

GOES-16 ABI L2+ Cloud Optical and Microphysical Properties (COMP)
Cloud Particle Size (CPS) Release
Provisional Data Quality
December 24, 2018
Read-Me for Data Users

The GOES-R Peer/Stakeholder Product Validation Review (PS-PVR) for ABI L2+ Cloud Optical and Microphysical Properties (COMP) Provisional Maturity was held on December 14, 2018. As a result of this review, the PS-PVR panel recommended that the ABI Cloud Optical Depth (COD) product be declared Provisional but not Cloud Particle Size (CPS). Incorrect relative azimuth angles were being used in the algorithm having significant impact on the CPS. A revisit after the fix was performed was done on December 14, 2018 resulted in CPS being declared Provisional. The fix was implemented in the ground system on December 17, 2018.

The ABI L2+ Cloud Particle Size product assigns each earth-navigated cloudy pixel a value. Non-cloudy pixels or those for which the retrieval was not successful receive fill values. For pixels with solar zenith angles less than or equal to 82° (daytime), valid CPS values can range from 0 to 160 μm while pixels with solar zenith angles greater than 82° (nighttime) will have valid CPS values ranging from 2.0 to 50.0 μm. CPS values outside those ranges are considered less accurate and their usage is not recommended. Similarly, pixels with solar zenith angles between 65° and 90° should be considered less accurate and do not meet the product specifications. Daytime CPS values are derived using visible and near-infrared channels while the nighttime CPS values are derived from near-infrared and infrared channels. The CPS product is generated for every ABI Full Disk (FD) of the Earth and Continental United States (CONUS) region.

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 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; 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-16 ABI Provisional maturity Cloud Particle Size 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 the other cloud algorithms (mask, type/phase, height).

Known issues at the Provisional validation stage include:

1. Missing values occur randomly due to upstream L1b issues;
2. The upstream cloud algorithms can lead to clear regions being assigned a cloud optical depth or cloudy regions being classified as clear sky, hence receiving no CPS value;
3. Issues in the NWP products can cause upstream cloud algorithms to misidentify cloudy pixels as non-cloudy so CPS retrievals are not performed;
4. Optically thin cirrus clouds are sometimes misclassified as liquid water, supercooled liquid water or mixed phase, which impacts CPS values;
5. The risk of misclassifying liquid water clouds as ice is greatest in regions with broken cumulus clouds, hence CPS values are impacted in those situations;
6. 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.
7. Any past or future calibration changes to channels involved in the day or night CPS retrievals can impact the CPS retrievals.
8. CPS was declared provisional on December 14, 2018 and the fix was implemented in the operational system on December 17, 2018.

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

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