GOES-17 ABI L2+ Cloud Optical and Microphysical Properties (COMP)
Cloud Optical Depth (COD) Release
Provisional Data Quality
September 24, 2019
Read-Me for Data Users

The Peer/Stakeholder Product Validation Review (PS-PVR) for the GOES-17 Advance Baseline Imager (ABI) L2+ Cloud Optical and Microphysical Properties (COMP) Provisional Maturity was held on June 13 with a revisit for the nighttime products on September 24, 2019. As a result of the revisit, the ABI COMP Cloud Optical Depth (COD) product was declared Provisional for the cold, stable periods of the day and night.

Up to date information on the GOES-17 cooling system issue can be found on the following web sites:
https://www.goes-r.gov/users/GOES-17-ABI-Performance.html
http://cimss.ssec.wisc.edu/goes-r/abi-/band_statistics_imagery.html

The table shown below is pulled from the above web site and is an estimate of times of peak interruption for 2019. The table represents potential saturation. The user should be more vigilant of potential anomalies during these times. The COD may be usable during some of these time blocks.

Date Range	Saturation increase/decrease	Time of Day
1 Jan - 26 Feb	Channel saturation goes from marginal to unusable by 26 Feb.	Saturation can occur between 0830 - 1730 UTC.
26 Feb - 20 Mar	Channel saturation goes from unusable to marginal.	Saturation can occur between 0900 - 1700 UTC.
20 Mar - 13 Apr	Channel saturation goes from marginal to unusable by 13 Apr.	Saturation can occur between 0900 - 1700 UTC.
13 Apr - 26 May	Channel saturation goes from unusable to marginal.	Saturation can occur between 0900 - 1700 UTC.
26 May - 20 Jul	No Channel saturation	
20 Jul - 30 Aug	Channel saturation goes from marginal to unusable by 30 Aug.	Saturation can occur between 0900 - 1700 UTC.
30 Aug - 23 Sep	Channel saturation goes from unusable to marginal.	Saturation can occur between 0930 - 1630 UTC.
23 Sep - 16 Oct	Channel saturation goes from marginal to unusable by 16 Oct.	Saturation can occur between 0900 - 1700 UTC.
16 Oct - 12 Dec	Channel saturation goes from unusable to marginal.	Saturation can occur between 0900 - 1700 UTC.

GOES-17 was placed into Mode 6 on April 2, 2019. Despite this change, the COD product continues to be generated once an hour for every ABI Full Disk (FD) of the Earth, over the Continental United States (CONUS) region, and 2 Meso domains.

The GOES-R ABI COD daytime product is generated from ABI bands 2 (0.64 µm) and 6 (2.25 µm). The COD nighttime product is generated from ABI bands 7 (3.9µm), 14 (11.2 µm) and 15 (12.3 µm). The retrieval is available for each cloudy pixel. The spatial resolutions for FD and CONUS COD results are 2 km.

A full description and format of the COD product can be found in the Product Definition and User's Guide (PUG) document (http://www.goes-r.gov/products/docs/PUG-L2+-vol5.pdf). The algorithm used to derive the daytime COD product from GOES-17 ABI observations is described in detail in the "ABI Algorithm Theoretical Basis Document For Daytime Cloud Optical and Microphysical Properties (DCOMP)" (https://www.star.nesdis.noaa.gov/goesr/documents/ATBDs/Baseline/ATBD_GOES-R_Cloud_DCOMP_v3.0_Jun2013.pdf. The Algorithm Theoretical Basis Document For Nighttime Cloud Optical and Microphysical Properties (NCOMP) used to derive the nighttime COD product from GOES-17 ABI observations will be delivered after heat loop pipe remediation strategies are implemented and tested and after any subsequent algorithm updates are made. For now, the NCOMP ATBD for GOES-16 details the algorithm applied to cold, stable periods.

Provisional maturity, by definition, means that:
- Validation and quality assurance activities are ongoing and the general research community is now encouraged to participate.
- Severe algorithm anomalies are identified and under analysis. Solutions to anomalies are in development and testing.
- Incremental product improvements may still be occurring.
- Product performance has been demonstrated through analysis of a small number of independent measurements obtained from select locations, periods, and associated ground truth or field campaign efforts.
- Product analysis is sufficient to communicate product performance to users relative to expectations (Performance Baseline).
- Documentation of product performance exists that includes recommended remediation strategies for all anomalies and weaknesses. Any algorithm changes associated with severe anomalies have been documented, implemented, tested, and shared with the user community.
- Testing has been fully documented.
- Product is ready for operational use and for use in comprehensive cal/val activities and product optimization.

Provisional users bear all responsibility for inspecting the data prior to use and for the manner in which the data are utilized. Persons desiring to use the GOES-17 ABI Provisional maturity Cloud Optical Depth product for any reason, including but not limited to scientific and technical investigations, are encouraged

to consult the NOAA algorithm working group (AWG) scientists for feasibility of the planned applications. This product is sensitive to upstream processing, such as the quality of the calibration, navigation, cloud mask, cloud phase, and cloud height. In particular, the accuracy of the provisional GOES-17 ABI Cloud Optical Depth product may be severely degraded or the product may contain fill values between the hours of 09-18 UTC at times of the year when the ABI focal plane module temperature is significantly elevated as a result of the GOES-17 Loop Heat Pipe (LHP) issue.

Status of the current GOES-17 COD product and any remaining known issues that are being resolved:

1. Summary of the measured performance of the COD product as measured against reference data:
    a. Accuracy specifications for FD and CONUS products are met in general based on validation results with respect to retrievals from other satellite-based instruments. Algorithm performance may vary over difference regions.
    b. Precision specifications are also met in general based on validation results with respect to retrievals from other satellite-based instruments. Algorithm performance may vary over different regions.
    c. Nighttime GOES-17 nighttime COD results exhibit a low bias compared to GOES-16 nighttime results at the higher end of the COD range, approximately COD > 4.0. That inconsistency is under investigation, hence pixels with larger COD results should be used with caution.
2. ABI daytime COD in general has good agreement with those from other sensors, including SNPP-VIIRS, AQUA-MODIS, and CALIOP.
3. ABI nighttime COD in general has good agreement with those from other sensors, including SNPP-VIIRS and CALIOP with the caveat mentioned in 1c above.
4. Any changes to ABI calibration or spectral response functions in the channels used in day or night COD retrievals can impact the COD retrievals.

Contact for further information: OSPO User Services at SPSD.UserServices@noaa.gov

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