

GOES-16 ABI L2+ Fractional Snow Cover
Full Data Quality
December 9, 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 Fractional Snow Cover (FSC) is considered Full Validation maturity as of December 9, 2024.

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, Contiguous United States (CONUS) region, and the Mesoscale (MESO) regions at 2km nominal spatial resolution.

The algorithm used to identify snow cover in the GOES-16 ABI imagery and to derive the Fractional Snow Cover product is described in detail in the two Algorithm Theoretical Basis Documents (ATBDs): “Enterprise Binary Snow Map Product” and “Enterprise Fractional Snow Cover Map Product”. The ATBDs are available at: https://www.star.nesdis.noaa.gov/goesr/documentation_ATBDs.php.

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 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 Full Validation maturity 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 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 Fractional Snow product satisfy the mission requirements. This performance anomaly has no effect on snow identification. The accuracy of snow/no-snow discrimination in the ABI Fractional Snow product satisfies the mission requirements.

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