GOES-17 ABI L2+ Cloud Top Phase (CPH) Release
Provisional Data Quality
May 6, 2019
Read-Me for Data Users

The GOES-R Peer/Stakeholder Product Validation Review (PS-PVR) for the GOES-17 Advance Baseline Imager (ABI) L2+ Cloud Top Phase (CPH) Provisional Maturity was held on May 6, 2019. As a result of this review, the PS-PVR panel recommended that the ABI Cloud Top Phase product be declared Provisional for the cold periods of the day.

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 CPH 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.

The ABI L2+ Cloud Top Phase product assigns each earth-navigated pixel one of the following classifications: clear sky (based on the ABI clear sky mask), liquid water, supercooled liquid water, mixed phase, ice phase, or unknown cloud phase. Aside from the clear sky designation, the classification is relative to the highest cloud layer present. Only infrared channels are used to determine the cloud thermodynamic phase. The cloud top phase product is generated for every ABI Full Disk (FD) of the Earth, Continental United States (CONUS) region, and the Mesoscale (MESO) regions.

The GOES-R Series Level I Requirements (LIRD) are not yet updated to reflect the operational Mode 6; however, for completeness the LIRD requirements are stated here: Cloud Phase shall be produced every 15 minutes for Full Disk, every 5 minutes for CONUS, and every 5 minutes for Mesoscale.

GOES-17 was placed into Mode 6 on April 2, 2019. The cadence of L2 products are different from Mode 3 and the official requirements defined above. Cloud Phase is produced every 10 minutes for Full Disk, every 5 minutes for CONUS, and every 1 minute for Mesoscale.

A full description and format of the CPH 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 CPH product from GOES-R ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for ABI Cloud Type and Cloud Phase" (https://www.star.nesdis.noaa.gov/goesr/docs/ATBD/Cloud_Phase.pdf).

Provisional maturity, by definition, means that:

- Validation 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;
- Documentation of product performance exists;
- Testing has been fully documented; and
- 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 Top Phase products 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 and cloud mask. In particular, the accuracy of the provisional GOES-17 ABI cloud top phase 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 focal plane module temperature is significantly elevated as a result of the loop heat pipe issue.

Additional known issues at the Provisional validation stage include:

1. Missing values occur randomly due to upstream L1b issues;
2. The upstream cloud detection algorithm can lead to clear regions being assigned a cloud thermodynamic phase or cloudy regions being classified as clear sky;
3. Optically thin cirrus clouds are sometimes misclassified as liquid water, supercooled liquid water or mixed phase;
4. The risk of misclassifying liquid water clouds as ice is greatest in regions with broken cumulus clouds;
5. The ability to correctly identify clouds that have both liquid water and ice within the portion of the cloud influencing the measured ABI radiances (e.g. mixed phase clouds) is limited. Errors in correctly classifying potentially mixed phase clouds are slightly greater in the GOES-17 provisional version of the products compared to the GOES-16 provisional version.
6. The baseline cloud phase classification is sometimes inconsistent with near-infrared based assessments of cloud phase, such as false color imagery constructed with phase sensitive near-infrared spectral channels.

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

Contacts for specific information on the ABI L2 CPH product:
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