

GOES-16 and GOES-18 ABI L2+ Fractional Snow Cover
Provisional Data Quality
December 9, 2022
Read-Me for Data Users

The Peer/Stakeholder Product Validation Review (PS-PVR) for the GOES-16 and GOES-18 Advanced Baseline Imager (ABI) L2+ Fractional Snow Cover (FSC) was held on December 9, 2022. The outcome of the review was that ABI FSC was approved at the Provisional Maturity level. Preliminary qualitative assessment of the GOES-17 FSC product demonstrated its satisfactory performance and close similarity to the products derived from GOES-18 ABI.

The ABI L2+ Fractional Snow Cover product assigns each earth-navigated pixel one of the following classifications: snow-free land surface, snow-covered land surface with the snow fraction ranging from 1 to 100%, fill value, and unavailable snow retrieval. The quality flag supplied with the product provides the reason for unavailable snow retrieval (water surface, clouds, rejected snow cover, insufficient daylight, etc.). The FSC algorithm uses ABI in bands 2, 3, 5 and 13. The Fractional Snow Cover product is generated for every ABI Full Disk (FD) of the Earth, Continental United States (CONUS) region, and the Mesoscale (MESO) regions at 2km nominal spatial resolution.

The algorithm used to derive the Fractional Snow Cover product from GOES-16 and GOES-18 ABI observations is described in detail in the two Algorithm Theoretical Basis Documents (ATBDs): “Enterprise Binary Snow Map Product” and “Enterprise Fractional Snow Cover Map Product”. ATBDs are available at: https://www.star.nesdis.noaa.gov/goesr/documentation_ATBDs.php. These two should be available at that link in January 2023.

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 calibration/validation activities and product optimization.

Persons desiring to use the GOES-18 ABI Provisional Validation Maturity FSC 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.

Known issues at the Provisional Maturity Validation stage include:

1. Excessive variation of the derived snow fraction with the solar-satellite relative azimuth angle and, hence, with the time of observation. A suspected cause for the problem is inconsistency in the application of the solar-satellite relative azimuth angle in reflectance anisotropy correction models used by the snow fraction retrieval algorithm. The exact cause for the problem and the required code adjustments are to be determined. The identified excessive variation of the derived snow fraction affects the product accuracy, but not the product precision. Despite this performance anomaly the accuracy and precision of the product satisfy the mission requirements.

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

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