GOES-16 ABI L2+ Land Surface Temperature (LST) Release,
Provisional Data Quality
March 19, 2018
Read-Me for Data Users

The GOES-R Peer/Stakeholder Product Validation Review (PS-PVR) for the Advanced Baseline Imager (ABI) L2+ Land Surface Temperature (LST) Provisional Maturity was held on March 19, 2018. As a result of this review, the PS-PVR panel recommended that the ABI LST product be declared Provisional.

The GOES-R ABI LST product is generated from ABI bands 14 (11.2 um) and 15 (12.3 um) with the split-window technique. The retrieval is available for each land/inland water pixel under clear or probably clear cloud conditions. The LST product is currently being generated once an hour for every ABI Full Disk (FD) of the Earth, the Continental United States (CONUS) region, and the Mesoscale (MESO) regions. No MESO LST will be available under Scan Mode 4. The spatial resolutions for FD, CONUS, and MESO LSTs are 10 km, 2 km, and 2 km, respectively.

A full description and format of the LST product can be found in the Product Definition and User's Guide (PUG) document (http://www.goes-r.gov/products/docs/PUG-L2+-vol5.pdf). The algorithm used to derive the LST product from GOES-16 ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for Land Surface Temperature" (https://www.goes-r.gov/products/ATBDs/land_surface_temp2.pdf).

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 cal/val activities and product optimization.

Persons desiring to use the GOES-16 ABI Provisional maturity LST 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 LST product is sensitive to upstream processing that includes the quality of the calibration, navigation, cloud mask, and total precipitable water.

Status of the current LST product and any remaining known issues that are being resolved:

1. The LST product performance has improved since Jan. 25th 2018, when the TPW unit issue was resolved.
2. Summary of the measured performance of the LST product as measured against reference data:
    - Accuracy specifications for FD, CONUS, and MESO LST products are met in general based on validation results with respect to in-situ observations. Algorithm performance may vary over difference regions.
    - Precision specifications are met for all three LST products. Algorithm performance may vary over different regions.
    - Significant underestimate at Desert Rock site is observed.
3. ABI LST in general has good agreement with those from other sensors, including SNPP-VIIRS, AQUA-MODIS, and TERRA-MODIS.
4. LST retrieval is available under probably cloudy or cloudy conditions at high sensor zenith angle area (> 70°) in CONUS and FD products. The solution to fix this problem has been proposed.
5. Miscalculation of some product and DQF metadata happens occasionally with FD and CONUS LST products. The LST AWG team is working with the AER/PRO to fix it.

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