GOES-19 ABI L2+ Cloud Top Phase (CPH) Release
Beta Data Quality
October 1, 2024
Read-Me for Data Users

The GOES-19 Advanced Baseline Imager (ABI) L2+ Cloud Top Phase (CPH) product was declared Beta maturity on October 1, 2024. No formal review was conducted because the algorithm is identical to GOES-16/17/18. Beta declaration of the ABI L1b and CMI therefore applies to the ABI L2+ products.

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.

A full description and format of the Cloud Top Phase product can be found in the Product Definition and User's Guide (PUG) Volume 5: Level 2+ Products, located on OSPO's GOES-R documents webpage: https://www.ospo.noaa.gov/Organization/Documents/goes-r.html. The Enterprise algorithm used to derive the Cloud Top Phase product from GOES-19 ABI observations is described in detail in the "Enterprise Algorithm Theoretical Basis Document (ATBD) for Cloud Type and Cloud Phase". ATBDs are available at: https://www.star.nesdis.noaa.gov/goesr/documentation_ATBDs.php.

Beta maturity, by definition, means that:

- Rapid changes in product input tables/algorithms are expected;
- Product initial looks and validation may not be fully adequate to determine product quality;
- Anomalies may be found in the product and the resolution strategy may not exist;
- Product is made available to users to gain familiarity with data formats and parameters;
- Product may have been minimally validated and may still contain significant errors;
- Product is not optimized for operational use.

Beta users are responsible for inspecting the data prior to use and for the manner in which the data are utilized. Anyone desiring to use the GOES-19 ABI Beta maturity Cloud Top Phase 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 calibration and navigation.

Known issues at the Beta validation stage include:

1. The Cloud team identified an issue with the Planck coefficients for GOES-19 used by the fast Planck routine within the GOES-R Ground System (GS). This affects the radiative transfer model (RTM) clear sky brightness temperatures as well as any fast Planck calls within the Enterprise Cloud Phase Algorithm. This has resulted in over-icing for the GOES-19 Cloud Phase output. The

updated coefficients will be installed to the GS prior to the Provisional evaluation. All downstream products that use the Cloud Phase will be impacted. This issue was resolved on 23 October 2024 when updated Planck coefficients were installed in the GS.

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, is limited.

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

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