GOES-19 ABI L2+ Land Surface Albedo
Provisional Data Quality
February 12, 2025
Read-Me for Data Users

The Peer/Stakeholder Product Validation Review (PS-PVR) for the GOES-19 Advance Baseline Imager (ABI) L2+ Land Surface Albedo Provisional Maturity was held on February 12, 2025. As a result of the review, the GOES-19 ABI Land Surface Albedo (LSA) products were declared Provisional Maturity.

The ABI L2+ LSA provides instantaneous shortwave broadband blue-sky Albedo over wavelengths between 0.4 and 3.0 μm. It is defined as the ratio between outgoing and incoming shortwave irradiance under natural illumination at the earth surface. The product includes associated data quality flags and percentage of each flag value, mean, maximum, minimum, and standard deviation of LSA. The LSA product provides spatial and temporal continuous surface albedo information. The LSA value under clear-sky condition is comparable and commits well with the ground measurements; while the LSA value under cloudy-sky conditions provides the contemporary surface status under clear-sky condition, not comparable with the simultaneous ground reference with influence from the cloud.

- Measurement range: 0-1
- Temporal coverage: Solar zenith angle at < 67 degrees. Daytime.
- Refresh: 10 minutes for FD, and 5 minutes for CONUS
- Spatial coverage: Full Disk, CONUS, Meso
- Spatial resolution: 2 km
- Quality: The requirement of ABI LSA product accuracy is 0.08 Albedo Units; and that of precision is 10%. According to the validation of the product from Oct 2024 to Feb 2025, the GOES-19 LSA product is better than this requirement. The GOES-19 LSA product demonstrates consistent performance with the GOES-16 and GOES-18 counterparts and show good agreement with ground-based measurements.

A full description and format of the ABI LSA product will be available in a future revision of the Product Definition and User's Guide (PUG) Volume 5 (https://www.ospo.noaa.gov/resources/documents/goes-r.html). The algorithm used to derive the LSA product from GOES-19 ABI observations is described in detail in the "ABI Algorithm Theoretical Basis Document for Land Surface Albedo (https://www.star.nesdis.noaa.gov/goesr/documentation_ATBDs.php).

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.

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-19 ABI Provisional maturity LSA 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 the quality of the calibration, navigation, and cloud mask.

Status of the current GOES-19 LSA products and any remaining known issues that are being resolved:

1. The validation metrics confirm that both FD and CONUS products show a bias of 0.00 and precision of 0.04 in comparison with the ground measurements from SURFRAD, ARM-SGP, and NEON.
2. The LSA DQF has been enhanced with more relevant information.

Bit	Name	Value
0	Overall quality	0: high quality (Routine algorithm & age<=1) 1: medium quality ((Routine algorithm & age>1) or (Back-up algorithm)) 2: low quality (Graceful degradation) 3: fill
1		
2	Zenith angles	0: SZA<67 & LZA<70 1: either angle beyond favorable range
3	Retrieval path	00: Routine algorithm 01: Back-up algorithm 10: Graceful degradation 11: No retrieval
4		
5	BRDF age	0: 1 day 1: >1 days
6	Land mask	0: land 1: water
7	Snow	0: snow-free 1: snow

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

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