000-01-01 12:00:00

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** x

**attributeType:**

**descriptor:** x-position of the spacecraft in the J2000 inertial reference frame

**units:**

**DerivedUnit:**

**identifier:** km

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** y

**attributeType:**

**descriptor:** y-position of the spacecraft in the J2000 inertial reference frame

**units:**

**DerivedUnit:**

**identifier:** km

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** z  
**attributeType:**  
**descriptor:** z-position of the spacecraft in the J2000 inertial reference frame  
**units:**  
**DerivedUnit:**  
**identifier:** km  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** theta-x  
**attributeType:**  
**descriptor:** x-velocity of the spacecraft in the J2000 inertial reference frame  
**units:**  
**DerivedUnit:**  
**identifier:** km s-1  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** theta-y  
**attributeType:**  
**descriptor:** y-velocity of the spacecraft in the J2000 inertial reference frame  
**units:**  
**DerivedUnit:**  
**identifier:** km s-1  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** theta-z  
**attributeType:**  
**descriptor:** z-velocity of the spacecraft in the J2000 inertial reference frame  
**units:**  
**DerivedUnit:**  
**identifier:** km s-1  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**

**MemberName:**  
**aName:** Q0  
**attributeType:**  
**descriptor:**  $Q0 = \cos(\text{phi} / 2)$ . phi is the angle between the J2000 reference and body frame of reference  
**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** Q1  
**attributeType:**  
**descriptor:**  $Q1 = e1 * \sin(\text{phi} / 2)$ . phi is the angle between the J2000 reference and body frame of reference. e1 is a component of the unit rotation vector u in either frame  
**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** Q2  
**attributeType:**  
**descriptor:**  $Q2 = e2 * \sin(\text{phi} / 2)$ . phi is the angle between the J2000 reference and body frame of reference. e2 is a component of the unit rotation vector u in either frame  
**units:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** Q3  
**attributeType:**  
**descriptor:**  $Q3 = e3 * \sin(\text{phi} / 2)$ . phi is the angle between the J2000 reference and body frame of reference. e3 is a component of the unit rotation vector u in either frame  
**units:**  
**scaleFactor:**  
**offset:**  
**rangeElementDescription:** (MI\_RangeElementDescription)  
**name:** Satellite Instrument Calibration Ephemeris  
**definition:** Satellite ephemeris data  
**rangeElement:**

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information

about a collection of datasets of a product line that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-R-S-T

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of

distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:**

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on the GOES-R Series for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-R Series ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/exis.html>

**date:**

**code:**

**type:** Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

**description:** The EXIS contains two primary sensors, the Extreme Ultraviolet Sensor (EUVS) and the X-Ray Sensor (XRS), which will help scientists monitor activity on the Sun. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array. The instrument also includes the Sun Positioning Sensor (SPS).

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:**

**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper (GLM) is an optical transient detector and imager operating in the near-IR that maps total lightning (in-cloud and cloud-to-ground) activity with near uniform spatial resolution of approximately 8 km continuously day and night over the Americas and adjacent ocean regions. The GLM provides early indication of storm

intensification and severe weather events, improved tornado warning lead time, and data for long-term climate variability studies. The GLM provides information to identify growing, active, and potentially destructive thunderstorms over land as well as ocean areas.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/mag.html>

**date:**

**code:**

**type:** Magnetometer

**description:** The GOES-R Magnetometer provides measurements of the space environment magnetic field that controls charged particle dynamics in the outer region of the magnetosphere. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements are important for providing alerts and warnings to many customers, including satellite operators and power utilities. GOES Magnetometer data are also important in research, being among the most widely used spacecraft data by the national and international research community. The GOES-R Magnetometer products will be an integral part of the National Oceanic and Atmospheric Administration (NOAA) space weather operations, providing information on the general level of geomagnetic activity and permitting detection of sudden magnetic storms. In addition, measurements will be used to validate large-scale space environment models that are used in operations. The MAG requirements are similar to the tri-axial fluxgates that have previously flown. GOES-R requires measurements of three components of the geomagnetic field with a resolution of 0.016 nT and response frequency of 2.5 Hz.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** SEISS Energetic Heavy Ion Sensor (EHIS)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** Magnetospheric Particle Sensor – High Energy Range (MPS-Hi)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data

Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** Magnetospheric Particle Sensor – Low Energy Range (MPS-Lo)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** Solar and Galactic Proton Sensor - SGPS

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/suvi.html>

**date:**

**code:**

**type:** Solar Ultraviolet Imager - SUVI

**description:** The GOES-R Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. By observing the Sun, SUVI will be able to compile full disk solar images around the clock.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:**

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on the GOES-R Series for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-R Series ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/exis.html>

**date:**

**code:**

**type:** Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS)

**description:** The EXIS contains two primary sensors, the Extreme Ultraviolet Sensor (EUVS) and the X-Ray Sensor (XRS), which will help scientists monitor activity on the Sun. EXIS will reside on the Sun Pointing Platform mounted in the yoke of the solar array. The



instrument also includes the Sun Positioning Sensor (SPS).

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:**

**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper (GLM) is an optical transient detector and imager operating in the near-IR that maps total lightning (in-cloud and cloud-to-ground) activity with near uniform spatial resolution of approximately 8 km continuously day and night over the Americas and adjacent ocean regions. The GLM provides early indication of storm intensification and severe weather events, improved tornado warning lead time, and data for long-term climate variability studies. The GLM provides information to identify growing, active, and potentially destructive thunderstorms over land as well as ocean areas.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/mag.html>

**date:**

**code:**

**type:** Magnetometer

**description:** The GOES-R Magnetometer provides measurements of the space environment magnetic field that controls charged particle dynamics in the outer region of the magnetosphere. These particles can be dangerous to spacecraft and human spaceflight. The geomagnetic field measurements are important for providing alerts and warnings to many customers, including satellite operators and power utilities. GOES Magnetometer data are also important in research, being among the most widely used spacecraft data by the national and international research community. The GOES-R Magnetometer products will be an integral part of the National Oceanic and Atmospheric Administration (NOAA) space weather operations, providing information on the general level of geomagnetic activity and permitting detection of sudden magnetic storms. In addition, measurements will be used to validate large-scale space environment models that are used in operations. The MAG requirements are similar to the tri-axial fluxgates that have previously flown. GOES-R requires measurements of three components of the geomagnetic field with a resolution of 0.016 nT and response frequency of 2.5 Hz.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** SEISS Energetic Heavy Ion Sensor (EHIS)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This

includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** Magnetospheric Particle Sensor – High Energy Range (MPS-Hi)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** Magnetospheric Particle Sensor – Low Energy Range (MPS-Lo)

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/seiss.html>

**date:**

**code:**

**type:** Solar and Galactic Proton Sensor - SGPS

**description:** The SEISS instrument suite consists of: the Energetic Heavy Ion Sensor (EHIS), the Magnetospheric Particle Sensors - High and Low (MPS-HI and MPS-LO), and the Solar and Galactic Proton Sensor (SGPS). The instrument suite also includes the Data Processing Unit (DPU). The EHIS is responsible for measuring heavy ion fluxes in the magnetosphere to provide a complete picture of the energetic particles surrounding Earth. This includes particles trapped within Earth's magnetosphere and particles arriving directly from the sun and cosmic rays which have been accelerated by electromagnetic fields in space.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/suvi.html>

**date:**

**code:**

**type:** Solar Ultraviolet Imager - SUVI

**description:** The GOES-R Solar Ultraviolet Imager is a telescope that monitors the Sun in the extreme ultraviolet wavelength range. By observing the Sun, SUVI will be able to compile full disk solar images around the clock.

#### 4.2.4 Level 1b Semi-Static Source Data ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f9d6dbe0-e4a6-11e5-a837-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for GOES-R L1b Processing Parameters Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-15

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_PARM-L1b-ISO-SERIES\_c20171351620000.xml

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R L1b Processing Parameters

**alternateTitle:** Data short name (DSN): PARM-L1b-ISO-SERIES

**date:** (CI\_Date)

**date:** 2017-05-15

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** Product Definition and Users Guide (PUG) Volume 1: Main

**date:** (CI\_Date)

**date:** 2016

**dateType:** (CI\_DateTypeCode) revision

**code:** GOES-R Document Control Number: 7035538

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** Processing parameters are used as a direct input to the GOES-R ground processing algorithms. There are six categories of semi-static source data used in the Advanced Baseline Imager (ABI) Level 1b ground processing algorithm, 1) Coverage calibration parameters (associated with the location of the ABI in geostationary orbit, global reference ellipsoid used to geolocate raw and resampled ABI imagery, ABI's field of regard, and instrument sensing rate), 2) Radiometric calibration parameters (associated with the instrument's radiometric observing characteristics, or its raw outputs), 3) Calibration target parameters (associated with the calibration performed by the instrument during operations including the internal calibration (i.e., blackbody), and space, solar, and star looks), 4) Geometric calibration parameters (associated with resampling, and the related geolocating of raw and resampled instrument data), 5) Kalman filter calibration parameters (associated with the Kalman filter used to support geolocation of raw samples and resampled pixels), 6) Algorithm processing parameters (used during service initiation, the processing of science data and to format data in preparation for producing an end product). There are three categories of Solar Ultraviolet Imagery (SUVI) processing parameters, 1) Radiometric calibration parameters and images (associated with the instrument's radiometric observing characteristics, or its raw outputs), 2) Geometric calibration parameters (associated with the precise look angle and size of the instrument's field of view), 3) Algorithm processing parameters (associated with configurable decision-making logic in the algorithm related to data identification, data, time, and position thresholds, and conversion factors). There are three categories of Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS) Solar Flux Extreme Ultraviolet processing parameters, 1) Sensor calibration parameters are used by the algorithms to calibrate the raw signals recorded by the instrument components into engineering units, 2) Solar calibration parameters are those associated with the distance, on a daily basis, between the earth and the sun, 3) Model processing parameters are those associated with the EUV spectrum proxy model. There are two categories of EXIS Solar Flux X-Ray processing parameters, 1) Sensor calibration parameters are those associated with the XRS and SPS sensors' radiometric and geometric observing characteristics, its raw outputs, and the subsequent calibration related processing, 2) Solar calibration parameters are those associated with the distance, on a daily basis, between the earth and the sun. There are two categories of SEISS processing parameters, 1) Sensor calibration parameters are those associated with the sensor's observing characteristics, or its raw outputs, 2) Algorithm processing parameters are those associated with configurable decision-making logic in the algorithm. Magnetometer uses four categories of processing parameters, 1) Factory calibration parameters are those associated with sensor and electronic temperature dependent, and alignment corrections required that were determined pre-launch, 2) On-orbit calibration

parameters are those that account for launch shift and in-flight drifts. These parameters are applied to the compensated (factory calibrated) magnetic field measurements, 3) Sensor calibration parameters are those associated with magnetometer hardware, valid telemetry ranges, and coordinate transformation matrices, 4) Algorithm processing parameters are those associated with the gradiometer model, and valid time and temperature thresholds.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** zip

**version:**

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** Earth Observation Satellites > GOES (Geostationary Operational Environmental Satellite) > GOES-R

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** semi-static processing parameters

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**language:** eng; USA

**characterSet:** (MD\_CharacterSetCode) utf8

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:**

**TimePeriod:**

**beginPosition:** 2017-05-15

**endPosition:** now

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

#### 4.2.5 Level 1b Algorithm Packages

(MI\_Metadata)

**fileIdentifier:** 6c77a140-3769-11e3-aa6e-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for GOES-R L1b Algorithm Package Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ALG-L1b-ISO-SERIES\_c20171311357000.xml

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** GOES-R L1b Algorithm Package

**alternateTitle:** Data short name (DSN): ALG-L1b-ISO-SERIES

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** ALG-L1b-ISO-SERIES  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** Each Algorithm Package includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), and descriptive information. Each ATBD will include an overview, logic flow, assumptions, theoretical/math description, limitations, exception handling, inputs/outputs, and software implementation considerations.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** zip  
**version:**  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** Earth Observation Satellites > GOES (Geostationary Operational Environmental Satellite) > GOES-R  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M.

Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** Algorithm Package

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**language:** eng; USA

**characterSet:** (MD\_CharacterSetCode) utf8

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:**

**TimePeriod:**

**beginPosition:** 2017-05-11

**endPosition:** now

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) series

**lineage:** (LI\_Lineage)

**source:** (LI\_Source)

**description:** Includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), for the following algorithms: Advanced Baseline Imager (ABI) Radiance Channel 1 through ABI Radiance Channel 16 algorithms. Also CDRL0080-1\_ABI\_GPA\_Overview, CDRL0080-2\_ABI\_GPA-Decompression, CDRL0080-3\_ABI\_GPA\_Calibration, CDRL0080-4\_ABI\_GPA\_Navigation, CDRL0080-5\_ABI\_GPA\_Resampler, CDRL0080-6\_ABI\_GPA\_ScanCal. For EXIS, SUVI, MAG, GLM and SEISS the CDRL 80 - Algorithm documents are included.

**source:** (LI\_Source)

**description:** Includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), and applicable CDRL documents for the following algorithm: Magnetometer (MAG).

**source:** (LI\_Source)

**description:** Includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), and applicable CDRL documents for the following algorithm: Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS).

**source:** (LI\_Source)

**description:** Includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), and applicable CDRL documents for the following algorithm: Space Environment In-Situ Suite (SEISS) sensors.

**source:** (LI\_Source)

**description:** Includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), and applicable CDRL documents for the following algorithm: Solar Ultraviolet Imager (SUVI).



**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

## 5.0 LEVEL 2+ PRODUCT AND DATA ISO SERIES METADATA

### 5.1 Level 2+ Products

#### 5.1.1 Cloud and Moisture Imagery Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 8c9e8150-3692-11e3-aa6e-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Cloud and Moisture Imagery

Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-CMIP-ISO-SERIES\_c20171311130000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 10848

**resolution:**

**Distance:** 1

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 10848  
**resolution:**  
    **Distance:** 1  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk; ABI Channels 1, 3, 5

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) row  
    **dimensionSize:** 3000  
    **resolution:**  
        **Distance:** 1  
**axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) column  
    **dimensionSize:** 5000  
    **resolution:**  
        **Distance:** 1  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS; ABI Channels 1, 3, 5

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) row  
    **dimensionSize:** 1000  
    **resolution:**  
        **Distance:** 1  
**axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) column  
    **dimensionSize:** 1000  
    **resolution:**  
        **Distance:** 1  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** Mesoscale; Channels 1, 3, 5

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 21696  
**resolution:**  
**Distance:** 0.5  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 21696  
**resolution:**  
**Distance:** 0.5  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk; ABI Channel 2

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 6000  
**resolution:**  
**Distance:** 0.5  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 10000  
**resolution:**  
**Distance:** 0.5  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS; ABI Channels 2

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 2000  
**resolution:**

**Distance:** 0.5  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 2000  
**resolution:**  
**Distance:** 0.5  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale; Channel 2

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk; ABI Channels 4 and 6 - 16

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 1500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 2500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS; ABI Channels 4 and 6 - 16

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
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**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale; Channels 4 and 6 - 16

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.  
**code:** goes\_projection  
**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** ABI Level 2+ Cloud and Moisture Imagery Product  
**alternateTitle:** Data short name (DSN): ABI-L2-CMIPM1-M3C01  
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**alternateTitle:** Data short name (DSN): ABI-L2-MCMIPF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-MCMIPF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-\*CMIP\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Cloud and Moisture Imagery product contains one or more Earth-view images with pixel values identifying “brightness values” that are scaled to support visual analysis. The product includes data quality information that provides an assessment of the cloud and moisture imagery data values for on-earth pixels. Cloud and Moisture Imagery product files are generated for each of the sixteen ABI reflective bands (channels 1 - 6 with wavelengths 0.47, 0.64, 0.87, 1.38, 1.61, 2.25 microns respectively) and emissive bands (channels 7 - 16 with wavelengths 3.89, 6.17, 6.93, 7.34, 8.44, 9.61, 10.33, 11.19, 12.27, 13.27 microns respectively). In addition, there is a multi-band product file where the imagery at all bands is included. The imagery value for the reflective bands, ABI bands 1 through 6, is a dimensionless “reflectance factor” quantity that is normalized by the solar zenith angle. These bands support the characterization of clouds, vegetation, snow/ice, and aerosols. The imagery value for the emissive bands, ABI bands 7 through 16, is the brightness temperature at the Top-Of-Atmosphere (TOA) in Kelvin. These bands supports the characterization of the surface, clouds, water vapor, ozone, volcanic ash and dust based on emissive properties.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring



**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** ATMOSPHERE > ATMOSPHERIC RADIATION > REFLECTANCE  
**keyword:** SPECTRAL/ENGINEERING > INFRARED WAVELENGTHS >  
 BRIGHTNESS TEMPERATURE  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,  
 M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M.  
 Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** toa\_lambertian\_equivalent\_albedo\_multiplied\_by\_cosine\_solar\_zenith\_angle  
**keyword:** toa\_brightness\_temperature  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
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**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** .5  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 1  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**language:** eng; USA

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**extent:** (EX\_Extent)  
    **temporalElement:** (EX\_TemporalExtent)  
        **extent:**  
            **TimePeriod:**  
                **beginPosition:** 2017-05-11  
                **endPosition:** now  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** Full Disk - GOES-East  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** -156.2995  
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**extent:** (EX\_Extent)  
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        **geographicIdentifier:** (MD\_Identifier)  
            **code:** Full Disk - GOES-West  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** 141.7005  
        **eastBoundLongitude:** -55.7005  
        **southBoundLatitude:** -81.3282  
        **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
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        **geographicIdentifier:** (MD\_Identifier)  
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        **westBoundLongitude:** -152.109282  
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        **southBoundLatitude:** 14.571340  
        **northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** CONUS - GOES-West  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** 175.623576  
        **eastBoundLongitude:** -89.623576  
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**extent:** (EX\_Extent)  
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        **geographicIdentifier:** (MD\_Identifier)

**code:** Mesoscale

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<p><b>contentInfo:</b> (MI_CoverageDescription)  <b>attributeDescription:</b>  <b>RecordType:</b> variable  <b>contentType:</b> (MD_CoverageContentTypeCode) physicalMeasurement  <b>dimension:</b> (MD_Band)  <b>sequenceIdentifier:</b>  <b>MemberName:</b>  <b>aName:</b> CMI  <b>attributeType:</b>  <b>descriptor:</b> ABI Cloud and Moisture Imagery reflectance factor (channels 1 - 6)  <b>units:</b>  <b>scaleFactor:</b>  <b>offset:</b>  <b>dimension:</b> (MD_Band)  <b>sequenceIdentifier:</b>  <b>MemberName:</b>  <b>aName:</b> CMI  <b>attributeType:</b>  <b>descriptor:</b> ABI Cloud and Moisture Imagery brightness temperature at top of atmosphere (channels 7 - 16)  <b>units:</b>  <b>DerivedUnit:</b>  <b>identifier:</b> k  <b>derivationUnitTerm:</b>  <b>scaleFactor:</b>  <b>offset:</b></p>
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<p><b>contentInfo:</b> (MI_CoverageDescription)  <b>attributeDescription:</b>  <b>RecordType:</b> variable  <b>contentType:</b> (MD_CoverageContentTypeCode) thematicClassification  <b>dimension:</b> (MD_Band)  <b>sequenceIdentifier:</b>  <b>MemberName:</b>  <b>aName:</b> DQF  <b>attributeType:</b>  <b>descriptor:</b> ABI Level 2+ Cloud and Moisture Imagery Product data quality flags  <b>units:</b></p>
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<p><b>dataQualityInfo:</b> (DQ_DataQuality)  <b>scope:</b> (DQ_Scope)  <b>level:</b> (MD_ScopeCode) dataset</p>
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**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Solar radiance and irradiance values that vary as a function of the Earth-Sun distance and planck constants used for cloud and moisture imagery correction; Number of geolocated pixels; Number of good and conditionally usable pixels; Number of cloud and moisture imagery pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the cloud and moisture imagery values in the product image. The cloud and moisture imagery outlier count and minimum, maximum, mean, and standard deviation values are calculated using good and conditionally usable quality pixels. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Cloud and Moisture product is generated by the GOES-R ABI Cloud and Moisture Imagery ground processing algorithm. Production of the reflective bands depends on the solar radiance at the Earth-Sun distance at the time of observation, and the solar zenith angle. The inverse of the solar radiance is represented by the "kappa0" variable in the product file. The dynamic range of the reflectance factor and brightness temperature output is not constrained by the algorithm but it is compared to the expected measurement range for each band based on the ABI's dynamic range.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode)

**output:** (LE\_Source)

**description:** Advanced Baseline Imager (ABI) L2 Cloud and Moisture Imagery data

are digital maps of clouds, moisture, and atmospheric windows, through which land and water are observed, from radiances for the visible, near-IR, and IR bands with associated per-pixel quality flag array. End-products are unique to an ABI scene (Full Disk, CONUS or Mesoscale) and ABI channel (1 - 16).

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>  
**date:**  
**code:**  
**status:** (MD\_ProgressCode) ongoing  
**parentOperation:**  
**platform:** (MI\_Platform)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov>  
**date:**  
**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov/spacesegment/abi.html>  
**date:**  
**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60

seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.2 Clear Sky Mask Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** b015d6f0-b002-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Clear Sky Mask Product  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-ACM-ISO-SERIES\_c20171311303000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2



**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 1500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 2500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** GOES-R Product Definition and Users Guide (PUG) Volume 5: Level 2+

#### Products

**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized

location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Clear Sky Mask Product

**alternateTitle:** Data short name (DSN): ABI-L2-ACMM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACMM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACMC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACMC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-ACMF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACMF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-ACM\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Clear Sky Mask product contains an image in the form of a binary cloud mask that identifies pixels within a coverage region as clear or cloudy. The production of the clear sky mask is an important step in the processing of many other GOES-R Level 2+ products that use the information generated in the production of the clear sky mask to determine the presence of cloud. The product includes data quality information for the binary cloud mask data values for on-earth pixels. The binary cloud mask value is a dimensionless quantity. The Clear Sky Mask product image is provided at 2 km resolution on the ABI fixed grid for Full Disk,

CONUS, and Mesoscale coverage regions. Product data is produced for geolocated source data to local zenith angles of 90 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > CLOUDS > CLOUD AMOUNT/FREQUENCY

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** cloud\_binary\_mask

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted.

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 2

**language:** eng; USA

**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
    **temporalElement:** (EX\_TemporalExtent)  
        **extent:**  
            **TimePeriod:**  
                **beginPosition:** 2017-05-11  
                **endPosition:** now  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** Full Disk - GOES-East  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** -156.2995  
        **eastBoundLongitude:** 6.2995  
        **southBoundLatitude:** -81.3282  
        **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** Full Disk - GOES-West  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** 141.7005  
        **eastBoundLongitude:** -55.7005  
        **southBoundLatitude:** -81.3282  
        **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** CONUS - GOES-East  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** -152.109282  
        **eastBoundLongitude:** -52.946879  
        **southBoundLatitude:** 14.571340  
        **northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** CONUS - GOES-West  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** 175.623576  
        **eastBoundLongitude:** -89.623576  
        **southBoundLatitude:** 14.571340  
        **northBoundLatitude:** 53.500062  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)

**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** BCM

**attributeType:**

**descriptor:** The Binary Cloud Mask (BCM) defines the detection of a cloud with a value of 1 for the mask otherwise the value of the mask is 0 for clear

**units:**

**scaleFactor:**

**offset:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) qualityInformation

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Clear Sky Mask data quality flags

**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of pixels and percentages of the intermediate 4-level cloud mask image having clear, probably clear, cloudy, and probably cloudy classifications; Applicable ABI emissive band-specific brightness temperature differences minimum, maximum, mean, and standard deviation values between those observed and modeled for all and clear sky conditions. These statistics are calculated using good quality pixels to a local zenith angle of 70 degrees. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Clear Sky Mask product is generated by the GOES-R ABI Cloud Mask ground processing algorithm. The Cloud Mask algorithm is an important component of the GOES-R Level 2+ Algorithm Precedence Network, as the output of the algorithm is used in the generation of the GOES-R Cloud, Aerosol, Sounding, Land, Ocean, Radiation, and Wind products. The Clear Sky Mask product algorithm identifies clear, probably clear, cloudy, and probably cloudy conditions based on spectral, spatial, and temporal tests. The algorithm compares ABI emissive band data with processed clear sky and cloudy sky model data derived from the Community Radiative Transfer Model (CRTM).

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

code: L2

---

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and

XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information



Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.3 Cloud Top Phase Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 1f205b40-afd3-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Cloud Top Phase Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
 for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-ACTP-ISO-SERIES\_c20171311132000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 1500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 2500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** CONUS

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

---

**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** GOES-R Product Definition and Users Guide (PUG) Volume 5: Level 2+

## Products

**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.  
**code:** goes\_projection  
**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** ABI Level 2+ Cloud Top Phase Product  
**alternateTitle:** Data short name (DSN): ABI-L2-ACTPM1-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-ACTPM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACTPC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACTPC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-ACTPF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACTPF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-ACTP\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Cloud Top Phase product contains an image with pixel values identifying the presence of cloud in four phase categories. The categories, which are consistent with heritage NOAA and NASA cloud products, include: Warm liquid water: liquid water cloud with an opaque cloud temperature greater than 273 degrees K; Supercooled liquid water: liquid water topped cloud with an opaque cloud temperature less than 273 degrees K; Mixed phase clouds: high probability of containing both liquid water and ice near cloud top; Ice phase clouds: all ice topped clouds. The Cloud Top Phase product image data variable also has categories for clear sky and unknown phases. A pixel is classified as having an unknown phase when the retrieval has failed because of missing or bad input data. The product includes data quality information that provides an assessment of the cloud top phase data values for on-earth pixels. The cloud top phase value is a dimensionless quantity which is provided at 2 km resolution on the ABI fixed grid for Full Disk, CONUS, and Mesoscale coverage regions. Product data is produced for geolocated source data to local zenith angles of 90 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** ATMOSPHERE > CLOUDS > CLOUD LIQUID WATER/ICE  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** cloud\_phase\_category  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted.  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**

**aName:** Phase  
**attributeType:**  
**descriptor:** ABI Level 2+ Cloud Top Phase  
**units:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Cloud Top Phase data quality flags

**units:**

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**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Percentage of pixels in each of the phase category; Number of cloudy pixels in the image. These statistics are calculated using geolocated pixels. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Cloud Top Phase product is generated by the GOES-R ABI Cloud Type ground processing algorithm. The algorithm determines the cloud top phase for pixels identified as cloudy, probably cloudy, and probably clear in the intermediate 4-level cloud mask generated by the Cloud Mask algorithm. Clear sky is determined using clear pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** NOAA Processing Levels**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher**code:** L2**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes.



The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions

between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

#### 5.1.4 Cloud Top Height Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 4571d650-b00c-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Cloud Top Height Product  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-ACHA-ISO-SERIES\_c20171311133000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
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**axisDimensionProperties:** (MD\_Dimension)  
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**dimensionSize:** 1086  
**resolution:**

**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 1086  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 300  
**resolution:**  
**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
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**dimensionSize:** 250  
**resolution:**  
**Distance:** 4  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 250  
**resolution:**  
**Distance:** 4  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)

**referenceSystemIdentifier:** (RS\_Identifier)

**authority:** (CI\_Citation)

**title:** GOES-R Product Definition and Users Guide (PUG)

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Cloud Top Height Product

**alternateTitle:** Data short name (DSN): ABI-L2-ACHAM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACHAM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACHAC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACHAC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-ACHAF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACHAF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-ACHA\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Cloud Top Height product contains an image with pixel values identifying the geopotential height at the top of a cloud layer. The product is generated in combination with the Cloud Top Temperature and Cloud Top Pressure products by the same algorithm. The product includes data quality information that provides an assessment of the cloud top height data values for on-earth pixels. The units of measure for the cloud top height value is meters. The Cloud Top Height product image is produced on the ABI fixed grid (at 10 km for Full Disk and CONUS coverage regions and at 4km for Mesoscale) under the following conditions: Cloudy; Geolocated source data to local zenith angles of 70 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > CLOUDS > CLOUD HEIGHT

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** geopotential\_height\_at\_cloud\_top

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted.  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 10  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 4  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282

**eastBoundLongitude:** -52.946879**southBoundLatitude:** 14.571340**northBoundLatitude:** 56.761450**extent:** (EX\_Extent)**geographicElement:** (EX\_GeographicDescription)**geographicIdentifier:** (MD\_Identifier)**code:** CONUS - GOES-West**geographicElement:** (EX\_GeographicBoundingBox)**westBoundLongitude:** 175.623576**eastBoundLongitude:** -89.623576**southBoundLatitude:** 14.571340**northBoundLatitude:** 53.500062**extent:** (EX\_Extent)**geographicElement:** (EX\_GeographicDescription)**geographicIdentifier:** (MD\_Identifier)**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** HT**attributeType:****descriptor:** ABI Level 2+ Cloud Top Height**units:****DerivedUnit:****identifier:** m**derivationUnitTerm:****scaleFactor:****offset:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF**attributeType:****descriptor:** ABI Level 2+ Cloud Top Height Product data quality flags



**units:****dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of cloudy or probably cloud pixels that qualify for the algorithm retrieval; Number of cloud top height pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the cloud top height values in the product image. These statistics are calculated using good quality pixels. The percentages of pixels assigned to each DQF value are also included in the product.

**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Cloud Top Temperature, Cloud Top Pressure, and Cloud Top Height products are generated by the GOES-R ABI Cloud Top Height ground processing algorithm. The Cloud Top Height algorithm is an important component of the GOES-R ground processing precedence chain as the output of the algorithm is used in the generation of other ABI Level 2+ products. The algorithm retrieves a state vector composed of cloud top temperature, channel 14 emissivity, and band 15/14 beta ratio. It is retrieved using an optimal estimation technique. Cloud top pressure and height are then derived from cloud top temperature. The channel 14 emissivity and band 15/14 beta ratio are output as intermediate products. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range. Cloudy conditions are determined using cloudy and probably cloudy pixels indicated in the temporally

coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. The Cloud Top Height algorithm operates on 2 km resolution pixels, generating intermediate temperature, pressure, and height products at this resolution, but the delivered Cloud Top Height and Pressure products are aggregated to 4 km or 10 km as needed to satisfy end user product resolution requirements.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's

Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to

weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6

scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

### 5.1.5 Cloud Top Pressure Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** aa36b140-b00d-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Cloud Top Pressure Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-CTP-ISO-SERIES\_c20171311300000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 300  
**resolution:**  
**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.  
**code:** goes\_projection  
**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)

**title:** ABI Level 2+ Cloud Top Pressure Product  
**alternateTitle:** Data short name (DSN): ABI-L2-CTPC-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-CTPC-M4  
**alternateTitle:** Data short name (DSN): ABI-L2-CTPF-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-CTPF-M4  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** ABI-L2-CTP\*  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** The Cloud Top Pressure product contains an image with pixel values identifying the atmospheric pressure at the top of a cloud layer. The product is generated in combination with the Cloud Top Height and Cloud Top Temperature products by the same algorithm. The product includes data quality information that provides an assessment of the cloud top height data values for on-earth pixels. The units of measure for the cloud top pressure value is hectopascals. The Cloud Top Pressure product image is produced on the ABI fixed grid (at 10 km for Full Disk and CONUS coverage regions) under the following conditions: Cloudy; Geolocated source data to local zenith angles of 70 degrees for both daytime and nighttime conditions.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** ATMOSPHERE > CLOUDS > CLOUD TOP PRESSURE  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** air\_pressure\_at\_cloud\_top  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted.  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 10  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995



**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** PRES  
**attributeType:**  
**descriptor:** ABI Level 2+ Cloud Top Pressure  
**units:**  
**DerivedUnit:**  
**identifier:** hPa  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**

**offset:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Cloud Top Pressure data quality flags

**units:**

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**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of cloudy or probably cloud pixels that qualify for the algorithm retrieval; Number of cloud top pressure pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the cloud top pressure values in the product image. These statistics are calculated using good quality pixels. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Cloud Top Temperature, Cloud Top Pressure, and Cloud Top Height products are generated by the GOES-R ABI Cloud Top Height ground processing algorithm. The Cloud Top Height algorithm is an important component of the GOES-R ground processing precedence chain as the output of the algorithm is used in the generation of other ABI Level 2+ products. The algorithm retrieves a state vector composed of cloud top temperature, channel 14 emissivity, and band 15/14 beta ratio. It is retrieved using an optimal estimation technique. Cloud top pressure and height are then derived from cloud top temperature. The channel 14 emissivity and band 15/14 beta ratio are output as intermediate products. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range. Cloudy conditions are determined using cloudy and probably cloudy pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. The Cloud Top Height algorithm operates on 2 km resolution pixels, generating intermediate temperature, pressure, and height products at this resolution, but the delivered Cloud Top Height and Pressure products are aggregated to 4 km or 10 km as needed to satisfy end user product resolution requirements.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** NOAA Processing Levels**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher**code:** L2**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://science.nasa.gov/missions/goes-r/>**date:****code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and

the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:****code:** GOES-17 ABI instrument\_id (serial number)**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.6 Cloud Top Temperature Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 8c98eff0-afda-11e1-afa6-0800200c9a66**language:** eng**characterSet:** (MD\_CharacterSetCode) utf8**parentIdentifier:** n/a**hierarchyLevel:** (MD\_ScopeCode) series**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Cloud Top Temperature Product**contact:** (CI\_ResponsibleParty)**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** GOES-R@noaa.gov**role:** (CI\_RoleCode) originator**dateStamp:** 2017-05-11**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-ACHT-ISO-SERIES\_c20171311300000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

---

**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** GOES-R Product Definition and Users Guide (PUG)  
**date:** (CI\_Date)  
**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Cloud Top Temperature Product

**alternateTitle:** Data short name (DSN): ABI-L2-ACHTM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACHTM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACHTF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ACHTF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-ACHT\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Cloud Top Temperature product contains an image with pixel values identifying the atmospheric temperature at the top of a cloud layer. The product is generated in combination with the Cloud Top Height and Cloud Top Pressure products by the same algorithm. The product includes data quality information that provides an assessment of the cloud top height data values for on-earth pixels. The units of measure for the cloud top temperature value is kelvin.



The Cloud Top Temperature product image is produced on the ABI fixed grid at 2 km resolution for Full Disk and Mesoscale coverage regions. Product data is produced under the following conditions: cloudy; Geolocated source data to local zenith angles of 70 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > CLOUDS > CLOUD TOP TEMPERATURE

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** air\_temperature\_at\_cloud\_top

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted.

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 2  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
     **temporalElement:** (EX\_TemporalExtent)  
         **extent:**  
             **TimePeriod:**  
                 **beginPosition:** 2017-05-11  
                 **endPosition:** now  
**extent:** (EX\_Extent)  
     **geographicElement:** (EX\_GeographicDescription)  
         **geographicIdentifier:** (MD\_Identifier)  
             **code:** Full Disk - GOES-East  
     **geographicElement:** (EX\_GeographicBoundingBox)  
         **westBoundLongitude:** -156.2995  
         **eastBoundLongitude:** 6.2995  
         **southBoundLatitude:** -81.3282  
         **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
     **geographicElement:** (EX\_GeographicDescription)  
         **geographicIdentifier:** (MD\_Identifier)  
             **code:** Full Disk - GOES-West  
     **geographicElement:** (EX\_GeographicBoundingBox)  
         **westBoundLongitude:** 141.7005  
         **eastBoundLongitude:** -55.7005  
         **southBoundLatitude:** -81.3282  
         **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
     **geographicElement:** (EX\_GeographicDescription)  
         **geographicIdentifier:** (MD\_Identifier)  
             **code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
     **RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
     **MemberName:**  
         **aName:** TEMP  
         **attributeType:**  
**descriptor:** ABI Level 2+ Cloud Top Temperature  
**units:**  
     **DerivedUnit:**  
         **identifier:** k  
         **derivationUnitTerm:**

**scaleFactor:**

**offset:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Cloud Top Temperature data quality flags

**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of cloudy or probably cloud pixels that qualify for the algorithm retrieval; Number of cloud top temperature pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the cloud top temperature values in the product image. These statistics are calculated using good quality pixels. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Cloud Top Temperature, Cloud Top Pressure, and Cloud Top Height products are generated by the GOES-R ABI Cloud Top Height ground processing algorithm. The Cloud Top Height algorithm is an important component of the GOES-R ground processing precedence chain as the output of the algorithm is used in the generation of other ABI Level 2+ products. The algorithm retrieves a state vector composed of cloud top temperature, channel 14 emissivity, and band 15/14 beta ratio. It is retrieved using an optimal estimation technique. Cloud top pressure and height are then derived from cloud top temperature. The channel 14 emissivity and band 15/14 beta ratio are output as intermediate products. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range. Cloudy conditions are determined using cloudy and probably cloudy pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. The Cloud Top Height algorithm operates on 2 km resolution pixels, generating intermediate temperature, pressure, and height products at this resolution, but the delivered Cloud Top Height and Pressure products are aggregated to 4 km or 10 km as needed to satisfy end user product resolution requirements.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** NOAA Processing Levels**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher**code:** L2**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://science.nasa.gov/missions/goes-r/>**date:****code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and

the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:****code:** GOES-17 ABI instrument\_id (serial number)**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.7 Cloud Optical Depth ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 49b3d350-afec-11e1-afa6-0800200c9a66**language:** eng**characterSet:** (MD\_CharacterSetCode) utf8**parentIdentifier:** n/a**hierarchyLevel:** (MD\_ScopeCode) series**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Cloud Optical Depth Product Collection**contact:** (CI\_ResponsibleParty)**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** GOES-R@noaa.gov**role:** (CI\_RoleCode) originator**dateStamp:** 2017-05-11**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data**metadataStandardVersion:** ISO 19115-2:2009(E)**dataSetURI:** OR\_ABI-L2-COD-ISO-SERIES\_c20171311132000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) row  
    **dimensionSize:** 2712  
    **resolution:**  
        **Distance:** 4  
    **axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) column  
    **dimensionSize:** 2712  
    **resolution:**  
        **Distance:** 4  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) row  
    **dimensionSize:** 1500  
    **resolution:**  
        **Distance:** 2  
    **axisDimensionProperties:** (MD\_Dimension)  
    **dimensionName:** (MD\_DimensionNameTypeCode) column  
    **dimensionSize:** 2500  
    **resolution:**  
        **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
    **title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
    **date:** (CI\_Date)  
    **date:** 2014  
    **dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products



are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Cloud Optical Depth Product

**alternateTitle:** Data short name (DSN): ABI-L2-CODC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-CODC-M34

**alternateTitle:** Data short name (DSN): ABI-L2-CODF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-CODF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-COD\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Cloud Optical Depth product contains an image with pixel values identifying the measure of the extinction due to condensed water or ice clouds at a wavelength of 0.64 um. Separate algorithms are used for daytime, solar zenith angle to 82 degrees, and nighttime, solar zenith angle greater than 82 degrees, conditions. The product is generated in combination with the Cloud Particle Size product by the same algorithms. The product includes data quality information that identifies whether the daytime or nighttime algorithm generated the pixel, and provides an assessment of the cloud optical depth data values for on-earth pixels. The cloud

optical depth value is a dimensionless quantity. The Cloud Optical Depth product image is produced on the ABI fixed grid at 4 km resolution for Full Disk and 2 km resolution for CONUS coverage regions. Product data is produced under the following conditions for the daytime algorithm: Cloudy; Geolocated source data to local zenith angles of 65 degrees and to solar zenith angles of 82 degrees. Product data generated by the nighttime algorithm is produced under the following conditions: Cloudy; Geolocated source data to local zenith angles of 70 degrees and solar zenith angles between 82 and 180 degrees. The cloud optical depth values reported range from 0 to 160. The sensitivity of the product to high optical depths is limited for nighttime conditions to the nighttime maximum threshold, which is an optical depth value of 16. Cloud Optical Depth product data is identified as degraded in the terminator region, which is a solar zenith angle between 65 and 82 degrees for the daytime algorithm, and 82 and 90 degrees for the nighttime algorithm.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > CLOUDS > CLOUD OPTICAL DEPTH/THICKNESS

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** atmosphere\_optical\_thickness\_due\_to\_cloud

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted.  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 4  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** COD  
**attributeType:**  
**descriptor:** ABI L2+ Cloud Optical Depth at 640 nm  
**units:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DQF  
**attributeType:**  
**descriptor:** ABI L2+ Cloud Optical Depth data quality flags  
**units:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_QuantitativeAttributeAccuracy)  
**nameOfMeasure:** Product summary statistics  
**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of good or degraded cloud optical depth pixels for both day and night; Percentage of daytime, nighttime, and twilight pixels in the product image (solar zenith)

angles 0 to 65, 90 to 180, and 65 to 90 degrees, respectively); Number of cloud optical depth pixels whose values are outside the required measurement range for both the daytime (1 to 50) and nighttime (1 to 8) algorithms; Minimum, maximum, mean, and standard deviation of the cloud optical depth values in the product image for both the daytime and nighttime algorithms. The daytime and nighttime statistics are calculated using pixels to a daytime solar zenith angle of 82 degrees, except for the percent day, night, and twilight statistics that are based on more restrictive day, night, and twilight solar zenith angle ranges. Percentage of daytime, nighttime, and twilight pixels in the image are calculated using geolocated pixels. The other statistics are calculated using good and degraded pixels to a local zenith angle of 65 degrees. The statistics for the image are not restricted to the measurement range specified in the performance requirements. The percentages of pixels assigned to each DQF value are also included in the product.

**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)**description:** The Cloud Optical Depth and Cloud Particle Size products are generated by the GOES-R ABI Cloud Microphysical and Optical Properties (COMP) ground processing algorithms for daytime and nighttime. The daytime algorithm employs a physical retrieval based on theoretically computed lookup tables while the nighttime retrieval employs the Community Radiative Transfer Model (CRTM) calculations in an iterative physical retrieval that seeks to minimize the difference between the compute TOA brightness temperature and the observations. The algorithm processes the data pixel-by-pixel, choosing to use the daytime or nighttime approach based on the solar zenith angle threshold value of 82 degrees. The two approaches use different criteria to identify candidate cloudy pixels. The daytime algorithm processes pixels that are identified as cloudy or probably cloudy in the intermediate 4-level cloud mask. In addition to the intermediate 4-level cloud mask, the nighttime algorithm processes pixels based on the intermediate cloud type product data that is generated by the Cloud Type algorithm. The nighttime processing occurs for any pixel that is identified as cloudy, probably cloudy, or

probably clear in the intermediate 4-level cloud mask. However, because the nighttime retrieval requires cloud top temperature product data as input, which is generated only for cloudy, and probably cloud pixels, the nighttime cloud optical depth and particle size are flagged as invalid for pixels identified anywhere the cloud top temperature is invalid. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range. The daytime algorithm is limited to local zenith angles below a threshold of 65 degrees. The nighttime algorithm produces degraded quality product data beyond the local zenith angle limit. However, because of the dependency on cloud top temperature, a valid product is restricted to the local zenith angle range for the Cloud Top Temperature product of 70 degrees. The product is generated for all solar zenith angles but is flagged as degraded in the twilight region where the solar zenith angle is between 65 and 82 degrees for the daytime algorithm, and between 82 and 90 degrees for the nighttime algorithm. The Cloud Optical and Microphysical Properties algorithm operates on 2 km pixels, generating an intermediate product at this resolution, but the delivered Cloud Optical Depth product is aggregated to 4 km for the Full Disk coverage region.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the

GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:****code:** GOES-16 ABI instrument\_id (serial number)**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov/spacesegment/abi.html>**date:****code:** GOES-17 ABI instrument\_id (serial number)**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16



different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.8 Cloud Particle Size Distribution Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 964f0910-afe1-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Cloud Particle Size Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-CPS-ISO-SERIES\_c20171311132000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 5424  
**resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
     **dimensionName:** (MD\_DimensionNameTypeCode) column  
     **dimensionSize:** 5424  
     **resolution:**  
         **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
     **dimensionName:** (MD\_DimensionNameTypeCode) row  
     **dimensionSize:** 1500  
     **resolution:**  
         **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
     **dimensionName:** (MD\_DimensionNameTypeCode) column  
     **dimensionSize:** 2500  
     **resolution:**  
         **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
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**axisDimensionProperties:** (MD\_Dimension)  
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     **dimensionSize:** 500  
     **resolution:**  
         **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area

**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)

**referenceSystemIdentifier:** (RS\_Identifier)

**authority:** (CI\_Citation)

**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Cloud Particle Size Product

**alternateTitle:** Data short name (DSN): ABI-L2-CPSM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-CPSM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-CPSC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-CPSC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-CPSF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-CPSF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**code:** ABI-L2-CPS\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Cloud Particle Size product contains an image with pixel values identifying a measure of the effective radius of the particles in a single cloud layer. It is defined by the ratio of the third and second moment of the particle size distribution. Separate algorithms are used for daytime, solar zenith angle to 82 degrees, and nighttime, solar zenith angle greater than 82 degrees, conditions. The product is generated in combination with the Cloud Optical Depth product by the same algorithms. The product includes data quality information that identifies whether the daytime or nighttime algorithm generated the pixel, and provides an assessment of the cloud particle size data values for on-earth pixels. The units of measure for the cloud particle size value is microns. Product data is produced under the following conditions for the daytime algorithm: Cloudy; Geolocated source data to local zenith angles of 65 degrees and to solar zenith angles of 82 degrees. Product data generated by the nighttime algorithm is produced under the following conditions: Cloudy; Geolocated source data to local zenith angles of 70 degrees and solar zenith angles between 82 and 180 degrees. The cloud particle size values reported range from 0 to 100 um. However, the size range depends on day/night conditions and the liquid/ice water phase. Cloud Particle Size product data is identified as degraded in the terminator region, which is a solar zenith angle between 65 and 82 degrees for the daytime algorithm, and 82 and 90 degrees for the nighttime algorithm. The measurement range for Cloud Particle Size is determined by the model parameterization used in the algorithm retrieval. For daytime retrievals, the effective radius is determined by the lookup table bounds, 100.4 to 102.0, corresponding to 2.51 to 100 um, for both liquid and ice clouds. For nighttime retrievals, the effective radiance is determined by the range of particle size models considered: 2 to 32 um for water clouds, and; 2.62 to 78.15 um for ice clouds where the retrieval of particle size diameter is related to the effective radius by a quadratic equation.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** ATMOSPHERE > CLOUDS > DROPLET CONCENTRATION/SIZE  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** effective\_radius\_of\_cloud\_condensed\_water\_particles\_at\_cloud\_top  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted.  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** PSD  
**attributeType:**  
**descriptor:** ABI L2+ Cloud Particle Size  
**units:**  
**DerivedUnit:**  
**identifier:** um  
**derivationUnitTerm:**  
**scaleFactor:**

**offset:**


---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) qualityInformation

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Cloud Particle Size data quality flags

**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of good or degraded cloud particle size pixels for both day and night; Percentage of daytime, nighttime, and twilight pixels in the product image (solar zenith angles 0 to 65, 90 to 180, and 65 to 90 degrees, respectively); Number of cloud particle size pixels whose values are outside the required measurement range for both the daytime and nighttime algorithms (liquid: 2 to 32 um; ice 2 to 50 um); Minimum, maximum, mean, and standard deviation of the cloud particle size values in the product image for both the daytime and nighttime algorithms. The daytime and nighttime statistics are calculated using pixels to a daytime solar zenith angle of 82 degrees, except for the percent day, night, and twilight statistics that are based on more restrictive day, night, and twilight solar zenith angle ranges. Percentage of daytime, nighttime, and twilight pixels in the image are calculated using geolocated pixels. The other statistics are calculated using good and degraded pixels to a local zenith angle of 65 degrees. The statistics for the image are not restricted to the measurement range specified in the performance requirements. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Cloud Optical Depth and Cloud Particle Size products are generated by the GOES-R ABI Cloud Microphysical and Optical Properties (COMP) ground processing algorithms for daytime and nighttime. The daytime algorithm employs a physical retrieval based on theoretically computed lookup tables while the nighttime retrieval employs the Community Radiative Transfer Model (CRTM) calculations in an iterative physical retrieval that seeks to minimize the difference between the compute TOA brightness temperature and the observations. The algorithm processes the data pixel-by-pixel, choosing to use the daytime or nighttime approach based on the solar zenith angle threshold value of 82 degrees. The two approaches use different criteria to identify candidate cloudy pixels. The daytime algorithm processes pixels that are identified as cloudy or probably cloudy in the intermediate 4-level cloud mask. In addition to the intermediate 4-level cloud mask, the nighttime algorithm processes pixels based on the intermediate cloud type product data that is generated by the Cloud Type algorithm. The nighttime processing occurs for any pixel that is identified as cloudy, probably cloudy, or probably clear in the intermediate 4-level cloud mask. However, because the nighttime retrieval requires cloud top temperature product data as input, which is generated only for cloudy, and probably cloud pixels, the nighttime cloud optical depth and particle size are flagged as invalid for pixels identified anywhere the cloud top temperature is invalid. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range. The daytime algorithm is limited to local zenith angles below a threshold of 65 degrees. The nighttime algorithm produces degraded quality product data beyond the local zenith angle limit. However, because of the dependency on cloud top temperature, a valid product is restricted to the local zenith angle range for the Cloud Top Temperature product of 70 degrees. The product is generated for all solar zenith angles but is flagged as degraded in the twilight region where the solar zenith angle is between 65 and 82 degrees for the daytime algorithm, and between 82 and 90 degrees for the nighttime algorithm. The Cloud Optical and Microphysical Properties algorithm operates on 2 km pixels, generating an intermediate product at this resolution, but the delivered Cloud Optical Depth product is aggregated to 4 km for the Full Disk coverage region.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)



**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric  
Administration (NOAA) National Geophysical Data Center (NGDC)  
**contactInfo:** (CI\_Contact)  
**onlineResource:** (CI\_OnlineResource)  
**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)  
**role:** (CI\_RoleCode) publisher  
**code:** L2

---

**metadataMaintenance:** (MD\_MaintenanceInformation)  
**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded  
**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)  
**operation:** (MI\_Operation)  
**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>  
**date:**  
**code:**  
**status:** (MD\_ProgressCode) onGoing  
**parentOperation:**  
**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.9 Aerosol Detection Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 258cad90-af4b-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Aerosol Detection Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-ADP-ISO-SERIES\_c20171311129000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 1500  
   **resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 2500  
   **resolution:**  
     **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 500  
   **resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 500  
   **resolution:**  
     **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
   **title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
   **date:** (CI\_Date)  
     **date:** 2014  
     **dateType:** (CI\_DateTypeCode) publication  
   **otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for

geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Aerosol Detection Product

**alternateTitle:** Data short name (DSN): ABI-L2-ADPM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ADPM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ADPC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ADPC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-ADPF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-ADPF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-ADP\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Aerosol Detection product contains three images in the form of binary masks that identify the presence of aerosols, dust, and smoke. The aerosol mask indicates the presence of either smoke or dust. The dust and smoke masks indicate the presence of dust and smoke, respectively. Because the presence of smoke and dust are independently derived, a given pixel can be identified with both dust and smoke. The product includes data quality information for on-earth pixels. The binary aerosol, dust, and smoke mask values are dimensionless quantities. The

Aerosol Detection product images are produced on the ABI fixed grid at 2 km resolution for Full Disk, CONUS and Mesoscale coverage regions. Product data is produced under the following conditions: Clear sky; Snow-free; Geolocated source data to local zenith angles of 90 degrees and to solar zenith angles of 87 degrees.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > AEROSOLS > DUST/ASH/SMOKE

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** aerosol\_binary\_mask

**keyword:** smoke\_binary\_mask

**keyword:** dust\_binary\_mask

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted.

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062



**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** aerosol\_binary\_mask  
**attributeType:**  
**descriptor:** Flag to signal the absence/presence of aerosols in each pixel  
**units:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** smoke\_binary\_mask  
**attributeType:**  
**descriptor:** Flag to signal the absence/presence of smoke in each pixel  
**units:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** dust\_binary\_mask  
**attributeType:**  
**descriptor:** Flag to signal the absence/presence of dust in each pixel  
**units:**

---

**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Aerosol Detection data quality flags

**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Number of pixels where geolocated source data is available to a local zenith angle of 60 degrees; Number of pixels where geolocated source data is available to a solar zenith angle of 60 degrees; Number of pixels that qualified for the smoke and dust retrievals; Number of pixels where each of smoke and dust are detected. Of the number of pixel statistics, the first in the list is calculated using geolocated pixels to a solar zenith angle of 87 degrees. The second statistic in the list is calculated using geolocated pixels to a local zenith angle of 90 degrees. The last two statistics in the list are calculated using good retrieved detection pixels to a local zenith angle of 90 degrees and a solar zenith angle of 87 degrees. The percentages of pixels assigned to each retrieval quality value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Aerosol Detection product is generated by the GOES-R ABI Aerosol Detection ground processing algorithm. The algorithm applies threshold tests to ABI reflectance bands and thermal bands over land and ocean backgrounds to obtain results. Clear sky is determined using clear and probably clear pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. Snow-free is determined using snow-free pixels indicated in the most recent intermediate binary snow mask generated by the Snow Cover algorithm.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** NOAA Processing Levels**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher**code:** L2**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the

GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:****code:** GOES-16 ABI instrument\_id (serial number)**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov/spacesegment/abi.html>**date:****code:** GOES-17 ABI instrument\_id (serial number)**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16

different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.10 Aerosol Optical Depth Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 6aae4020-af4e-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Aerosol Optical Depth Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-AOD-ISO-SERIES\_c20171311130000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
     **dimensionName:** (MD\_DimensionNameTypeCode) column  
     **dimensionSize:** 5424  
     **resolution:**  
         **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
     **dimensionName:** (MD\_DimensionNameTypeCode) row  
     **dimensionSize:** 1500  
     **resolution:**  
         **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
     **dimensionName:** (MD\_DimensionNameTypeCode) column  
     **dimensionSize:** 2500  
     **resolution:**  
         **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
     **title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
     **date:** (CI\_Date)  
         **date:** 2014  
         **dateType:** (CI\_DateTypeCode) publication  
     **otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the

same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Aerosol Optical Depth Product

**alternateTitle:** Data short name (DSN): ABI-L2-AODC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-AODC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-AODF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-AODF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-AOD\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Aerosol Optical Depth product contains an image with pixel values identifying a measure of the extinction due to atmospheric aerosols at a wavelength of 550 nm over land and ocean. The product includes data quality information that provides an assessment of the quality of the algorithm retrievals for on-earth pixels. The aerosol optical depth value is a dimensionless quantity. The Aerosol Optical Depth product image is produced on the ABI fixed grid at 2 km resolution for Full Disk and CONUS coverage regions. Product data is produced under the following conditions: Clear sky; snow-free; Geolocated source data to local zenith angles of 90 degrees, to solar zenith angles of 90 degrees, and sunglint angles greater than 40 degrees when over the ocean.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,



and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > AEROSOLS > AEROSOL OPTICAL

DEPTH/THICKNESS

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** atmosphere\_absorption\_optical\_thickness\_due\_to\_ambient\_aerosol

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted.

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 2

**language:** eng; USA

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)

**sequenceIdentifier:****MemberName:****aName:** AOD**attributeType:****descriptor:** ABI Level 2+ Aerosol Optical Depth at 550 nm**units:****scaleFactor:****offset:****contentInfo:** (MI\_CoverageDescription)**attributeDescription:****contentType:** (MD\_CoverageContentTypeCode) qualityInformation**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF**attributeType:****descriptor:** ABI Level 2+ Aerosol Optical Depth data quality flags**units:****dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Percentage of each of good and bad aerosol optical depth pixels over land and over ocean for the eighteen, 10 degree latitude bands in the product image; Number of aerosol optical depth pixels whose values are outside the required measurement range over land and over ocean; Minimum, maximum, mean, and standard deviation of the aerosol optical depth values in the 550 nm image over land and over ocean for the eighteen, 10 degree latitude bands in the product image; Minimum, maximum, mean, and standard deviation of the aerosol optical depth values in the images at ABI reflective band wavelengths associated with source level 1b data used by the algorithm over land and over ocean for the eighteen, 10 degree latitude bands in the product image; Minimum, maximum, mean, and standard deviation of the surface reflectivity values at the ABI reflective band wavelengths associated with source level 1b data used by the algorithm over land and over ocean for the eighteen, 10 degree latitude bands in the product image; Number of attempted retrievals over land and over ocean for the eighteen, 10 degree latitude bands; Number of attempted retrievals over land and over ocean within the local zenith angle performance specification limit of 60 degrees for the eighteen, 10 degree latitude bands. These statistics are calculated using geolocated pixels to a solar zenith angle of 80 degrees, which is associated with good quality pixels. These statistics are calculated using geolocated pixels to a local zenith angle of 90 degrees, except for the number of attempted retrievals over land and over ocean within the local zenith angle performance specification limit of 60 degrees. The percentages of pixels assigned to each retrieval quality value are also included in the product.

**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Aerosol Optical Depth product is generated by the GOES-R ABI Aerosol Optical Depth ground processing algorithm. The algorithm determines ABI reflectance measurements using physical retrievals that utilize a lookup table of TOA reflectance that is pre-calculated from the Community Radiative Transfer Model (CRTM). The physical retrievals are performed separately over land and ocean. The algorithm computes the optical thickness of aerosols at wavelengths that depend on the surface type. ABI bands 1, 2, and 6 with central wavelengths of 0.47, 0.64, and 2.25  $\mu\text{m}$  are used for land retrievals over dark vegetated surfaces. ABI bands 2, 3, 5, and 6 with central wavelengths of 0.64, 0.87, 1.61, and 2.25  $\mu\text{m}$  are used for ocean retrievals. The aerosol type is evaluated based on the selection of an aerosol model from four prescribed land aerosol models, generic, dust, smoke, and urban, or for a pair of fine and coarse marine aerosol modes selected from four prescribed fine modes and five prescribed coarse modes. The suspended matter is derived from the computed aerosol optical depth. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range. Clear sky is determined using clear and probably clear pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. Snow-free is determined using snow-free pixels indicated in the most recent intermediate binary snow mask generated by the Snow Cover algorithm. The latitude band statistics, whose extents are a function of the ABI's fixed grid field of regard and latitude, use the CF metadata conventions hybrid grid mapping that includes both the grid\_mapping for the "geostationary" and "latitude\_longitude" projections.

**processor:** (CI\_ResponsibleParty)**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)  
**processedLevel:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** NOAA Processing Levels  
**date:** (CI\_Date)  
**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric  
Administration (NOAA) National Geophysical Data Center (NGDC)  
**contactInfo:** (CI\_Contact)  
**onlineResource:** (CI\_OnlineResource)  
**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)  
**role:** (CI\_RoleCode) publisher  
**code:** L2

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**metadataMaintenance:** (MD\_MaintenanceInformation)  
**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded  
**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)  
**operation:** (MI\_Operation)  
**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>

**date:****code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov/spacesegment/abi.html>**date:****code:** GOES-16 ABI instrument\_id (serial number)**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.11 Volcanic Ash: Detection and Height Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 0c7acd60-b012-11e1-afa6-0800200c9a66

**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Volcanic Ash: Detection and Height Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-VAA-ISO-SERIES\_c20171311126000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)



**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Volcanic Ash: Detection and Height Product

**alternateTitle:** Data short name (DSN): ABI-L2-VAAF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-VAAF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-VAAF-\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Volcanic Ash: Detection and Height product contains two images with pixel values identifying volcanic ash cloud height and volcanic ash mass loading. The ash cloud top height is the geopotential height of the ash cloud top. The ash mass loading is the mass of volcanic ash per unit of area. The product includes two types of data quality information. One

type of data quality indicator describes the quality of the volcanic ash detection, providing an assessment of the presence of volcanic ash for on-earth pixels including an indication of good or degraded quality, or invalid pixels, and the confidence in the detection of volcanic ash existing in single and multiple layers. The second type of data quality indicator provides information about the quality and ash characteristics of the retrieval for on-earth pixels, identifying failure conditions, cloud top temperature, cloud emissivity, and absorbed optical depth ratio retrieval quality, and the volcanic ash particle size. The units of measure for the ash cloud top height value is meters. The units of measure for the ash mass loading value is metric tons (tonnes) per square kilometer. The Volcanic Ash: Detection and Height product images are produced on the ABI fixed grid at 2 km resolution for the Full Disk coverage region. Product data is produced for geolocated source data to local zenith angles of 90 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > AEROSOLS > DUST/ASH/SMOKE

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** volcanic\_ash\_cloud\_height

**keyword:** volcanic\_ash\_mass

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** VAH

**attributeType:**  
**descriptor:** ABI Level 2+ Volcanic Ash: Ash Cloud Height  
**units:**  
**DerivedUnit:**  
**identifier:** m  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** VAML  
**attributeType:**  
**descriptor:** ABI Level 2+ Volcanic Ash: Ash Mass Loading  
**units:**  
**DerivedUnit:**  
**identifier:** t km-2  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DET\_DQF  
**attributeType:**  
**descriptor:** ABI Level 2+ Volcanic Ash data detection quality flags  
**units:**  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** RET\_DQF  
**attributeType:**  
**descriptor:** ABI L2+ Volcanic Ash data retrieval quality flags  
**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of attempted retrievals; Total volcanic ash mass loading in image; Number of volcanic ash cloud top height and volcanic ash mass loading pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the values in the volcanic ash cloud top height and volcanic ash mass loading product images. Number of attempted retrievals is calculated using geolocated pixels where the retrieval is successful or failed. The other statistics are calculated using geolocated pixels where the retrieval is successful to a local zenith angle of 80 degrees. The percentages of pixels assigned to each flag value for the data detection and retrieval quality information are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Volcanic Ash: Detection and Height product is generated by the GOES-R ABI Volcanic Ash: Detection and Height ground processing algorithm. Volcanic ash cloud top height and mass loading are determined by retrieving ash cloud effective temperature, 11 micron cloud emissivity, and the 12/11 micron effective absorption optical depth ratio ( $\beta$ -ratio). The algorithm uses a physical retrieval utilizing an in-line radiative transfer model to compute clear sky TOA radiances, clear sky transmittance and radiance profiles, and black cloud radiance profiles. The algorithm is optimized by first detecting volcanic ash, and then performing the volcanic ash cloud top height and mass loading retrievals satisfying an ash confidence level threshold. The algorithm identifies volcanic ash confidence levels for both single and multiple layer cloud conditions. Pixels in the product images with out of range values are assigned the minimum or maximum value in the valid range.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility,

Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric

Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Proc](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

essing\_Levels

**role:** (CI\_RoleCode) publisher

**code:** L2

---

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared

wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.12 Legacy Vertical Temperature Profile Product ISO Series Metadata



(MI\_Metadata)

**fileIdentifier:** 52291390-afe9-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Legacy Vertical Temperature Profile Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-LVTP-ISO-SERIES\_c20171311302000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**cellGeometry:** (MD\_CellGeometryCode) area

**transformationParameterAvailability:** true

**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 300  
   **resolution:**  
     **Distance:** 10  
   **axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 500  
   **resolution:**  
     **Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 100  
   **resolution:**  
     **Distance:** 10  
   **axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 100  
   **resolution:**  
     **Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** GOES-R Product Definition and Users Guide (PUG) Volume 5: Level 2+  
 Products  
**date:** (CI\_Date)  
   **date:** 2014  
   **dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products

are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Legacy Vertical Temperature Profile Product

**alternateTitle:** Data short name (DSN): ABI-L2-LVTPM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVTPM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVTPC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVTPC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-LVTPF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVTPF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-LVTP\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Legacy Vertical Temperature Profile product contains a three-dimensional image with pixel values identifying the air temperature at 101 standard pressure levels. The units of measure for the temperature profile is Kelvin. The product includes three types of data quality information. One describes the overall quality of the data pixels, providing an assessment of the derived stability indices data values for on-earth pixels. The second provides information about

the quality of the physical retrieval for on-earth pixels, identifying failure conditions. The third provides information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels. The Legacy Vertical Temperature Profile product images are produced on the ABI fixed grid at 10 km resolution for Full Disk, CONUS, and Mesoscale coverage regions. Product data is produced under the following conditions: Clear sky; Geolocated source data to local zenith angles of 80 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > ATMOSPHERIC TEMPERATURE > TEMPERATURE PROFILES

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** air\_temperature

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
    **Distance:** 10  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
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    **temporalElement:** (EX\_TemporalExtent)  
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                **beginPosition:** 2017-05-11  
                **endPosition:** now  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** Full Disk - GOES-East  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** -156.2995  
        **eastBoundLongitude:** 6.2995  
        **southBoundLatitude:** -81.3282  
        **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** Full Disk - GOES-West  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** 141.7005  
        **eastBoundLongitude:** -55.7005  
        **southBoundLatitude:** -81.3282  
        **northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** CONUS - GOES-East  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** -152.109282  
        **eastBoundLongitude:** -52.946879  
        **southBoundLatitude:** 14.571340  
        **northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
    **geographicElement:** (EX\_GeographicDescription)  
        **geographicIdentifier:** (MD\_Identifier)  
            **code:** CONUS - GOES-West  
    **geographicElement:** (EX\_GeographicBoundingBox)  
        **westBoundLongitude:** 175.623576

**eastBoundLongitude:** -89.623576

**southBoundLatitude:** 14.571340

**northBoundLatitude:** 53.500062

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Mesoscale

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** LVT

**attributeType:**

**descriptor:** ABI Level 2+ Legacy Vertical Temperature Profile provides air temperature at 101 pressure levels in the atmosphere

**units:**

**DerivedUnit:**

**identifier:** K

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF\_Overall

**attributeType:**

**descriptor:** overall quality of the data pixels, providing an assessment of the vertical temperature profile data values for on-earth pixels

**units:**

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:****MemberName:****aName:** DQF\_Retrieval**attributeType:****descriptor:** information about the quality of the physical retrieval for on-earth pixels, identifying failure conditions**units:****contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF\_SkinTemp**attributeType:****descriptor:** information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels**units:****dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) series**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of attempted retrievals; Number of legacy vertical temperature profile data values outside the required measurement range. Note that the count is constrained to no more than one per horizontal grid point; Applicable ABI emissive band-specific brightness temperature differences mean and standard deviation values between those observed and modeled. These statistics are calculated using valid pixels based on the local zenith angle threshold of 80 degrees and the latitude threshold of 70 degrees north and south. The percentages of pixels assigned to each flag value for the three types of data quality information are also included in the product.**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent

**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Legacy Vertical Temperature Profile, Legacy Vertical Moisture Profile, Total Precipitable Water, and Derived Stability Indices products are generated by the GOES-R ABI Legacy Atmospheric Profiles ground processing algorithm. The algorithm uses processed NWP model profile data as the first guess and employs a regression retrieval followed by an iterative physical retrieval that utilizes the ground system implementation of the Community Radiative Transfer Model (CRTM) to derive the final product data. The temperature and moisture profiles contain values at 101 standard pressure levels, of which only 54 temperature and 35 moisture pressure levels are actually populated in the retrieval. The 54 temperature levels are from approximately 103 hPa to approximately 1014 hPa. The 35 moisture levels are from 300 hPa to approximately 1014 hPa. The regression retrieval is applied for coverage regions corresponding to local zenith angles to 80 degrees but the physical retrieval is limited to local zenith angles to 67 degrees. The product is generated for 5 x 5 fields of regard from 2 km pixel inputs where the percentage of clear pixels satisfies a 20 percent threshold. Clear sky is determined using clear and probably clear pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. Total precipitable water from the surface to 300 hPa is derived from the retrieved moisture profile. In addition, the five atmospheric stability indices, CAPE, K-index, Lifted Index, Showalter Index, and Total Totals Index, are derived from the retrieved moisture and temperature profiles. Pixels in the product images with out of range values are assigned the minimum or maximum value in the valid range.

**processor:** (CI\_ResponsibleParty)**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** NOAA Processing Levels**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**citedResponsibleParty:** (CI\_ResponsibleParty)**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)**contactInfo:** (CI\_Contact)



**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from

geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer.

Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.13 Legacy Vertical Moisture Profile Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** d5ed67b0-afe6-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Legacy Vertical Moisture Profile Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-LVMP-ISO-SERIES\_c20171311302000.xml

**spatialRepresentationInfo:** (MD\_Georectified)

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**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**cellGeometry:** (MD\_CellGeometryCode) area

**transformationParameterAvailability:** true

**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** Full Disk

**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

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**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 300

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**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 500

**resolution:**

**Distance:** 10

**cellGeometry:** (MD\_CellGeometryCode) area

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**transformationDimensionDescription:** CONUS

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**dimensionSize:** 100  
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**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 100  
**resolution:**  
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**cellGeometry:** (MD\_CellGeometryCode) area  
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**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** GOES-R Product Definition and Users Guide (PUG) Volume 5: Level 2+

Products

**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection  
**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** ABI Level 2+ Legacy Vertical Moisture Profile Product

**alternateTitle:** Data short name (DSN): ABI-L2-LVMPM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVMPM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVMPC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVMPC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-LVMPF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LVMPF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-LVMP\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Legacy Vertical Moisture Profile product contains a three-dimensional image with pixel values identifying the water vapor at 101 standard pressure levels. The product includes three types of data quality information. One describes the overall quality of the data pixels, providing an assessment of the legacy vertical temperature profile data values for on-earth pixels. The second provides information about the quality of the physical retrieval for on-earth pixels, identifying failure conditions. The third provides information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels. The units of measure for the vertical temperature value is percent. The Legacy Vertical Moisture Profile product image is generated on the ABI fixed grid at 10 km resolution for Full Disk, CONUS, and Mesoscale coverage regions. Product data is produced under the following conditions: Clear sky; Geolocated source data to local zenith angles of 80 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** ATMOSPHERE > ATMOSPHERIC WATER VAPOR > WATER VAPOR  
 PROFILES  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens,  
 M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M.  
 Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** relative\_humidity  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
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**Distance:** 10  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
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**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)



**sequenceIdentifier:****MemberName:****aName:** LVM**attributeType:****descriptor:** ABI Level 2+ Legacy Vertical Moisture Profile provides relative humidity at 101 pressure levels in the atmosphere**units:****DerivedUnit:****identifier:** percent**derivationUnitTerm:****scaleFactor:****offset:**

---

**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF\_Overall**attributeType:****descriptor:** overall quality of the data pixels, providing an assessment of the vertical moisture profile data values for on-earth pixels**units:**

---

**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF\_Retrieval**attributeType:****descriptor:** information about the quality of the physical retrieval for on-earth pixels, identifying failure conditions**units:**

---

**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)

**sequenceIdentifier:****MemberName:****aName:** DQF\_SkinTemp**attributeType:****descriptor:** information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics**evaluationMethodDescription:** mean difference and standard deviation of calculated vs observed brightness temperature by channel; percent of pixels for each data quality flag value**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_LO\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)**description:** The Legacy Vertical Temperature Profile, Legacy Vertical Moisture Profile, Total Precipitable Water, and Derived Stability Indices products are generated by the GOES-R ABI Legacy Atmospheric Profiles ground processing algorithm. The algorithm uses processed NWP model profile data as the first guess and employs a regression retrieval followed by an iterative physical retrieval that utilizes the ground system implementation of the Community Radiative Transfer Model (CRTM) to derive the final product data. The temperature and moisture profiles contain values at 101 standard pressure levels, of which only 54 temperature and 35 moisture pressure levels are actually populated in the retrieval. The 54

temperature levels are from approximately 103 hPa to approximately 1014 hPa. The 35 moisture levels are from 300 hPa to approximately 1014 hPa. The regression retrieval is applied for coverage regions corresponding to local zenith angles to 80 degrees but the physical retrieval is limited to local zenith angles to 67 degrees. The product is generated for 5 x 5 fields of regard from 2 km pixel inputs where the percentage of clear pixels satisfies a 20 percent threshold. Clear sky is determined using clear and probably clear pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. Total precipitable water from the surface to 300 hPa is derived from the retrieved moisture profile. In addition, the five atmospheric stability indices, CAPE, K-index, Lifted Index, Showalter Index, and Total Totals Index, are derived from the retrieved moisture and temperature profiles. Pixels in the product images with out of range values are assigned the minimum or maximum value in the valid range.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and

lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of

storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

### 5.1.14 Total Precipitable Water Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 42511480-afef-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Total Precipitable Water Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-TPW-ISO-SERIES\_c20171311303000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 1086

**resolution:**  
**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 1086  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 300  
**resolution:**  
**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 100  
**resolution:**  
**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 100  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true

**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** GOES-R Product Definition and Users Guide (PUG) Volume 5: Level 2+ Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.  
**code:** goes\_projection  
**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** ABI Level 2+ Total Precipitable Water Product  
**alternateTitle:** Data short name (DSN): ABI-L2-TPWM1-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-TPWM2-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-TPWC-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-TPWC-M4  
**alternateTitle:** Data short name (DSN): ABI-L2-TPWF-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-TPWF-M4  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** ABI-L2-TPW\*  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce



**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Total Precipitable Water product contains an image with pixel values identifying the integrated column water vapor amount from the surface to a height corresponding to an atmospheric pressure of 300 hPa. The units of measure for the total precipitable water value is millimeters. The product includes three types of data quality information. One describes the overall quality of the data pixels, providing an assessment of the derived stability indices data values for on-earth pixels. The second provides information about the quality of the physical retrieval for on-earth pixels, identifying failure conditions. The third provides information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels. The Total Precipitable Water product images are produced on the ABI fixed grid at 10 km resolution for Full Disk, CONUS, and Mesoscale coverage regions. Product data is produced under the following conditions: Clear sky; Geolocated source data to local zenith angles of 80 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > ATMOSPHERIC WATER VAPOR > PRECIPITABLE WATER

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** lwe\_thickness\_of\_atmosphere\_mass\_content\_of\_water\_vapor

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 10

**language:** eng; USA

**characterSet:** (MD\_CharacterSetCode) utf8

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:**

**TimePeriod:**

**beginPosition:** 2017-05-11

**endPosition:** now

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Full Disk - GOES-East

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** -156.2995

**eastBoundLongitude:** 6.2995

**southBoundLatitude:** -81.3282

**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Full Disk - GOES-West

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** 141.7005

**eastBoundLongitude:** -55.7005

**southBoundLatitude:** -81.3282

**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** TPW  
**attributeType:**  
**descriptor:** Total Precipitable Water  
**units:**  
**DerivedUnit:**  
**identifier:** mm  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)

**sequenceIdentifier:****MemberName:****aName:** DQF\_Overall**attributeType:****descriptor:** overall quality of the data pixels, providing an assessment of the total precipitable water data values for on-earth pixels**units:****contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF\_Retrieval**attributeType:****descriptor:** information about the quality of the physical retrieval for on-earth pixels, identifying failure conditions**units:****contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF\_SkinTemp**attributeType:****descriptor:** information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels**units:****dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of attempted retrievals; Number of total precipitable water pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the total precipitable water values in the product image; Applicable ABI emissive band-specific brightness temperature differences mean and standard deviation values

between those observed and modeled. These statistics are calculated using valid pixels based on the local zenith angle threshold of 80 degrees and the latitude threshold of 70 degrees north and south. The percentages of pixels assigned to each flag value for the three types of data quality information are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Legacy Vertical Temperature Profile, Legacy Vertical Moisture Profile, Total Precipitable Water, and Derived Stability Indices products are generated by the GOES-R ABI Legacy Atmospheric Profiles ground processing algorithm. The algorithm uses processed NWP model profile data as the first guess and employs a regression retrieval followed by an iterative physical retrieval that utilizes the ground system implementation of the Community Radiative Transfer Model (CRTM) to derive the final product data. The temperature and moisture profiles contain values at 101 standard pressure levels, of which only 54 temperature and 35 moisture pressure levels are actually populated in the retrieval. The 54 temperature levels are from approximately 103 hPa to approximately 1014 hPa. The 35 moisture levels are from 300 hPa to approximately 1014 hPa. The regression retrieval is applied for coverage regions corresponding to local zenith angles to 80 degrees but the physical retrieval is limited to local zenith angles to 67 degrees. The product is generated for 5 x 5 fields of regard from 2 km pixel inputs where the percentage of clear pixels satisfies a 20 percent threshold. Clear sky is determined using clear and probably clear pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. Total precipitable water from the surface to 300 hPa is derived from the retrieved moisture profile. In addition, the five atmospheric stability indices, CAPE, K-index, Lifted Index, Showalter Index, and Total Totals Index, are derived from the retrieved moisture and temperature profiles. Pixels in the product images with out of range values are assigned the minimum or maximum value in the valid range.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>  
**date:**  
**code:**  
**status:** (MD\_ProgressCode) onGoing  
**parentOperation:**  
**platform:** (MI\_Platform)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov>  
**date:**  
**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov/spacesegment/abi.html>  
**date:**  
**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60

seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.15 Derived Stability Indices Product ISO Series Metadata



(MI\_Metadata)

**fileIdentifier:** 158fae30-affd-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Derived Stability Indices

Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-DSI-ISO-SERIES\_c20171311302000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**cellGeometry:** (MD\_CellGeometryCode) area

**transformationParameterAvailability:** true

**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 300  
**resolution:**  
**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 100  
**resolution:**  
**Distance:** 10  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 100  
**resolution:**  
**Distance:** 10  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** GOES-R Product Definition and Users Guide (PUG) Volume 5: Level 2+  
 Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products

are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Derived Stability Indices Product

**alternateTitle:** Data short name (DSN): ABI-L2-DSIM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-DSIM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-DSIC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-DSIC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-DSIF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-DSIF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-DSI\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Derived Stability Indices product contains images for five stability indices with pixel values that are indicators of atmospheric instability associated with convection and potential thunderstorm activity. 1) Convective(ly) Available Potential Energy (CAPE): A measure of atmospheric stability calculated by integrating the positive temperature difference between the surrounding atmosphere and a parcel of air lifted adiabatically from the surface to its

equilibrium level. It exists under conditions of potential instability, and measures the potential energy per unit mass that would be released by the unstable parcel if it were able to convect upwards to equilibrium. Units of measure are joules per kilogram. 2) Lifted Index: The temperature difference between a parcel of air lifted adiabatically from the surface to a finishing air pressure of 500 hPa in the troposphere and the ambient air temperature at the finishing air pressure in the troposphere. The air parcel is "lifted" by moving the air parcel from the surface to the Lifting Condensation Level (dry adiabatically) and then from the Lifting Condensation Level to the finishing air pressure (wet adiabatically). Units of measure are kelvin. 3) K-Index: A measure of atmospheric stability indicating the potential of severe convection. The index is the difference in air temperature between 850 and 500 hPa, the dew point temperature at 850 hPa, and the difference between the air temperature and the dew point temperature at 700 hPa. Units of measure are kelvin. 4) Showalter Index: A measure of atmospheric stability indicating the convective and thunderstorm potential. The index is the temperature difference between a parcel of air lifted from 850 to 500 hPa (wet adiabatically) and the ambient air temperature at 500 hPa. Units of measure are kelvin. 5) Total Totals Index: A measure of atmospheric stability indicating the likelihood of severe convection. The index is derived from the difference in air temperature between 850 and 500 hPa (the vertical totals) and the difference between the dew point temperature at 850 hPa and the air temperature at 500 hPa (the cross totals). The index is the sum of the vertical and cross totals. Units of measure are kelvin. The product includes three types of data quality information. One describes the overall quality of the data pixels, providing an assessment of the derived stability indices data values for on-earth pixels. The second provides information about the quality of the physical retrieval for on-earth pixels, identifying failure conditions. The third provides information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels. The Derived Stability Indices product images are produced on the ABI fixed grid at 10 km resolution for Full Disk, CONUS, and Mesoscale coverage regions. Product data is produced under the following conditions: Clear sky; Geolocated source data to local zenith angles of 80 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > ATMOSPHERIC TEMPERATURE > ATMOSPHERIC STABILITY

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** temperature\_difference\_between\_ambient\_air\_and\_air\_lifted\_adiabatically\_from\_the\_surface  
**keyword:** atmosphere\_convective\_available\_potential\_energy\_wrt\_surface  
**keyword:** atmosphere\_stability\_k\_index  
**keyword:** atmosphere\_stability\_showalter\_index  
**keyword:** atmosphere\_stability\_total\_totals\_index  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 10  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995

**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** LI  
**attributeType:**  
**descriptor:** Derived Stability Indices: Lifted Index  
**units:**  
**DerivedUnit:**

**identifier:** K  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** CAPE  
**attributeType:**  
**descriptor:** ABI Level 2+ Derived Stability Indices: CAPE (Convective(ly) Available Potential Energy)  
**units:**  
**DerivedUnit:**  
**identifier:** J kg-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** TT  
**attributeType:**  
**descriptor:** ABI Level 2+ Derived Stability Indices: Total Totals Index  
**units:**  
**DerivedUnit:**  
**identifier:** K  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**

**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** SI  
**attributeType:**  
**descriptor:** ABI Level 2+ Derived Stability Indices: Showalter Index  
**units:**  
**DerivedUnit:**  
**identifier:** K  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** KI  
**attributeType:**  
**descriptor:** ABI Level 2+ Derived Stability Indices: K-Index  
**units:**  
**DerivedUnit:**  
**identifier:** K  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DQF\_Overall  
**attributeType:**  
**descriptor:** overall quality of the data pixels, providing an assessment of the derived stability indices data values for on-earth pixels  
**units:**



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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF\_Retrieval**attributeType:****descriptor:** information about the quality of the physical retrieval for on-earth pixels, identifying failure conditions**units:**

---

**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF\_SkinTemp**attributeType:****descriptor:** information about the quality of the first guess skin temperature for on-earth pixels, identifying temperature threshold failure conditions for on-earth pixels**units:**

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**dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of attempted retrievals; Number of CAPE, Lifted Index, K-Index, Showalter Index, and Total Totals Index pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the values in the CAPE, Lifted Index, K-Index, Showalter Index, and Total Totals Index product images; Applicable ABI emissive band-specific brightness temperature differences mean and standard deviation values between those observed and modeled. These statistics are calculated using valid pixels based on the local zenith angle threshold of 80 degrees and the latitude threshold of 70 degrees north and south. The percentages of pixels assigned to each flag value for the three types of data quality information are also included in the product.**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Legacy Vertical Temperature Profile, Legacy Vertical Moisture Profile, Total Precipitable Water, and Derived Stability Indices products are generated by the GOES-R ABI Legacy Atmospheric Profiles ground processing algorithm. The algorithm uses processed NWP model profile data as the first guess and employs a regression retrieval followed by an iterative physical retrieval that utilizes the ground system implementation of the Community Radiative Transfer Model (CRTM) to derive the final product data. The temperature and moisture profiles contain values at 101 standard pressure levels, of which only 54 temperature and 35 moisture pressure levels are actually populated in the retrieval. The 54 temperature levels are from approximately 103 hPa to approximately 1014 hPa. The 35 moisture levels are from 300 hPa to approximately 1014 hPa. The regression retrieval is applied for coverage regions corresponding to local zenith angles to 80 degrees but the physical retrieval is limited to local zenith angles to 67 degrees. The product is generated for 5 x 5 fields of regard from 2 km pixel inputs where the percentage of clear pixels satisfies a 20 percent threshold. Clear sky is determined using clear and probably clear pixels indicated in the temporally coincident intermediate 4-level cloud mask generated by the Cloud Mask algorithm. Total precipitable water from the surface to 300 hPa is derived from the retrieved moisture profile. In addition, the five atmospheric stability indices, CAPE, K-index, Lifted Index, Showalter Index, and Total Totals Index, are derived from the retrieved moisture and temperature profiles. Pixels in the product images with out of range values are assigned the minimum or maximum value in the valid range.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)  
**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric  
Administration (NOAA) National Geophysical Data Center (NGDC)  
**contactInfo:** (CI\_Contact)  
**onlineResource:** (CI\_OnlineResource)  
**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)  
**role:** (CI\_RoleCode) publisher  
**code:** L2

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**metadataMaintenance:** (MD\_MaintenanceInformation)  
**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded  
**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)  
**operation:** (MI\_Operation)  
**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>  
**date:**  
**code:**  
**status:** (MD\_ProgressCode) onGoing  
**parentOperation:**

**platform:** (MI\_Platform)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov>  
**date:**  
**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov/spacesegment/abi.html>  
**date:**  
**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov>  
**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.16 Rainfall Rate (Quantitative Precipitation Estimate) Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 3a3268a0-b006-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Rainfall Rate (Quantitative Precipitation Estimate) Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-RRQPE-ISO-SERIES\_c20171311301000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 5424

**resolution:**

**Distance:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 5424

**resolution:**

**Distance:** 2

**cellGeometry:** (MD\_CellGeometryCode) area

**transformationParameterAvailability:** true

**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** Full Disk

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**referenceSystemInfo:** (MD\_ReferenceSystem)

**referenceSystemIdentifier:** (RS\_Identifier)

**authority:** (CI\_Citation)

**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** Advanced Baseline Imager (ABI) Level 2+ Rainfall Rate (Quantitative Precipitation Estimate) Product

**alternateTitle:** Data short name (DSN): ABI-L2-RRQPEF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-RRQPEF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-RRQPEF-\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Rainfall Rate Quantitative Precipitation Estimate (QPE) product contains an image with pixel values identifying the rainfall rate. The product includes data quality information that provides an assessment of the rainfall rate data values for on-earth pixels. The units of measure for the rainfall rate value is millimeters per hour. The Rainfall Rate (QPE) product image is produced on the ABI fixed grid at 2 km resolution for the Full Disk coverage region. Product data is produced for geolocated source data to local zenith angles of 90 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** ATMOSPHERE > PRECIPITATION > PRECIPITATION RATE  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** rainfall\_rate  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)



**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** RRQPE  
**attributeType:**  
**descriptor:** ABI Level 2+ Rainfall Rate (Quantitative Prediction Estimate)  
**units:**  
**DerivedUnit:**  
**identifier:** mm h-1  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**

**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DQF  
**attributeType:**  
**descriptor:** ABI Level 2+ Rainfall Rate (Quantitative Prediction Estimate) data quality  
 flags  
**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_QuantitativeAttributeAccuracy)  
**nameOfMeasure:** Product summary statistics  
**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of pixels where retrieval is successful; Number of pixels with rain; Total rainfall rate in product image; Number of rainfall rate pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the rainfall rate values in the product image. These statistics are calculated using good quality pixels. The percentages of pixels assigned to each DQF value are also included in the product.  
**result:**  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors  
**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors  
**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**lineage:** (LI\_Lineage)  
**processStep:** (LE\_ProcessStep)  
**description:** The Rainfall Rate (QPE) product is generated by the GOES-R ABI

Rainfall Rate (QPE) ground processing algorithm. Rainfall rate is obtained using a two-step process that involves the detection of pixels where rain is occurring and the retrieval of rainfall rate for those pixels. The algorithm includes eight linear and eight non-linear predictors based on brightness temperatures measured in five emissive ABI bands 8, 10, 11, 14, and 15 with central wavelengths of 6.17, 7.34, 8.44, 11.19, and 12.27 um, respectively. As a result of the spectral range of the ABI instrument not being capable of penetrating optically thick clouds where precipitation is occurring, the algorithm uses retrieval coefficients that are established based on a statistical correlation of the observed cloud top brightness temperatures with rainfall occurrence and rate as detected by sources capable of penetrating optically thick clouds, such as microwave observations. The retrieval coefficients used by the algorithm are managed as Level 2+ processing parameters (i.e. semi-static data) in the ground system.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and

lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of

storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.17 Derived Motion Winds Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** aee58cd0-f85-11e1-a21f-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Derived Motion Winds Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-DMW-ISO-SERIES\_c20171311305000.xml

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**referenceSystemInfo:** (MD\_ReferenceSystem)

**referenceSystemIdentifier:** (RS\_Identifier)

**authority:** (CI\_Citation)

**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2+ Products

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R DMW products use the latitude\_longitude CF grid mapping. The coordinates for the global latitude/longitude grid are latitude and longitude. In two-dimensional map space, the x-axis is at the equator, and the y-axis is at the prime (Greenwich) meridian. By convention, degrees north and degrees east are used for latitude and longitude, respectively.

**code:** latitude\_longitude

**codeSpace:** <http://cfconventions.org/latest.html>

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Derived Motion Winds Product

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM1-M3C02

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM1-M3C07

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM1-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWVM1-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM1-M3C09

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM1-M3C10

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM1-M3C14

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM2-M3C02

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM2-M3C07

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM2-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWVM2-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM2-M3C09

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM2-M3C10

**alternateTitle:** Data short name (DSN): ABI-L2-DMWM2-M3C14

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M3C02

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M3C07

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWVC-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M3C09

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M3C10

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M3C14

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M4C02

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M4C07

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M4C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWVC-M4C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M4C09

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M4C10

**alternateTitle:** Data short name (DSN): ABI-L2-DMWC-M4C14

**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M3C02

**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M3C07

**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWVF-M3C08

**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M3C09

**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M3C10

**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M3C14

**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M4C02  
**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M4C07  
**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M4C08  
**alternateTitle:** Data short name (DSN): ABI-L2-DMWVF-M4C08  
**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M4C09  
**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M4C10  
**alternateTitle:** Data short name (DSN): ABI-L2-DMWF-M4C14  
**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-DMW\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Derived Motion Winds product contains a list of wind vectors identifying their location, wind speed, wind direction, air pressure and temperature, and local zenith angle. The product includes data quality information for each wind vector. The product name includes the word "derived" because the wind vectors are derived by tracking environmental features, specifically clouds and clear sky water vapor over multiple ABI observations. The type of feature tracked varies as a function of the ABI band. Derived Motion Wind product files are generated for the ABI reflective and emissive band that are used to track features. The units of measure for the wind vector quantities are meters per second for wind speed; degrees for wind direction; hectopascals for wind pressure; kelvin for air temperature. Product data is produced for geolocated source data to local zenith angles of 90 degrees. The Derived Motion Winds product is produced using ABI Full Disk, CONUS, and Mesoscale coverage region observations.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring



**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** ATMOSPHERE > ATMOSPHERIC WINDS  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** wind\_speed  
**keyword:** wind\_from\_direction  
**keyword:** air\_pressure  
**keyword:** air\_temperature  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted.  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) vector  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 10  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11

**endPosition:** now

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Full Disk - GOES-East

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** -156.2995

**eastBoundLongitude:** 6.2995

**southBoundLatitude:** -81.3282

**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Full Disk - GOES-West

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** 141.7005

**eastBoundLongitude:** -55.7005

**southBoundLatitude:** -81.3282

**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** CONUS - GOES-East

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** -152.109282

**eastBoundLongitude:** -52.946879

**southBoundLatitude:** 14.571340

**northBoundLatitude:** 56.761450

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** CONUS - GOES-West

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** 175.623576

**eastBoundLongitude:** -89.623576

**southBoundLatitude:** 14.571340

**northBoundLatitude:** 53.500062

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
  **aName:** wind\_direction  
**attributeType:**  
**descriptor:** wind vectors wind from direction measured positive clockwise from due  
north  
**units:**  
**DerivedUnit:**  
  **identifier:** degree  
  **derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
  **RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
  **aName:** wind\_speed  
**attributeType:**  
**descriptor:** wind vector's wind speed  
**units:**  
**DerivedUnit:**  
  **identifier:** m s-1  
  **derivationUnitTerm:**  
  **derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
  **RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
  **aName:** pressure  
**attributeType:**  
**descriptor:** wind vector's air pressure  
**units:**  
**DerivedUnit:**  
  **identifier:** hPa

**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** temperature

**attributeType:**

**descriptor:** wind vector's air temperature

**units:**

**DerivedUnit:**

**identifier:** k

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) qualityInformation

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Derived Motion Winds data quality flags

**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) series

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Time between successive ABI images used to derive wind vectors, and ABI band-specific geospatial criteria for finding and tracking features; Start, midpoint, and end time of the wind vectors in the product, which corresponds to the middle Level 1b product image observation period; Number of vectors' wind speeds whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the

vector's wind speed values in the product file; Number of wind vectors in each of three atmospheric layers, and the minimum, maximum, mean, and standard deviation of the constituent wind vectors' cloud top pressure values. These statistics are calculated using good quality wind vectors. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Derived Motion Winds product is generated by the GOES-R ABI Derived Motion Winds ground processing algorithm. Wind speed and direction are determined by tracking environmental features, specifically cloud edges and clear sky moisture gradients, over a time series composed of three ABI observations. Two displacement vectors are produced for the two time adjacent observation pairs, and then averaged. The time associated with wind vectors in a Derived Motion Winds product file is the acquisition time associated with the middle observation. The algorithm performs several consistency checks on the derived wind information including a comparison with the NWP wind forecast to establish a confidence level for the wind vector and an estimate of its wind speed error. For each ABI band, algorithm processing occurs independently and separate product files are generated. The configuration of each retrieval is band dependent and is determined by the target type (clear sky water vapor or cloud), target box size, search window size (i.e. lag size), temporal spacing between image pairs, and the application of nested tracking of target sub-regions. This configuration information is included in the product metadata. Product files include data for each attempted wind retrieval. It is possible that one or more wind vectors in a product file have one or more null values in its data elements, which is indicated with the applicable variables' fill values. When operating in ABI mode 3, there will be a delay in the production of mesoscale Derived Motion Wind product files when the ABI is commanded to observe a new mesoscale region. This is because the algorithm requires three successive product images. The amount of delay is approximately twice the required time between successive images, which is band-specific and managed as a parameter in the Level 2+

semi-static source data. The time between successive images value is included in the product.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

---

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit

storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5

minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% ( $1 \sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K ( $1 \sigma$ ) at 300K.

### 5.1.18 Hurricane Intensity Product ISO Series Metadata



(MI\_Metadata)

**fileIdentifier:** a70be540-c38b-11e0-962b-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Hurricane Intensity Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-HIE-ISO-SERIES\_c20171311301000.xml

---

**referenceSystemInfo:** (MD\_ReferenceSystem)

**referenceSystemIdentifier:** (RS\_Identifier)

**authority:** (CI\_Citation)

**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2+ Products

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) publication

**otherCitationDetails:** The data points on GOES-R HIE products use the latitude\_longitude CF grid mapping. The coordinates for the global latitude/longitude grid are latitude and longitude. In two-dimensional map space, the x-axis is at the equator, and the y-axis is at the prime (Greenwich) meridian. By convention, degrees north and degrees east are used for latitude and longitude, respectively.

**code:** latitude\_longitude

**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Hurricane Intensity Product

**alternateTitle:** Data short name (DSN): ABI-L2-HIEF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-HIEF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-HIEF-\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Hurricane Intensity product contains information about tropical cyclones along their trajectories from the time they are identified to the current time. Tropical cyclone information provided in the product includes its identity, location, maximum wind speed, Dvorak tropical cyclone current intensity number, detailed wind shear, cloud, and eye characteristics, strengthening and weakening state information, and the start, midpoint, and end observation time of the source ABI product image. Data quality information is not included in the product. A hurricane intensity product file is produced for each tropical cyclone. The units of measure for the maximum sustained wind speed value is meters per second. The advanced Dvorak technique tropical cyclone current and tropical intensity numbers are dimensionless quantities. The Hurricane Intensity product is produced using ABI Full Disk coverage region observations. Product data is produced when a tropical cyclone is in the ABI's field of regard for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)**name:** netCDF**version:** 4**descriptiveKeywords:** (MD\_Keywords)**keyword:** ATMOSPHERE > ATMOSPHERIC PHENOMENA > HURRICANES**type:** (MD\_KeywordTypeCode) theme**thesaurusName:** (CI\_Citation)**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords**date:** (CI\_Date)**date:** 2012-10**dateType:** (CI\_DateTypeCode) revision**edition:** Version 7.0.0.0.0**citedResponsibleParty:** (CI\_ResponsibleParty)**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea**role:** (CI\_RoleCode) author**descriptiveKeywords:** (MD\_Keywords)**keyword:** dvorak\_tropical\_cyclone\_current\_intensity\_number**keyword:** tropical\_cyclone\_maximum\_sustained\_wind\_speed**keyword:** dvorak\_tropical\_number**type:** (MD\_KeywordTypeCode) theme**thesaurusName:** (CI\_Citation)**title:** CF Standard Name Table v27**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**resourceConstraints:** (MD\_SecurityConstraints)**useLimitation:** Unrestricted**classification:** (MD\_ClassificationCode) unclassified**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) vector**spatialResolution:** (MD\_Resolution)**distance:****Distance:** 2**language:** eng; USA**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere**extent:** (EX\_Extent)**temporalElement:** (EX\_TemporalExtent)**extent:****TimePeriod:****beginPosition:** 2017-05-11**endPosition:** now**extent:** (EX\_Extent)**geographicElement:** (EX\_GeographicDescription)**geographicIdentifier:** (MD\_Identifier)**code:** Full Disk - GOES-East**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** -156.2995

**eastBoundLongitude:** 6.2995

**southBoundLatitude:** -81.3282

**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Full Disk - GOES-West

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** 141.7005

**eastBoundLongitude:** -55.7005

**southBoundLatitude:** -81.3282

**northBoundLatitude:** 81.3282

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** wind\_speed

**attributeType:**

**descriptor:** ABI Level 2+ Hurricane Intensity: tropical cyclone's maximum sustained  
wind speed

**units:**

**DerivedUnit:**

**identifier:** m s-1

**derivationUnitTerm:**

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** CI\_number

**attributeType:**

**descriptor:** ABI Level 2+ Hurricane Intensity: advanced Dvorak technique tropical  
cyclone current intensity number (CI#)

**units:**

**scaleFactor:**

**offset:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** final\_T\_number

**attributeType:**

**descriptor:** ABI Level 2+ Hurricane Intensity: advanced Dvorak technique final tropical number (T#)

**units:**

**scaleFactor:**

**offset:**

---

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) series

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Observation time: J2000 epoch (seconds since 2000-01-01 12:00:00) mid-point between the start and end image scan in seconds associated with tropical cyclone intensity estimate; Observation time bounds: start and end time of each image scan associated with tropical cyclone intensity estimates over time; Cloud temperature annular average: cloud top temperature in cloud region annulus centered at storm center; Eye temperature standard deviation: standard deviation of brightness temperature values in eye region.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Hurricane Intensity product is generated by the GOES-R ABI Hurricane Intensity ground processing algorithm. The algorithm, which is the Advanced Dvorak Technique, is used to derive a set of Dvorak Tropical numbers and a Current Intensity number that map directly to a maximum sustained one minute wind speed using a set of pre-determined statistical relationships. The algorithm determines the intensity of a tropical cyclone by matching observed brightness temperature patterns in the current processed ABI Full Disk level 1b band 13 image with a central wavelength of 10.33 um to a set of pre-defined tropical cyclone structures. From this correlation, the center and scene type of the tropical cyclone are determined. The Tropical and Current Intensity numbers are determined based on the recent trend of strengthening or weakening, and pre-defined intensity variation thresholds that vary as a function of time.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** NOAA Processing Levels**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher**code:** L2**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov/spacesegment/abi.html>  
**date:**  
**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov>  
**date:**  
**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov/spacesegment/abi.html>  
**date:**  
**code:** GOES-17 ABI instrument\_id (serial number)



**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.19 Fire (Hot Spot Characterization) Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** b015d6f0-b002-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Fire (Hot Spot Characterization) Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-FDC-ISO-SERIES\_c20171311305000.xml

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 5424  
   **resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 5424  
   **resolution:**  
     **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 1500  
   **resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 2500  
   **resolution:**  
     **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
   **title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
   **date:** (CI\_Date)  
     **date:** 2014  
     **dateType:** (CI\_DateTypeCode) publication  
   **otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for

geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Fire (Hot Spot Characterization) Product

**alternateTitle:** Data short name (DSN): ABI-L2-FDCC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-FDCC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-FDCF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-FDCF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-FDC\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Fire (HSC) product contains four images, one in the form of a fire mask, and the other three with pixel values identifying fire temperature, fire area, and fire radiative power. Pixel values in the fire mask image identify a fire category and diagnostic information associated with algorithm execution. The six fire categories include: Good quality or temporally filtered good quality fire pixel; Saturated fire pixel or temporally filtered saturated fire pixel; Cloud contaminated or temporally filtered cloud contaminated fire pixel; High probability or temporally filtered high probability fire pixel; Medium probability or temporally filtered high probability fire pixel; Low probability or temporally filtered high probability fire. Temporally filtered fire pixels

are those resulting from fire pixels that are in close proximity in both space and time. The product includes data quality information that provides an assessment of fire detection for on-earth pixels. The units of measure for the Fire (HSC) product quantities are for Mask: dimensionless; for Temperature: kelvin; for Area: square kilometers; for Radiative Power: megawatts. The Fire (HSC) product image is produced on the ABI fixed grid at 2 km resolution for Full Disk and CONUS coverage regions. Product data is produced under the following conditions: Existence of land; Geolocated source data to local zenith angles of 80 degrees, solar zenith angles between 10 and 180 degrees, and sunglint angles greater than 10 degrees.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** HUMAN DIMENSIONS > NATURAL HAZARDS > FIRES

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** fire\_area

**keyword:** fire\_temperature

**keyword:** fire\_radiative\_power

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** 175.623576

**eastBoundLongitude:** -89.623576

**southBoundLatitude:** 14.571340

**northBoundLatitude:** 53.500062

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** Mask

**attributeType:**

**descriptor:** ABI Level 2+ Fire (Hot Spot Characterization): Fire Mask

**units:**

**scaleFactor:**

**offset:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** Area

**attributeType:**

**descriptor:** ABI Level 2+ Fire (Hot Spot Characterization): Fire Area

**units:**

**DerivedUnit:**

**identifier:** km2

**derivationUnitTerm:**

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**  
  **aName:** Temp  
  **attributeType:**  
**descriptor:** ABI Level 2+ Fire (Hot Spot Characterization): Fire Temperature  
**units:**  
  **DerivedUnit:**  
    **identifier:** K  
    **derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
  **RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
  **MemberName:**  
    **aName:** Power  
    **attributeType:**  
**descriptor:** ABI Level 2+ Fire (Hot Spot Characterization): Fire Power  
**units:**  
  **DerivedUnit:**  
    **identifier:** MW  
    **derivationUnitTerm:**  
    **derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
  **RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
  **MemberName:**  
    **aName:** DQF  
    **attributeType:**  
**descriptor:** ABI Level 2+ Fire (Hot Spot Characterization) data quality flags  
**units:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) series

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of pixels with fire detected, but fire temperature, area and radiative power not reported; Number of pixels with fire temperature and area reported, but radiative power not reported; Number of pixels with fire temperature, area, and radiative power reported; Number of fire temperature, fire area, and fire radiative power pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the values in the fire temperature, fire area, and fire radiative power product images. The fire pixel count statistics are calculated using good quality fire pixels where the fire mask for these pixels indicate at least medium probability of fire. The fire temperature, fire area, and fire radiative power minimum, maximum, mean and standard deviation statistics are calculated using good quality fire pixels where the fire mask for these pixels indicate definite fire. The percentages of pixels assigned to each DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Fire product is generated by the GOES-R ABI Land Fire ground processing algorithm. The Fire algorithm is a dynamic multispectral thresholding algorithm that uses the differences in sensitivity to high temperature subpixel anomalies of ABI bands 7 and 14, with central wavelengths of 3.89 and 11.19 um, respectively. The algorithm consists of a series of screening tests, threshold tests, and calculations that are applied to each pixel. Estimates of subpixel fire area, temperature, and power are computed based on a screening. Additionally, subsequent analysis can introduce additional fire pixels in the fire mask for which fire properties are not derived from the source ABI data. Pixels in the product images with out of range values are assigned the minimum or maximum value in the valid range. Reflectance for band 2 and brightness temperature for band 15 are used in cloud tests but are not required to detect fires. The



algorithm maintains “time of last fire” intermediate data for each pixel that is used and updated for each execution of the algorithm.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

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**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis

stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3

concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

## 5.1.20 Land Surface (Skin) Temperature Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f22c3310-b00a-11e1-afa6-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Land Surface Temperature

Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-11

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_ABI-L2-LST-ISO-SERIES\_c20171311306000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)

**numberOfDimensions:** 2

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) row

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**axisDimensionProperties:** (MD\_Dimension)

**dimensionName:** (MD\_DimensionNameTypeCode) column

**dimensionSize:** 1086

**resolution:**

**Distance:** 10

**cellGeometry:** (MD\_CellGeometryCode) area

**transformationParameterAvailability:** true

**checkPointAvailability:** false

**pointInPixel:** (MD\_PixelOrientationCode) upperLeft

**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 1500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 2500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 500  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for

geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Land Surface Temperature Product

**alternateTitle:** Data short name (DSN): ABI-L2-LSTM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LSTM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LSTC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LSTC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-LSTF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-LSTF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-LST\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Land Surface (Skin) Temperature product contains an image with pixel values identifying the instantaneous land surface skin temperature or surface radiometric temperature. Measured from the perspective of the satellite, the product is limited to clear conditions over land and represents the effective land temperature over an isothermal mixed pixel. The product includes data quality information that provides an assessment of the quality of the algorithm retrievals for on-earth pixels. The units of measure for the land surface (skin)

temperature value is kelvin. The Land Surface (Skin) Temperature product image is produced on the ABI fixed grid at 10 km resolution for Full Disk and 2 km resolution for CONUS and Mesoscale coverage regions. Product data is produced under the following conditions: Existence of land; Clear sky; Geolocated source data to local zenith angles of 85 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** LAND SURFACE > LAND TEMPERATURE > LAND SURFACE TEMPERATURE

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** surface\_temperature

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 10

**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 2

**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)



**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** LST  
**attributeType:**  
**descriptor:** ABI Level 2+ Land Surface Temperature  
**units:**  
**DerivedUnit:**  
**identifier:** K  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) thematicClassification  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** DQF  
**attributeType:**  
**descriptor:** ABI Level 2+ Land Surface Temperature data quality flags  
**units:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_QuantitativeAttributeAccuracy)  
**nameOfMeasure:** Product summary statistics  
**evaluationMethodDescription:** Start, midpoint, and end time of the product image

observation period; Number of good retrievals; Number of good retrievals where valid land surface (skin) temperature data is determined. Number of land surface (skin) temperature pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the land surface (skin) temperature values in the product image. These statistics are calculated using pixels with good retrievals and a local zenith angle to 85 degrees. The percentages of pixels assigned to each retrieval quality value are also included in the product.

**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)**description:** The Land Surface Temperature product is generated by the GOES-R ABI Land Surface Temperature ground processing algorithm. This product is generated using a regression algorithm based on ABI brightness temperatures and brightness temperature differences for ABI window bands 14 and 15 with central wavelengths of 11.19 and 12.27  $\mu\text{m}$ , respectively and on Level 2+ processing parameters containing surface emissivity data. The algorithm applies difference regression coefficients for dry or moist atmospheric conditions as determined from the Total Precipitable Water product or the NWP total precipitable water dynamic processed ancillary data. The 10 km resolution Total Precipitable Water product is upscaled to 2 km using nearest neighbor to support the retrieval. The Land Surface Temperature algorithm operates on 2 km resolution pixels and generates products at this resolution for CONUS and Mesoscale coverage regions, and aggregates the retrieved land surface temperatures to 10 km resolution for the Full Disk coverage region.**processor:** (CI\_ResponsibleParty)**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)  
**title:** NOAA Processing Levels  
**date:** (CI\_Date)  
**date:** 2013-11  
**dateType:** (CI\_DateTypeCode) revision  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** National Oceanographic and atmospheric  
Administration (NOAA) National Geophysical Data Center (NGDC)  
**contactInfo:** (CI\_Contact)  
**onlineResource:** (CI\_OnlineResource)  
**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)  
**role:** (CI\_RoleCode) publisher  
**code:** L2

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**metadataMaintenance:** (MD\_MaintenanceInformation)  
**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded  
**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)  
**operation:** (MI\_Operation)  
**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://science.nasa.gov/missions/goes-r/>  
**date:**  
**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.21 Snow Cover Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** e7ce8b20-b00a-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Fractional Snow Cover Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-FSC-ISO-SERIES\_c20171311306000.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 5424  
**resolution:**  
**Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 1500  
   **resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 2500  
   **resolution:**  
     **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

---

**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) row  
   **dimensionSize:** 500  
   **resolution:**  
     **Distance:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
   **dimensionName:** (MD\_DimensionNameTypeCode) column  
   **dimensionSize:** 500  
   **resolution:**  
     **Distance:** 2  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

---

**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
   **title:** Product Definition and Users Guide (PUG) Volume 5: Level 2 Products  
   **date:** (CI\_Date)  
     **date:** 2014  
     **dateType:** (CI\_DateTypeCode) publication  
   **otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for

geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** ABI Level 2+ Fractional Snow Cover Product

**alternateTitle:** Data short name (DSN): ABI-L2-FSCM1-M3

**alternateTitle:** Data short name (DSN): ABI-L2-FSCM2-M3

**alternateTitle:** Data short name (DSN): ABI-L2-FSCC-M3

**alternateTitle:** Data short name (DSN): ABI-L2-FSCC-M4

**alternateTitle:** Data short name (DSN): ABI-L2-FSCF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-FSCF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-FSC\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Snow Cover product contains an image with pixel values identifying the fraction of their areas covered by snow. The product includes data quality information that provides an assessment of the snow cover data values for on-earth pixels. The units of measure for the snow cover value is percent. The Snow Cover product image is produced on the ABI fixed grid at 2 km resolution for Full Disk, CONUS and Mesoscale coverage regions. Product data is produced under the following conditions: Existence of land; Clear sky; Geolocated source data to



local zenith angles of 90 degrees and solar zenith angles of 90 degrees.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** CRYOSPHERE > SNOW/ICE > SNOW COVER

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** surface\_snow\_area\_fraction

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 2

**language:** eng; USA

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.2995  
**eastBoundLongitude:** 6.2995  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.7005  
**eastBoundLongitude:** -55.7005  
**southBoundLatitude:** -81.3282  
**northBoundLatitude:** 81.3282

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -152.109282  
**eastBoundLongitude:** -52.946879  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 56.761450

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.623576  
**eastBoundLongitude:** -89.623576  
**southBoundLatitude:** 14.571340  
**northBoundLatitude:** 53.500062

**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** FSC**attributeType:****descriptor:** ABI Level 2+ Snow Cover, which contains fraction of pixel covered by snow**units:****DerivedUnit:****identifier:** percent**derivationUnitTerm:****scaleFactor:****offset:**

---

**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF**attributeType:****descriptor:** ABI Level 2+ Snow Cover data quality flags**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) dataset**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of snow cover pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the snow cover values in the product image; Minimum, maximum, mean, and standard deviation of the root mean square difference between the observed surface bidirectional reflectance values in ABI reflective bands 1, 2, 3, 5 and 6 with central wavelengths of 0.47, 0.64, 0.87, 1.61, and 2.25 um, and the corresponding modeled values derived from a multiple endmember mixing model values in the product image. These statistics are calculated using good quality pixels. The percentages of pixels assigned to each DQF value are also included in the product.**result:**

---

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_LO\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors

**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Snow Cover product is generated by the GOES-R ABI Snow Cover ground processing algorithm. The algorithm relies on atmospherically-corrected surface reflectances derived as part of the determination of the surface albedo and does not use ABI Level 1b data inputs directly. The product is generated using spectral mixture analysis with a look-up table containing spectral reflectances of individual surfaces calculated from a radiative transfer model, and also a physical retrieval utilizing a spectral library lookup table to account for the dependency of reflectance on snow grain size, and local and solar zenith angles. The algorithm maintains an endmember memory file that contains two values per pixel indicating the endmember identifiers of the last modeled endmembers. Types of endmembers are land surface materials such as snow, vegetation, and rock, and are characterized using unique reflectance spectra based on modeled and field measurements. The endmemory memory file is re-initialized daily.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric

Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager

(ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.22 Sea Surface (Skin) Temperature Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** d70be540-c38a-11e0-962b-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Sea Surface (Skin)

Temperature Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** GOES-R@noaa.gov**role:** (CI\_RoleCode) originator**dateStamp:** 2017-05-11**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
for imagery and gridded data**metadataStandardVersion:** ISO 19115-2:2009(E)**dataSetURI:** OR\_ABI-L2-SST-ISO-SERIES\_c20171311306000.xml**spatialRepresentationInfo:** (MD\_Georectified)**numberOfDimensions:** 2**axisDimensionProperties:** (MD\_Dimension)**dimensionName:** (MD\_DimensionNameTypeCode) row**dimensionSize:** 5424**resolution:****Distance:** 2**axisDimensionProperties:** (MD\_Dimension)**dimensionName:** (MD\_DimensionNameTypeCode) column**dimensionSize:** 5424**resolution:****Distance:** 2**cellGeometry:** (MD\_CellGeometryCode) area**transformationParameterAvailability:** true**checkPointAvailability:** false**pointInPixel:** (MD\_PixelOrientationCode) upperLeft**transformationDimensionDescription:** Full Disk**referenceSystemInfo:** (MD\_ReferenceSystem)**referenceSystemIdentifier:** (RS\_Identifier)**authority:** (CI\_Citation)**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2+ Products**date:** (CI\_Date)**date:** 2014**dateType:** (CI\_DateTypeCode) publication**otherCitationDetails:** The data points on GOES-R ABI level 1b and level 2+ products are on the ABI fixed grid. The ABI fixed grid defines the location of each data point to allow for geo-referencing. The ABI fixed grid is a projection that is mathematically based on the idealized location of the GOES-R satellite. The ABI fixed grid allows the data points in every product from a GOES-R satellite at a particular longitude in geostationary orbit generated over time to be at the



same location on the earth. All of the dynamics associated with an orbiting satellite are removed to accomplish this. The fixed grid is rectified to a GRS80 geoid viewed from the idealized geostationary position.

**code:** goes\_projection

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)

**citation:** (CI\_Citation)

**title:** Advanced Baseline Imager (ABI) Level 2+ Sea Surface (Skin) Temperature Product

**alternateTitle:** Data short name (DSN): ABI-L2-SSTF-M3

**alternateTitle:** Data short name (DSN): ABI-L2-SSTF-M4

**date:** (CI\_Date)

**date:** 2017-05-11

**dateType:** (CI\_DateTypeCode) creation

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** gov.nesdis.noaa

**date:** (CI\_Date)

**date:** 2014

**dateType:** (CI\_DateTypeCode) revision

**code:** ABI-L2-SSTF-\*

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Sea Surface (Skin) Temperature product contains an image with pixel values identifying the variations in temperature of the top 10 um of the sea surface. These values are calibrated to the bulk temperature at a depth of 1 m associated with in situ temperature measurements. On average, the pixel values represent the bulk sea surface temperature, but horizontal spatial variations in the product image reveal features associated with the sea surface skin temperature. The product includes data quality information that provides an assessment of the sea surface (skin) temperature data values for on-earth pixels. The units of measure for the sea surface (skin) temperature value is kelvin. The Sea Surface (Skin) Temperature product image is produced on the ABI fixed grid at 2 km resolution for the Full Disk coverage region. Product data is produced under the following conditions: Existence of sea; Geolocated source data to local zenith angles of 90 degrees for both daytime and nighttime conditions.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,

and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** OCEANS > OCEAN TEMPERATURE > SEA SURFACE TEMPERATURE

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** sea\_surface\_skin\_temperature

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 2

**language:** eng; USA

**characterSet:** (MD\_CharacterSetCode) utf8

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:****TimePeriod:****beginPosition:** 2017-05-11**endPosition:** now**extent:** (EX\_Extent)**geographicElement:** (EX\_GeographicDescription)**geographicIdentifier:** (MD\_Identifier)**code:** Full Disk - GOES-East**geographicElement:** (EX\_GeographicBoundingBox)**westBoundLongitude:** -156.2995**eastBoundLongitude:** 6.2995**southBoundLatitude:** -81.3282**northBoundLatitude:** 81.3282**extent:** (EX\_Extent)**geographicElement:** (EX\_GeographicDescription)**geographicIdentifier:** (MD\_Identifier)**code:** Full Disk - GOES-West**geographicElement:** (EX\_GeographicBoundingBox)**westBoundLongitude:** 141.7005**eastBoundLongitude:** -55.7005**southBoundLatitude:** -81.3282**northBoundLatitude:** 81.3282

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** SST**attributeType:****descriptor:** ABI Level 2+ Sea Surface (Skin) Temperature**units:****DerivedUnit:****identifier:** K**derivationUnitTerm:****scaleFactor:****offset:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:**

**MemberName:**  
**aName:** DQF  
**attributeType:**  
**descriptor:** ABI Level 2+ Sea Surface (Skin) Temperature data quality flags  
**units:**

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**dataQualityInfo:** (DQ\_DataQuality)  
**scope:** (DQ\_Scope)  
**level:** (MD\_ScopeCode) dataset  
**report:** (DQ\_QuantitativeAttributeAccuracy)  
**nameOfMeasure:** Product summary statistics  
**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of good quality sea surface (skin) temperature pixels; Number of degraded and severely degraded quality sea surface (skin) temperature pixels; Number of unprocessed on-earth pixels in the sea surface (skin) temperature image; Number of day, night, and twilight sea surface (skin) temperature pixels; Number of sea surface (skin) temperature pixels whose values are outside the required measurement range; Minimum, maximum, mean, and standard deviation of the land surface (skin) temperature values in the product image; Minimum, maximum, mean, and standard deviation of the difference in the observed and modeled brightness temperature for ABI band 7 with central wavelength of 3.89 um used during the nighttime only generation of the sea surface (skin) temperature data; Minimum, maximum, mean, and standard deviation of the difference in the observed and modeled brightness temperature for ABI bands 14 and 15 with central wavelengths of 11.19 and 12.27 um used during the daytime and nighttime generation of the sea surface (skin) temperature data. The number of good quality, day, night, twilight, and outlier statistics are calculated using geolocated sea pixels to a local zenith angle of 67 degrees. The degraded count statistics are calculated using geolocated sea pixels to a local zenith angle of 90 degrees. The sea surface (skin) temperature and brightness temperature difference statistics are calculated using good quality pixels to a local zenith angle of 67 degrees. The percentages of pixels assigned to each DQF value are also included in the product.  
**result:**  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_L0\_errors  
**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.  
**result:** (DQ\_QuantitativeResult)  
**valueUnit:**  
**BaseUnit:**  
**identifier:** percent  
**unitsSystem:**  
**value:**  
**report:** (DQ\_CompletenessOmission)  
**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors  
**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors  
**result:** (DQ\_QuantitativeResult)

**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)

**description:** The Sea Surface (Skin) Temperature product is generated by the GOES-R ABI Sea Surface (Skin) Temperature ground processing algorithm. This product is retrieved using a hybrid regression algorithm that incorporates observed brightness temperatures, clear sky brightness temperatures computed based on the Community Radiative Transfer Model (CRTM), and the Reynolds sea surface temperature. Regression coefficients are defined for daytime and for nighttime conditions. This algorithm can also be configured to execute in a standard regression configuration that does not rely on the CRTM inputs. An attribute of the primary data variable in the product file, "algorithm\_type", indicates the specific algorithm used. Both algorithms employ a multiband approach, relying on brightness temperature in ABI bands 7, 14, and 15 with central wavelengths 3.89, 11.19, and 12.27 um for nighttime, and ABI bands 14 and 15 for daytime. Pixels in the product image with out-of-range values are assigned the minimum or maximum value in the valid range. The product is a composite, making use of multiple ABI Full Disk observations collected over a one hour period at fifteen minute intervals. The algorithm applies the hybrid regression for all ocean pixels regardless of cloud cover.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor**output:** (LE\_Source)**processedLevel:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** NOAA Processing Levels**date:** (CI\_Date)**date:** 2013-11**dateType:** (CI\_DateTypeCode) revision**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher**code:** L2**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded**maintenanceNote:** ISO Series metadata contain quasi-static general information about a

collection of datasets of a particular product that changes infrequently

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**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of

distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** <http://www.goes-r.gov/spacesegment/abi.html>  
**date:**  
**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.23 Downward Shortwave Radiation: Surface Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** de00d810-b013-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Downward Shortwave Radiation: Surface Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2014-10-18  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data



**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-DSR-ISO-SERIES\_c20142911829410.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 326  
**resolution:**  
**Distance:** 50  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 326  
**resolution:**  
**Distance:** 50  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 397  
**resolution:**  
**Distance:** 25  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 169  
**resolution:**  
**Distance:** 25  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS East

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 380

**resolution:**  
**Distance:** 25  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 156  
**resolution:**  
**Distance:** 25  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS West

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 565  
**resolution:**  
**Distance:** 5  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 888  
**resolution:**  
**Distance:** 5  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Mesoscale

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2+ Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R Radiation products use the latitude\_longitude CF grid mapping. The coordinates for the global latitude/longitude grid are latitude and longitude. In two-dimensional map space, the x-axis is at the equator, and the y-axis is at the prime (Greenwich) meridian. By convention, degrees north and degrees east are used for latitude and longitude, respectively.  
**code:** latitude\_longitude

**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** ABI Level 2+ Downward Shortwave Radiation: Surface Product  
**alternateTitle:** Data short name (DSN): ABI-L2-DSRM1-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-DSRM2-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-DSRC-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-DSRC-M4  
**alternateTitle:** Data short name (DSN): ABI-L2-DSRF-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-DSRF-M4  
**date:** (CI\_Date)  
**date:** 2014-10-18  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** ABI-L2-DSR\*  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** The Downward Shortwave Radiation: Surface product contains an image with pixel values identifying the instantaneous total shortwave irradiance (flux) received at the Earth's surface integrated over the 0.2 to 4.0 um wavelength bandpass. It includes contributions from direct solar radiation attenuated by the atmosphere and from diffuse radiation associated with scattering within the atmosphere. The product includes data quality information that provides an assessment of the downward shortwave radiation: surface data values for on-earth pixels. The units of measure for the downward shortwave radiation: surface value is watts per square meter. The Downward Shortwave Radiation: Surface product image is produced on a global latitude/longitude grid at 0.5 degree resolution for Full Disk, 0.25 degree resolution for CONUS, and 0.05 degree resolution for Mesoscale coverage regions. Product data is produced for geolocated source data to local zenith angles of 90 degrees and solar zenith angles to 90 degrees.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,

and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > ATMOSPHERIC RADIATION > SHORTWAVE

RADIATION

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** surface\_downwelling\_shortwave\_flux\_in\_air

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 50

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 25

**spatialResolution:** (MD\_Resolution)

**distance:**  
**Distance:** 5  
**language:** eng; USA  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2014-10-18  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -156.50  
**eastBoundLongitude:** 6.50  
**southBoundLatitude:** -81.50  
**northBoundLatitude:** 81.50  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.50  
**eastBoundLongitude:** -55.50  
**southBoundLatitude:** -81.50  
**northBoundLatitude:** 81.50  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -151.75  
**eastBoundLongitude:** -53.25  
**southBoundLatitude:** 14.25  
**northBoundLatitude:** 55.75  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.5  
**eastBoundLongitude:** -89.5  
**southBoundLatitude:** 14.25  
**northBoundLatitude:** 53.5  
**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Mesoscale

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DSR

**attributeType:**

**descriptor:** ABI Level 2+ Downward Shortwave Radiation: Surface

**units:**

**DerivedUnit:**

**identifier:** W m-2

**derivationUnitTerm:**

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** DQF

**attributeType:**

**descriptor:** ABI Level 2+ Downward Shortwave Radiation: Surface data quality flags

**units:**

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**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) series

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of attempted retrievals; Number of attempted retrievals to local zenith angle of 70 degrees; Number of downward shortwave radiation: surface pixels whose values are outside the required measurement range; Cloud fraction in product image; Minimum, maximum, mean, and standard deviation of the solar zenith angle values for the product image's

pixels; Minimum, maximum, mean, and standard deviation of the downward shortwave radiation: surface values in the product image. The attempted retrieval count, cloud fraction, and solar zenith angle statistics are calculated using geolocated pixels to a solar zenith angle of 90 degrees. The downward shortwave radiation: surface outlier count and other statistics are calculated using good quality pixels to a local zenith angle to 70 degrees and solar zenith angle to 70 degrees. The percentages of pixels assigned to each DQF value are also included in the product.

**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****lineage:** (LI\_Lineage)**processStep:** (LE\_ProcessStep)**description:** The Downward Shortwave Radiation: Surface product is generated by the GOES-R ABI Downward Shortwave Radiation: Surface and Reflected Shortwave Radiation: TOA ground processing algorithm. Depending on the availability of inputs, the algorithm performs either a direct or indirect retrieval of broadband transmittance and reflectance over four scene types: clear sky over no snow/ice; clear sky over snow/ice; water cloud, and; ice cloud. The direct retrieval is primary method. Computed atmospheric transmittance and reflectance are used to derive the shortwave fluxes at the surface and TOA. The direct retrieval path uses ABI products to estimate fluxes from Level 2 processing parameter lookup tables whose values are based on a forward radiative transfer model. When inputs needed for the direct retrieval path are not available, the algorithm uses the indirect retrieval path, invoking a multistep inversion scheme. The indirect retrieval path includes the calculation of a clear-sky snow/ice-free composite TOA albedo derived from the ABI reflectance observations over the previous 29 days. Both retrieval paths rely on primary inputs at 2 km resolution that are averaged over each scene type on the output global latitude/longitude grid. Grid cells within the product extent not represented by a direct mapping between the ABI fixed grid and the global latitude/longitude grid are assigned values based on the nearest neighbor. The coverage region included in the Full Disk and CONUS radiation products is the minimum bounding rectangle within the global latitude/longitude grid. In the case of the mesoscale coverage region, the radiation product data

structure dimensions are fixed and based on its maximum latitude/longitude extent on the ABI Full Disk. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of



Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk

mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60

seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

#### 5.1.24 Reflected Shortwave Radiation: Top-Of-Atmosphere Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** 02f5ddc0-b008-11e1-afa6-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a  
**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for ABI Level 2+ Reflected Shortwave Radiation: Top-Of-Atmosphere Product Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2014-10-18  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ABI-L2-RSR-ISO-SERIES\_c20142911843070.xml

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 652  
**resolution:**  
**Distance:** 25  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 652  
**resolution:**  
**Distance:** 25  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true

**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** Full Disk

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**spatialRepresentationInfo:** (MD\_Georectified)  
**numberOfDimensions:** 2  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) row  
**dimensionSize:** 156  
**resolution:**  
**Distance:** 25  
**axisDimensionProperties:** (MD\_Dimension)  
**dimensionName:** (MD\_DimensionNameTypeCode) column  
**dimensionSize:** 380  
**resolution:**  
**Distance:** 25  
**cellGeometry:** (MD\_CellGeometryCode) area  
**transformationParameterAvailability:** true  
**checkPointAvailability:** false  
**pointInPixel:** (MD\_PixelOrientationCode) upperLeft  
**transformationDimensionDescription:** CONUS

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**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2+ Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R Radiation products use the latitude\_longitude CF grid mapping. This grid mapping defines the canonical 2D geographical coordinate system based upon latitude and longitude coordinates on a spherical Earth. It is included so that the figure of the Earth can be described.  
**code:** latitude\_longitude  
**codeSpace:** <http://cfconventions.org/latest.html>

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** ABI Level 2+ Reflected Shortwave Radiation: Top-Of-Atmosphere Product  
**alternateTitle:** Data short name (DSN): ABI-L2-RSRC-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-RSRC-M4  
**alternateTitle:** Data short name (DSN): ABI-L2-RSRF-M3  
**alternateTitle:** Data short name (DSN): ABI-L2-RSRF-M4  
**date:** (CI\_Date)

**date:** 2014-10-18  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** ABI-L2-RSR  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** The Reflected Shortwave Radiation: TOA product contains an image with pixel values identifying the instantaneous total shortwave irradiance (flux) emerging at the Earth's TOA integrated over the 0.2 to 4.0 um wavelength bandpass. It includes contributions from the solar radiation reflected upward by the Earth's surface and that scattered by the atmosphere. The product includes data quality information that provides an assessment of the reflected shortwave radiation: TOA data values for on-earth pixels. The units of measure for the reflected shortwave radiation: TOA value is watts per square meter. The Reflected Shortwave Radiation: TOA product image is produced on a global latitude/longitude grid at 0.25 degree resolution for Full Disk and CONUS coverage regions. Product data is produced for geolocated source data to local zenith angles of 90 degrees and solar zenith angles to 90 degrees.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** netCDF  
**version:** 4  
**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > ATMOSPHERIC RADIATION > SHORTWAVE RADIATION

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)

**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea

**role:** (CI\_RoleCode) author

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** toa\_outgoing\_shortwave\_flux

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** CF Standard Name Table v25

**date:** (CI\_Date)

**date:** 2013-07-05

**dateType:** (CI\_DateTypeCode) revision

**resourceConstraints:** (MD\_SecurityConstraints)

**useLimitation:** Unrestricted

**classification:** (MD\_ClassificationCode) unclassified

**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid

**spatialResolution:** (MD\_Resolution)

**distance:**

**Distance:** 25

**language:** eng; USA

**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)

**temporalElement:** (EX\_TemporalExtent)

**extent:**

**TimePeriod:**

**beginPosition:** 2014-10-18

**endPosition:** now

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)

**geographicIdentifier:** (MD\_Identifier)

**code:** Full Disk - GOES-East

**geographicElement:** (EX\_GeographicBoundingBox)

**westBoundLongitude:** -156.50

**eastBoundLongitude:** 6.50

**southBoundLatitude:** -81.50

**northBoundLatitude:** 81.50

**extent:** (EX\_Extent)

**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 141.50  
**eastBoundLongitude:** -55.50  
**southBoundLatitude:** -81.50  
**northBoundLatitude:** 81.50  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -151.75  
**eastBoundLongitude:** -53.25  
**southBoundLatitude:** 14.25  
**northBoundLatitude:** 55.75  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** CONUS - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** 175.5  
**eastBoundLongitude:** -89.5  
**southBoundLatitude:** 14.50  
**northBoundLatitude:** 53.5

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**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** RSR  
**attributeType:**  
**descriptor:** ABI Level 2+ Reflected Shortwave Radiation: TOA  
**units:**  
**DerivedUnit:**  
**identifier:** W m-2  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

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**contentInfo:** (MI\_CoverageDescription)**attributeDescription:****RecordType:** variable**contentType:** (MD\_CoverageContentTypeCode) thematicClassification**dimension:** (MD\_Band)**sequenceIdentifier:****MemberName:****aName:** DQF**attributeType:****descriptor:** ABI Level 2+ Reflected Shortwave Radiation: TOA data quality flags**units:**

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**dataQualityInfo:** (DQ\_DataQuality)**scope:** (DQ\_Scope)**level:** (MD\_ScopeCode) series**report:** (DQ\_QuantitativeAttributeAccuracy)**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Start, midpoint, and end time of the product image observation period; Number of attempted retrievals; Number of attempted retrievals to local zenith angle of 70 degrees; Number of reflected shortwave radiation: TOA pixels whose values are outside the required measurement range; Cloud fraction in product image; Minimum, maximum, mean, and standard deviation of the solar zenith angle values for the product image's pixels; Minimum, maximum, mean, and standard deviation of the reflected shortwave radiation: TOA values in the product image. The attempted retrieval count, cloud fraction, and solar zenith angle statistics are calculated using geolocated pixels to a solar zenith angle of 90 degrees. The downward shortwave radiation: surface outlier count and other statistics are calculated using good quality pixels to a local zenith angle to 70 degrees and solar zenith angle to 70 degrees. The percentages of pixels assigned to each DQF value are also included in the product.

**result:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:****identifier:** percent**unitsSystem:****value:****report:** (DQ\_CompletenessOmission)**nameOfMeasure:** percent\_uncorrectable\_GRB\_errors**evaluationMethodDescription:** percent data lost due to uncorrectable GRB errors**result:** (DQ\_QuantitativeResult)**valueUnit:****BaseUnit:**



**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Reflected Shortwave Radiation: TOA product is generated by the GOES-R ABI Downward Shortwave Radiation: Surface and Reflected Shortwave Radiation: TOA ground processing algorithm. Depending on the availability of inputs, the algorithm performs either a “direct” or “indirect” retrieval of broadband transmittance and reflectance over four scene types: clear sky over no snow/ice; clear sky over snow/ice; water cloud, and; ice cloud. The “direct” retrieval is primary method. Computed atmospheric transmittance and reflectance are used to derive the shortwave fluxes at the surface and TOA. The “direct” retrieval path uses ABI products to estimate fluxes from Level 2 processing parameter lookup tables whose values are based on a forward radiative transfer model. When inputs needed for the “direct” retrieval path are not available, the algorithm uses the “indirect” retrieval path, invoking a multistep inversion scheme. The “indirect” retrieval path includes the calculation of a clear-sky snow/ice-free composite TOA albedo derived from the ABI reflectance observations over the previous 29 days. Both retrieval paths rely on primary inputs at 2 km resolution that are averaged over each scene type on the output global latitude/longitude grid. Grid cells within the product extent not represented by a direct mapping between the ABI fixed grid and the global latitude/longitude grid are assigned values based on the nearest neighbor. The coverage region included in the Full Disk and CONUS radiation products is the minimum bounding rectangle within the global latitude/longitude grid. In the case of the mesoscale coverage region, the radiation product data structure dimensions are fixed and based on its maximum latitude/longitude extent on the ABI Full Disk. Pixels in the product image with out of range values are assigned the minimum or maximum value in the valid range.

**processor:** (CI\_ResponsibleParty)

**organisationName:** NESDIS/OSPO at NSOF (NOAA Satellite Operations Facility, Suitland, MD)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher

**code:** L2

---

**metadataMaintenance:** (MD\_MaintenanceInformation)**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded**maintenanceNote:** ISO Series metadata contain quasi-static general information about a collection of datasets of a particular product that changes infrequently

---

**acquisitionInformation:** (MI\_AcquisitionInformation)**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://science.nasa.gov/missions/goes-r/>**date:****code:****status:** (MD\_ProgressCode) onGoing**parentOperation:****platform:** (MI\_Platform)**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** <http://www.goes-r.gov>**date:****code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning

detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-16 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-16 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-16 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs)

and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/abi.html>

**date:**

**code:** GOES-17 ABI instrument\_id (serial number)

**type:** Advanced Baseline Imager

**description:** The Advanced Baseline Imager is the primary instrument on GOES-17 for imaging Earth's weather, climate, and environment. The ABI observes the Earth at 16 different spectral bands, including two visible channels, four near-infrared channels, and ten infrared channels. The products generated from ABI observations provides spatial resolutions between 0.5 and 2.0 km. Forecasters use these high resolution images to track the development of storms in their early stages. The GOES-17 ABI is used for a wide range of applications related to weather, oceans, land, climate, and hazards (fires, volcanoes, hurricanes, and storms that spawn tornados). The ABI has three scan modes that produce imagery data. The continuous full disk mode (Mode 4) provides uninterrupted scans of the full disk every 5 minutes. Mode 3 concurrently allows full disk imagery every 15 minutes, the continental US (CONUS) every 5 minutes, and two interleaved mesoscale regions with each viewed every 60 seconds. And Mode 6 scans the full disk every 10 minutes, CONUS every 5 minutes, and mesoscale regions every 60 seconds. The ABI is calibrated to an accuracy of 3% (1  $\sigma$ ) radiance for visible and near-infrared wavelengths. For infrared channels, the ABI is accurate to 1K (1  $\sigma$ ) at 300K.

### 5.1.25 Surface Albedo Product

The current ground system baseline does not produce the Surface Albedo product.

### 5.1.26 Lightning Detection Product ISO Series Metadata

(MI\_Metadata)

**fileIdentifier:** f5816f53-fd6d-11e3-a3ac-0800200c9a66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for GLM Level 2+ Lightning Detection Product Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions  
 for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_GLM-L2-LCFA-ISO-SERIES\_c20171311307000.xml

---

**referenceSystemInfo:** (MD\_ReferenceSystem)  
**referenceSystemIdentifier:** (RS\_Identifier)  
**authority:** (CI\_Citation)  
**title:** Product Definition and Users Guide (PUG) Volume 5: Level 2+ Products  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) publication  
**otherCitationDetails:** The data points on GOES-R GLM products use the latitude\_longitude CF grid mapping. This grid mapping defines the canonical 2D geographical coordinate system based upon latitude and longitude coordinates on a spherical Earth. It is included so that the figure of the Earth can be described.  
**code:** latitude\_longitude  
**codeSpace:** <http://cfconventions.org/latest.html>

---

**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** GLM Level 2+ Lightning Detection Product  
**alternateTitle:** Data short name (DSN): GLM-L2-LCFA  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** GLM-L2-LCFA  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**abstract:** The Lightning Detection product contains a list of lightning flashes, and their constituent groups and events. The definition of and relationship among flashes, groups, and events are governed by the following spatial and temporal characteristics: An event represents the signal detected from the cloud top associated with a lightning emission in an individual sensor pixel for a 2 ms integration period; A group represents the events detected in adjacent sensor pixels for the same integration period as an event; A flash represents a series of measurements constrained by temporal and spatial extent thresholds that are associated with one or more groups. The parent, child relationship among specific flashes, groups, and events is stored in the product. Data for each flash includes an energy-weighted centroid latitude, longitude location, time span of occurrence, amount of radiant energy, and coverage area. Data for each group includes an energy-weighted centroid latitude, longitude location, mean time of occurrence, amount of radiant energy, and coverage area. Data for each event includes a latitude, longitude location, time of occurrence, and amount of radiant energy. The product includes data quality information for each flash and group. A Lightning Detection product file contains a set of flashes, and its constituent groups and events for a 20 second period. The units of measure for the flash, group, and event radiant energy values is joules. The units of measure for the flash and group coverage areas is square kilometers.

**pointOfContact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator

**resourceFormat:** (MD\_Format)

**name:** netCDF

**version:** 4

**descriptiveKeywords:** (MD\_Keywords)

**keyword:** ATMOSPHERE > ATMOSPHERIC ELECTRICITY > LIGHTNING

**keyword:** ATMOSPHERE > ATMOSPHERIC PHENOMENA > LIGHTNING

**type:** (MD\_KeywordTypeCode) theme

**thesaurusName:** (CI\_Citation)

**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords

**date:** (CI\_Date)

**date:** 2012-10

**dateType:** (CI\_DateTypeCode) revision

**edition:** Version 7.0.0.0.0

**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** lightning\_radiant\_energy  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** CF Standard Name Table v25  
**date:** (CI\_Date)  
**date:** 2013-07-05  
**dateType:** (CI\_DateTypeCode) revision  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**spatialRepresentationType:** (MD\_SpatialRepresentationTypeCode) grid  
**spatialResolution:** (MD\_Resolution)  
**distance:**  
**Distance:** 8  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-East  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -141.56  
**eastBoundLongitude:** -8.44  
**southBoundLatitude:** -66.56  
**northBoundLatitude:** 66.56  
**extent:** (EX\_Extent)  
**geographicElement:** (EX\_GeographicDescription)  
**geographicIdentifier:** (MD\_Identifier)  
**code:** Full Disk - GOES-West  
**geographicElement:** (EX\_GeographicBoundingBox)  
**westBoundLongitude:** -203.56  
**eastBoundLongitude:** -70.44  
**southBoundLatitude:** -66.56

**northBoundLatitude:** 66.56

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**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** event\_lat

**definition:** latitude degrees north

**rangeElement:**

**Record:** GLM L2+ Lightning Detection: event latitude coordinate

**rangeElementDescription:** (MI\_RangeElementDescription)

**name:** event\_lon

**definition:** longitude degrees east

**rangeElement:**

**Record:** GLM L2+ Lightning Detection: event longitude coordinate

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** event\_time\_offset

**attributeType:**

**descriptor:** GLM Level 2+ Lightning Detection: event's time of occurrence

**units:**

**DerivedUnit:**

**identifier:** milliseconds since start time of product

**derivationUnitTerm:**

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** event\_energy

**attributeType:**



**descriptor:** GLM Level 2+ Lightning Detection: event radiant energy

**units:**

**DerivedUnit:**

**identifier:** J

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** group\_time\_offset

**attributeType:**

**descriptor:** GLM Level 2+ Lightning Detection: mean time of group's constituent events' times of occurrence

**units:**

**DerivedUnit:**

**identifier:** milliseconds since start time of product

**derivationUnitTerm:**

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** group\_energy

**attributeType:**

**descriptor:** GLM Level 2+ Lightning Detection: group radiant energy

**units:**

**DerivedUnit:**

**identifier:** J

**derivationUnitTerm:**

**scaleFactor:**

**offset:**

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** group\_area  
**attributeType:**  
**descriptor:** GLM Level 2+ Lightning Detection: group area coverage (pixels containing at least one constituent event only)  
**units:**  
**DerivedUnit:**  
**identifier:** km2  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** flash\_time\_offset\_of\_first\_event  
**attributeType:**  
**descriptor:** GLM Level 2+ Lightning Detection: time of occurrence of first constituent event in flash  
**units:**  
**DerivedUnit:**  
**identifier:** milliseconds since start time of product  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**

**aName:** flash\_time\_offset\_of\_last\_event  
**attributeType:**  
**descriptor:** GLM Level 2+ Lightning Detection: time of occurrence of last constituent event in flash  
**units:**  
**DerivedUnit:**  
**identifier:** milliseconds since start time of product  
**derivationUnitTerm:**  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** flash\_energy  
**attributeType:**  
**descriptor:** GLM Level 2+ Lightning Detection: flash radiant energy  
**units:**  
**DerivedUnit:**  
**identifier:** J  
**derivationUnitTerm:**  
**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)  
**attributeDescription:**  
**RecordType:** variable  
**contentType:** (MD\_CoverageContentTypeCode) physicalMeasurement  
**dimension:** (MD\_Band)  
**sequenceIdentifier:**  
**MemberName:**  
**aName:** flash\_area  
**attributeType:**  
**descriptor:** GLM Level 2+ Lightning Detection: flash area coverage (pixels containing at least one constituent event only)  
**units:**  
**DerivedUnit:**  
**identifier:** km2  
**derivationUnitTerm:**  
**derivationUnitTerm:**

**scaleFactor:**  
**offset:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** group\_quality\_flag

**attributeType:**

**descriptor:** GLM Level 2+ Lightning Detection: group data quality flags

**units:**

---

**contentInfo:** (MI\_CoverageDescription)

**attributeDescription:**

**RecordType:** variable

**contentType:** (MD\_CoverageContentTypeCode) thematicClassification

**dimension:** (MD\_Band)

**sequenceIdentifier:**

**MemberName:**

**aName:** flash\_quality\_flag

**attributeType:**

**descriptor:** GLM Level 2+ Lightning Detection: flash data quality flags

**units:**

---

**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) dataset

**report:** (DQ\_QuantitativeAttributeAccuracy)

**nameOfMeasure:** Product summary statistics

**evaluationMethodDescription:** Approximate start and end time of the observation period; Number of flashes, groups, and events; Satellite yaw flip configuration. The percentages of pixels assigned to each flash and group DQF value are also included in the product.

**result:**

**report:** (DQ\_CompletenessOmission)

**nameOfMeasure:** percent\_uncorrectable\_L0\_errors

**evaluationMethodDescription:** Percentage of Raw Data CCSDS Channel Access Data Units (CADUs) received with bit errors too numerous to be corrected by the Low Density Parity Check Forward Error Correction coding.

**result:** (DQ\_QuantitativeResult)

**valueUnit:**

**BaseUnit:**

**identifier:** percent

**unitsSystem:**

**value:**

**lineage:** (LI\_Lineage)

**processStep:** (LE\_ProcessStep)

**description:** The Lightning Detection product is generated by the sequential execution of Level 0, Level 1b and Level 2+ ground processing algorithms. The Level 2+ algorithm is the GOES-R GLM Lightning Cluster-Filter algorithm. The Level 0 algorithm decompresses and extracts events and GLM background image data from the CCSDS packets. The GLM instrument detects areas of potential lightning by capturing optical images of the Earth in its field of view, and identifying potential lightning events based on transient emissions from the tops of cloud. GLM Level 1b algorithm ground processing filters false lightning events using spatial and temporal thresholds and tracking tests. Each event remaining after filtering is radiometrically corrected, navigated to latitude, longitude coordinates, and time-tagged. The time-tag is corrected for light propagation time from cloud to satellite. The Level 2+ Lightning Detection algorithm clusters the events into groups and flashes based on spatial and temporal threshold parameters. Events, groups, and flashes are related in a tree-like structure with each flash made up of a unique set of groups and each group made up of a unique set of events. For each group and flash, the centroid location is its optically-weighted position, the energy is the sum of its events' energies, and its area is the sum of the areas covered by its events' pixels. Flashes from cloud-to-ground lightning and intra-cloud lightning are not distinguished. The wavelength of the radiant energy sensed by the instrument is from 776.87 to 777.87 nm at half the maximum of the spectral response function. The Level 1b and Level 2+ processing algorithms are executed at a cadence of once per second. The flashes for which processing has completed are included in the 20 second products. This means that event, group, time stamp values may be prior to the 20 second period associated with the particular product instance. These algorithms are designed subject to requirements for the maximum event, group, and flash rates to ensure that ground system processing operates at the data rate for lightning in the sensor's field of view.

**processor:** (CI\_ResponsibleParty)

**organisationName:** WCDAS (Wallops Command and Data Acquisition Station, Wallops Island, VA), RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**processor:** (CI\_ResponsibleParty)

**organisationName:** RBU (Remote Backup Unit, Fairmont, WV)

**role:** (CI\_RoleCode) processor

**output:** (LE\_Source)

**processedLevel:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** NOAA Processing Levels

**date:** (CI\_Date)

**date:** 2013-11

**dateType:** (CI\_DateTypeCode) revision

**citedResponsibleParty:** (CI\_ResponsibleParty)

**organisationName:** National Oceanographic and atmospheric Administration (NOAA) National Geophysical Data Center (NGDC)

**contactInfo:** (CI\_Contact)

**onlineResource:** (CI\_OnlineResource)

**linkage:** [https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA\\_Processing\\_Levels](https://www.ngdc.noaa.gov/wiki/index.php?title=NOAA_Processing_Levels)

**role:** (CI\_RoleCode) publisher  
**code:** L2

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a product line that changes infrequently

**acquisitionInformation:** (MI\_AcquisitionInformation)

**operation:** (MI\_Operation)

**description:** The Geostationary Operational Environmental Satellite-R Series (GOES-R) is the United States Government geostationary weather satellite series having an operational life-cycle from 2016 to the 2030s. The advanced spacecraft and instrument technology used on the GOES-R series result in more timely and accurate forecasts and warnings than previous generations, including the capability to image its near hemispherical field of view in five minutes. The sixteen imaging channels supporting product resolutions between 0.5 and 2.0 km, and lightning detection capability improves support for the detection and observations of meteorological phenomena that directly affect public safety, protection of property, and ultimately, economic health and development. The GOES-R series was a collaborative development and acquisition effort between the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA). The GOES-R satellite provides continuous imagery and atmospheric measurements of Earth's Western Hemisphere and space weather monitoring. It is the primary tool for the detection and tracking of hurricanes and severe weather and is a key enabler for fulfilling NOAA's goals of Water and Weather, Climate, Commerce, and Ecosystem. The GOES-R spacecraft is 3-axis stabilized and designed for 10 years of on-orbit operation preceded by up to 5 years of on-orbit storage. The satellite operates through periodic station-keeping and momentum transfer maneuvers, which allow for near-continuous instrument observations.

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://science.nasa.gov/missions/goes-r/>

**date:**

**code:**

**status:** (MD\_ProgressCode) onGoing

**parentOperation:**

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-East (G16)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and

the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:** GOES-16 GLM serial number

**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper (GLM) is an optical transient detector and imager operating in the near-IR that maps total lightning (in-cloud and cloud-to-ground) activity with near uniform spatial resolution of approximately 8 km continuously day and night over the Americas and adjacent ocean regions. The GLM provides early indication of storm intensification and severe weather events, improved tornado warning lead time, and data for long-term climate variability studies. The GLM provides information to identify growing, active, and potentially destructive thunderstorms over land as well as ocean areas.

**platform:** (MI\_Platform)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov>

**date:**

**code:** GOES-West (G17)

**description:** The GOES-R System acquires and disseminates environmental data from geostationary orbit. The system observes the Earth's surface and atmosphere, solar activity, and the in-situ space environment. The major functions of the GOES-R System are to support, process, and distribute the data from its instruments, specifically the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM), Solar Ultraviolet Imager (SUVI), EUVS and XRS Irradiance Sensors (EXIS), Space Environment In-Situ Suite (SEISS) and Magnetometer. Other functions of the GOES-R System are to: (1) rebroadcast Level 1b and Level 2+ lightning detection products generated by the GOES-R System (GRB), (2) support terrestrial and oceanographic Data Collection Platforms (DCPs), (3) relay High Rate Information Transmission (HRIT) data between earth terminals and relay the Emergency Managers Weather Information Network (EMWIN) broadcast on the HRIT/EMWIN link, and (4) provide rapid detection of distress messages from the Search and Rescue (SAR) Emergency Locator Transmitters (ELTs) and Emergency Position Indicating Radio Beacons (EPIRBs). The GOES operational constellation provides coverage operationally from two locations, one at 75° West longitude and

the second at 137° West longitude.

**instrument:** (MI\_Instrument)

**identifier:** (MD\_Identifier)

**authority:** (CI\_Citation)

**title:** <http://www.goes-r.gov/spacesegment/glm.html>

**date:**

**code:** GOES-17 GLM serial number

**type:** Geostationary Lightning Mapper

**description:** The Geostationary Lightning Mapper (GLM) is an optical transient detector and imager operating in the near-IR that maps total lightning (in-cloud and cloud-to-ground) activity with near uniform spatial resolution of approximately 8 km continuously day and night over the Americas and adjacent ocean regions. The GLM provides early indication of storm intensification and severe weather events, improved tornado warning lead time, and data for long-term climate variability studies. The GLM provides information to identify growing, active, and potentially destructive thunderstorms over land as well as ocean areas.

## 5.2 Level 2+ Data

### 5.2.1 Level 2+ Semi-Static Source Data

(MI\_Metadata)

**fileIdentifier:** 10d80d3e-ef77-11e5-9ce9-5e5517507c66

**language:** eng

**characterSet:** (MD\_CharacterSetCode) utf8

**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series

**hierarchyLevelName:** ISO Series Metadata for GOES-R L2 Processing Parameters Collection

**contact:** (CI\_ResponsibleParty)

**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce

**contactInfo:** (CI\_Contact)

**address:** (CI\_Address)

**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor

**city:** Silver Spring

**administrativeArea:** MD

**postalCode:** 20910

**country:** USA

**electronicMailAddress:** GOES-R@noaa.gov

**role:** (CI\_RoleCode) originator

**dateStamp:** 2017-05-15

**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2 Extensions for imagery and gridded data

**metadataStandardVersion:** ISO 19115-2:2009(E)

**dataSetURI:** OR\_PARM-L2-ISO-SERIES\_c20171351618000.xml



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**identificationInfo:** (MD\_DataIdentification)**citation:** (CI\_Citation)**title:** GOES-R L2 Processing Parameters**alternateTitle:** Data short name (DSN): PARM-L2-ISO-SERIES**date:** (CI\_Date)**date:** 2017-05-15**dateType:** (CI\_DateTypeCode) creation**identifier:** (MD\_Identifier)**authority:** (CI\_Citation)**title:** Product Definition and Users Guide (PUG) Volume 1: Main**date:** (CI\_Date)**date:** 2016**dateType:** (CI\_DateTypeCode) revision**code:** GOES-R Document Control Number: 7035538**citedResponsibleParty:** (CI\_ResponsibleParty)**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** goes-r@noaa.gov**role:** (CI\_RoleCode) originator

**abstract:** Processing parameters are used as a direct input to the GOES-R ground processing algorithms. There are three categories of semi-static source data used in the Advanced Baseline Imager (ABI) Level 2 ground processing algorithm, 1) Algorithm-specific parameters, such as qualification thresholds and limits, look-up tables, conversion factors, and minimum and maximum valid ranges, 2) Common library parameters, such as band wavelength maps, Planck look-up tables, pixel displacement parameters, and other constant values, 3) Gridded parameters, such as parameters used in projection and mapping. Geostationary Lightning Mapper (GLM) uses radiometric calibration parameters (associated with the instrument's observing characteristics); geometric calibration parameters (associated with the precise look angle and size of the field of view); as well as algorithm processing parameters (associated with configurable decision-making logic in the algorithm as well as spatial and temporal thresholds, look up tables and scales and offsets applied to output values.

**pointOfContact:** (CI\_ResponsibleParty)**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce**contactInfo:** (CI\_Contact)**address:** (CI\_Address)**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor**city:** Silver Spring**administrativeArea:** MD**postalCode:** 20910**country:** USA**electronicMailAddress:** goes-r@noaa.gov

**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** zip  
**version:**  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** Earth Observation Satellites > GOES (Geostationary Operational Environmental Satellite) > GOES-R  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C. Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** semi-static processing parameters  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode) unclassified  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere  
**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-15  
**endPosition:** now

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**metadataMaintenance:** (MD\_MaintenanceInformation)  
**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded  
**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

### 5.2.2 Level 2+ Algorithm Packages

(MI\_Metadata)

**fileIdentifier:** 808dfb20-3a75-11e3-aa6e-0800200c9a66  
**language:** eng  
**characterSet:** (MD\_CharacterSetCode) utf8  
**parentIdentifier:** n/a

**hierarchyLevel:** (MD\_ScopeCode) series  
**hierarchyLevelName:** ISO Series Metadata for GOES-R L2 Algorithm Package  
Collection  
**contact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data,  
and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** GOES-R@noaa.gov  
**role:** (CI\_RoleCode) originator  
**dateStamp:** 2017-05-11  
**metadataStandardName:** ISO 19115-2 Geographic Information - Metadata Part 2  
Extensions for imagery and gridded data  
**metadataStandardVersion:** ISO 19115-2:2009(E)  
**dataSetURI:** OR\_ALG-L2-ISO-SERIES\_c20171311357000.xml

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**identificationInfo:** (MD\_DataIdentification)  
**citation:** (CI\_Citation)  
**title:** GOES-R L2 Algorithm Package  
**alternateTitle:** Data short name (DSN): ALG-L2-ISO-SERIES  
**date:** (CI\_Date)  
**date:** 2017-05-11  
**dateType:** (CI\_DateTypeCode) creation  
**identifier:** (MD\_Identifier)  
**authority:** (CI\_Citation)  
**title:** gov.nesdis.noaa  
**date:** (CI\_Date)  
**date:** 2014  
**dateType:** (CI\_DateTypeCode) revision  
**code:** ALG-L2-ISO-SERIES  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite,  
Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910

**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**abstract:** Each Algorithm Package includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), and descriptive information. Each ATBD will include an overview, logic flow, assumptions, theoretical/math description, limitations, exception handling, inputs/outputs, and software implementation considerations.  
**pointOfContact:** (CI\_ResponsibleParty)  
**organisationName:** DOC/NOAA/NESDIS > National Environmental Satellite, Data, and Information Services, NOAA, U.S. Department of Commerce  
**contactInfo:** (CI\_Contact)  
**address:** (CI\_Address)  
**deliveryPoint:** 1335 East-West Highway, SSMC1, 8th Floor  
**city:** Silver Spring  
**administrativeArea:** MD  
**postalCode:** 20910  
**country:** USA  
**electronicMailAddress:** goes-r@noaa.gov  
**role:** (CI\_RoleCode) originator  
**resourceFormat:** (MD\_Format)  
**name:** zip  
**version:**  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** Earth Observation Satellites > GOES (Geostationary Operational Environmental Satellite) > GOES-R  
**type:** (MD\_KeywordTypeCode) theme  
**thesaurusName:** (CI\_Citation)  
**title:** NASA Global Change Master Directory (GCMD) Earth Science Keywords  
**date:** (CI\_Date)  
**date:** 2012-10  
**dateType:** (CI\_DateTypeCode) revision  
**edition:** Version 7.0.0.0.0  
**citedResponsibleParty:** (CI\_ResponsibleParty)  
**individualName:** Olsen, L.M., G. Major, K. Shein, J. Scialdone, S. Ritz, T. Stevens, M. Morahan, A. Aleman, R. Vogel, S. Leicester, H. Weir, M. Meaux, S. Grebas, C.Solomon, M. Holland, T. Northcutt, R. A. Restrepo, R. Bilodea  
**role:** (CI\_RoleCode) author  
**descriptiveKeywords:** (MD\_Keywords)  
**keyword:** Algorithm Package  
**resourceConstraints:** (MD\_SecurityConstraints)  
**useLimitation:** Unrestricted  
**classification:** (MD\_ClassificationCode)  
**language:** eng; USA  
**characterSet:** (MD\_CharacterSetCode) utf8  
**topicCategory:** (MD\_TopicCategoryCode) climatologyMeteorologyAtmosphere

**extent:** (EX\_Extent)  
**temporalElement:** (EX\_TemporalExtent)  
**extent:**  
**TimePeriod:**  
**beginPosition:** 2017-05-11  
**endPosition:** now

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**dataQualityInfo:** (DQ\_DataQuality)

**scope:** (DQ\_Scope)

**level:** (MD\_ScopeCode) series

**lineage:** (LI\_Lineage)

**source:** (LI\_Source)

**description:** Includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), for the following algorithms: Advanced Baseline Imager (ABI) L2 Cloud and Moisture Imagery Channel 1 through ABI L2 Cloud and Moisture Imagery Channel 16 algorithms and the ABI L2 Cloud and Moisture Imagery Multiband Algorithm, and all ABI L2 derived product algorithms.

**source:** (LI\_Source)

**description:** Includes the Algorithm Theoretical Basis Document (ATBD), data files (synthetic input, output, and ancillary), for the following algorithm: Geostationary Lightning Mapper (GLM).

---

**metadataMaintenance:** (MD\_MaintenanceInformation)

**maintenanceAndUpdateFrequency:** (MD\_MaintenanceFrequencyCode) asNeeded

**maintenanceNote:** GOES-R ISO Series metadata contain quasi-static general information about a collection of datasets of a product line that changes infrequently

## 6.0 ISO SERIES METADATA FILENAME CONVENTIONS

The main volume of the PUG contains a summary level description of the filename conventions used for all GOES-R product and data files. This appendix contains the detailed filename conventions for Level 0, 1b, and 2+ product and data ISO series metadata.

As discussed in the main volume of the PUG, filenames consist of a set of string fields delimited by an underscore or a period that are concatenated together. The content and format of several of the filename string fields are common across more than one of the ISO series metadata product and data filenames. Refer to Table 6.0-1, Common Filename String Fields.

**Table 6.0-1 Common Filename String Fields**

Common String Field	Description	Values and Meanings
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Creation Date & Time	Date & time the file is created.	"cYYYYDDDDHHMMSSs"  Notes: <ul style="list-style-type: none"> <li>➤ YYYY = year: e.g., 2015</li> <li>➤ DDD = day of year: 001-366</li> <li>➤ HH = UTC hour of day: 00-23</li> <li>➤ MM = minute of hour: 00-59</li> <li>➤ SS = second of minute: 00-59 (60 indicates leap second, and third "s" is tenth of second)</li> </ul>
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Table 6.0-2, Appendix X Filename Convention Paragraphs for Specific ISO Series Metadata Types, identifies the subordinate paragraph where ISO series metadata are defined for GOES-R products and data. In addition, example filenames are included in the subordinate paragraphs.

**Table 6.0-2 Appendix X Filename Convention Paragraphs for Specific ISO Series Metadata Types**

Level 1b Product or Data Types	Appendix X Paragraph
Level 0 Products	Paragraph 6.1
Level 1b Products and Data, and GRB Information	Paragraph 6.2
Level 2+ Products and Data	Paragraph 6.3

### 6.1 Level 0 Products

Level 0 product ISO series metadata filenames are assembled using filename string fields as follows:

**<DSN>\_Version.<File Extension>**

Different ISO series metadata files have unique DSNs. Refer to Table 6.1, Level 0 ISO Series Metadata DSNs.

**Table 6.1 Level 0 ISO Series Metadata DSNs**

Type of Level 1b Product or Data	ISO Series Metadata DSN	Specific Product
Level 0 Product	OR_ABI-L0-ISO-SERIES	ABI Level 0 Product
	OR_GLM-L0-ISO-SERIES	GLM Level 0 Product
	OR_SUVI-L0-ISO-SERIES	SUVI Level 0 Product
	OR_EXIS-L0-ISO-SERIES	EXIS Level 0 Product
	OR_SEIS-L0-ISO-SERIES	SEISS Level 0 Product
	OR_MAG-L0-ISO-SERIES	Magnetometer Level 0 Product

The file extension for ISO series metadata files is ".xml".

The filename for the third major version, second minor revision to SEISS Level 0 ISO series metadata is: "OR\_SEISS-L0-ISO-SERIES\_v0302.xml"

### 6.2 Level 1b Products and Data

Level 1b ISO series metadata filenames are assembled using filename string fields as follows:

<DSN>\_<Creation Date & Time>.<File Extension>

The relationship between different ISO series metadata files and the other GOES-R Level 1b products and data files varies as a function of the type of product or data. The relationship between Level 1b product and data files is as follows:

- Each Level 1b product is associated with a unique ISO series metadata file.
- All of the types of GRB information data files are associated with a unique ISO series metadata file.
- ABI sample outlier data file is associated with a unique ISO series metadata file.
- All of the types of instrument calibration data files are associated with a shared, but unique ISO series metadata file.
- All of the types of Level 1b semi-static source data are associated with a shared, but unique ISO series metadata file.
- All of the types of Level 1b algorithm package files are associated with a shared, but unique ISO series metadata file.

Different ISO series metadata files have unique DSNs. Refer to Table 6.2, Level 1b ISO Series Metadata DSNs.

**Table 6.2 Level 1b ISO Series Metadata DSNs**

Type of Level 1b Product or Data	ISO Series Metadata DSN	Specific Product
Level 1b Product	OR_ABI-L1b-Rad-ISO-SERIES	Radiances
	OR_SUVI-L1b-SUVI-ISO-SERIES	Solar Imagery: X-Ray
	OR_EXIS-L1b-SF XR-ISO-SERIES	Solar Flux: X-Ray
	OR_EXIS-L1b-SFEU-ISO-SERIES	Solar Flux: EUV
	OR_SEIS-L1b-EHIS-ISO-SERIES	Energetic Heavy Ions
	OR_SEIS-L1b-MPSL-ISO-SERIES	Magnetospheric Electrons and Protons: Low Energy
	OR_SEIS-L1b-MPSH-ISO-SERIES	Magnetospheric Electrons and Protons: Medium and High Energy
	OR_SEIS-L1b-SGPS-ISO-SERIES	Solar and Galactic Protons
	OR_MAG-L1b-GEOF-ISO-SERIES	Geomagnetic Field
GRB Information	OR_GRB-INFO-ISO-SERIES	
ABI Sample Outlier Data	OR_SOF-ISO-SERIES	
Instrument Calibration Data	OR_CAL-ISO-SERIES	
Level 1b Semi-Static Source Data	OR_PARM-L1b-ISO-SERIES	
Level 1b Algorithm Packages	OR_ALG-L1b-ISO-SERIES	

The file extension for ISO series metadata files is “.xml”.

The filename for the instrument calibration data ISO series metadata file created at 1:00 PM UTC on January 4, 2015 is:

“OR\_CAL-ISO-SERIES\_c20140041300000.xml”

### 6.3 Level 2+ Products and Data

Level 2+ ISO series metadata filenames are assembled using filename string fields as follows:

**<DSN>\_<Version>.<File Extension>**

The relationship between different ISO series metadata files and the other GOES-R Level 1b products and data files varies as a function of the type of product or data. The relationship between Level 1b product and data files is as follows:

- Each Level 2+ product is associated with a unique ISO series metadata file.
- All of the types of Level 2+ semi-static source data are associated with a shared, but unique ISO series metadata file.
- All of the types of Level 2+ algorithm package files are associated with a shared, but unique ISO series metadata file.

Different ISO series metadata files have unique DSNs. Refer to Table 6.3, Level 2+ ISO Series Metadata DSNs.

**Table 6.3 Level 2+ ISO Series Metadata DSNs**

Type of Level 2+ Product or Data	ISO Series Metadata DSN	Specific Product
Level 2+ Product	OR_ABI-L2-ACHA-ISO-SERIES	Cloud Top Height
	OR_ABI-L2-ACHT-ISO-SERIES	Cloud Top Temperature
	OR_ABI-L2-ACM-ISO-SERIES	Clear Sky Masks
	OR_ABI-L2-ACTP-ISO-SERIES	Cloud Top Phase
	OR_ABI-L2-ADP-ISO-SERIES	Aerosol Detection
	OR_ABI-L2-AOD-ISO-SERIES	Aerosol Optical Depth
	OR_ABI-L2-CMIP-ISO-SERIES	Cloud & Moisture Imagery
	OR_ABI-L2-COD-ISO-SERIES	Cloud Optical Depth
	OR_ABI-L2-CPS-ISO-SERIES	Cloud Particle Size Distribution
	OR_ABI-L2-CTP-ISO-SERIES	Cloud Top Pressure
	OR_ABI-L2-DMW-ISO-SERIES	Derived Motion Winds
	OR_ABI-L2-DSI-ISO-SERIES	Derived Stability Indices
	OR_ABI-L2-DSR-ISO-SERIES	Downward Shortwave Radiation: Surface
	OR_ABI-L2-FDC-ISO-SERIES	Fire / Hot Spot Characterization
	OR_ABI-L2-FSC-ISO-SERIES	Snow Cover
	OR_ABI-L2-HIE-ISO-SERIES	Hurricane Intensity
	OR_ABI-L2-LST-ISO-SERIES	Land Surface (Skin) Temperature
	OR_ABI-L2-LVMP-ISO-SERIES	Legacy Vertical Moisture Profile
	OR_ABI-L2-LVTP-ISO-SERIES	Legacy Vertical Temperature Profile
	OR_ABI-L2-RRQPE-ISO-SERIES	Rainfall Rate/QPE
	OR_ABI-L2-RSR-ISO-SERIES	Reflected Shortwave Radiation: TOA
	OR_ABI-L2-SST-ISO-SERIES	Sea Surface (Skin) Temperature
OR_ABI-L2-TPW-ISO-SERIES	Total Precipitable Water	
OR_ABI-L2-VAA-ISO-SERIES	Volcanic Ash: Detection & Height	
OR_GLM-L2-LCFA-ISO-SERIES	Lightning Detection	
Level 2+ Semi-Static Source Data	OR_PARM-L2-ISO-SERIES	



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Level 2+ Algorithm Packages	OR_ALG-L2-ISO-SERIES	
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The file extension for ISO series metadata files is “.xml”, indicating XML files.

The filename for the Total Precipitable Water ISO series metadata file created at 5:05 PM UTC on January 7, 2017 is:

“OR\_ABI-L2-TPW-ISO-SERIES\_c20170071705000.xml”