

GOES-16 ABI L2+ Clear Sky Mask
Full Data Quality
May 16, 2024
Read-Me for Data Users

GOES-R Advanced Baseline Imager (ABI) L2+ products will achieve Full Validation maturity by default after two years of Provisional and Operational use with no major anomalies reported (minor product improvements may still be occurring). As a result, GOES-16 Clear Sky Mask (CSM), also known as the Binary Cloud Mask (BCM), is considered Full Validation maturity as of February 16, 2020.

The GOES-16 ABI BCM generates the cloud mask used by many of the ABI L2 Products. The BCM consists of the binary cloud mask, a 4-level mask and the results of individual tests. Only the binary cloud mask is made available to external users. In Mode 6 operations, the BCM is generated every 10 minutes for ABI Full Disk (FD) of the Earth, every 5 minutes over the Continental United States (CONUS) region, and every 1 minute over the Mesoscale (MESO) regions. On November 11, 2021, the Baseline Clear Sky Mask algorithm was upgraded to the Enterprise Cloud Mask (ECM) algorithm. With this enterprise upgrade, the 4-level Cloud Mask and Cloud Probabilities are additionally output along with the Binary Cloud Mask in the end product file.

A full description and format of the ECM products 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 algorithm used to derive the ECM from GOES-16 ABI observations is described in detail in the "Enterprise Algorithm Theoretical Basis Document for Cloud Mask", located on STAR's GOES-R ATBD webpage: https://www.star.nesdis.noaa.gov/goesr/documentation_ATBDs.php. The baseline CSM ATBD can be referenced there as well.

Full maturity, by definition, means that:

- Validation, quality assurance, and anomaly resolution activities are ongoing.
- Incremental product improvements may still be occurring.
- Users are engaged and user feedback is assessed.
- Product performance for all products is defined and documented over a wide range of representative conditions via ongoing ground-truth and validation efforts.
- Products are operationally optimized, as necessary, considering mission parameters of cost, schedule, and technical competence as compared to user expectations.
- All known product anomalies are documented and shared with the user community.
- Product is operational.

Persons desiring to use the GOES-16 ABI Full maturity ECM products for any reason, including but not limited to scientific and technical investigations, are encouraged to consult the NOAA/NESDIS/STAR Algorithm Working Group (AWG) scientists for feasibility of the planned applications. The ECM product

is sensitive to upstream processing that includes the quality of the calibration, navigation, terminator regions and dynamic ancillary data, such as the snow mask.

Status of the ECM products and any remaining known issues that are being resolved:

1. Summary of the measured performance of the ECM products as measured against reference data:
 - a. Accuracy specifications are met when compared with MODIS C6 MYD35 EDRs, excluding MYD35 EDRs with known issues
 - b. Accuracy is met for GOES-16 ECM when compared to the clear sky SST, and most SURFRAD observations
 - c. Accuracy specifications are met when compared with CALIPSO, is above specifications

2. The ECM has the current known issues and limitations, which are being addressed
 - a. False cloud due to fresh snow not being present in ancillary snow mask: The ECM relies on the ancillary snow mask. Errors in the snow mask will impact the ECM. Modifications to the ECM to reduce this reliance are being explored.

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