

GOES-17 ABI L2+ Land Surface Temperature Release
 Provisional Data Quality
 June 13, 2019
 Read-Me for Data Users

The GOES-R Peer/Stakeholder Product Validation Review (PS-PVR) for the GOES-17 Advance Baseline Imager (ABI) L2+ Land Surface Temperature (LST) Provisional Maturity was held on June 13, 2019. As a result of this review, the PS-PVR panel recommended that the ABI Land Surface Temperature product be declared Provisional for the cold, stable periods of the day.

Up to date information on the GOES-17 cooling system issue can be found on the following web sites:

<https://www.goes-r.gov/users/GOES-17-ABI-Performance.html>

http://cimss.ssec.wisc.edu/goes-r/abi-/band_statistics_imagery.html

The table shown below is pulled from the above web site and is an estimate of times of peak interruption for 2019. The table represents potential saturation. The user should be more vigilant of potential anomalies during these times. The LST may be usable during some of these time blocks.

| Date Range | Saturation increase/decrease | Time of Day |
|-----------------|--|---|
| 1 Jan - 26 Feb | Channel saturation goes from marginal to unusable by 26 Feb. | Saturation can occur between 0830 - 1730 UTC. |
| 26 Feb - 20 Mar | Channel saturation goes from unusable to marginal. | Saturation can occur between 0900 - 1700 UTC. |
| 20 Mar - 13 Apr | Channel saturation goes from marginal to unusable by 13 Apr. | Saturation can occur between 0900 - 1700 UTC. |
| 13 Apr - 26 May | Channel saturation goes from unusable to marginal. | Saturation can occur between 0900 - 1700 UTC. |
| 26 May - 20 Jul | No Channel saturation | |
| 20 Jul - 30 Aug | Channel saturation goes from marginal to unusable by 30 Aug. | Saturation can occur between 0900 - 1700 UTC. |
| 30 Aug - 23 Sep | Channel saturation goes from unusable to marginal. | Saturation can occur between 0930 - 1630 UTC. |
| 23 Sep - 16 Oct | Channel saturation goes from marginal to unusable by 16 Oct. | Saturation can occur between 0900 - 1700 UTC. |
| 16 Oct - 12 Dec | Channel saturation goes from unusable to marginal. | Saturation can occur between 0900 - 1700 UTC. |

The GOES-R Series Level I Requirements (LIRD) are not yet updated to reflect the operational Mode 6; however, for completeness the LIRD requirements are stated here: Land Surface Temperature shall be produced every 60 minutes for Full Disk, CONUS, and Mesoscale.

GOES-17 was placed into Mode 6 on April 2, 2019. Despite this change, the LST product continues to be generated once an hour for every ABI Full Disk (FD) of the Earth, over the Continental United States (CONUS) region, and over the Mesoscale (MESO) regions.

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. 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-17 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.

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-17 ABI Provisional maturity Land Surface Temperature 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, cloud mask, and total precipitable water. In particular, the accuracy of the provisional GOES-17 ABI Land Surface Temperature product may be severely degraded or the product may contain fill values between the hours of 09-18 UTC at times of the year when the ABI focal plane module temperature is significantly elevated as a result of the GOES-17 Loop Heat Pipe (LHP) issue.

Status of the current GOES-17 LST product and any remaining known issues that are being resolved:

1. Summary of the measured performance of the LST product as measured against reference data:
 - a. 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 different regions.
 - b. Precision specifications are met for all three LST products. Algorithm performance may vary over different regions.
 - c. Significant underestimate at Desert Rock site is observed.
2. ABI LST in general has good agreement with those from other sensors, including SNPP-VIIRS, NOAA20-VIIRS, AQUA-MODIS, and TERRA-MODIS.
3. A bug regarding incorrect units used in LST TPW Ingest in the ground system has been identified, which potentially degrades the overall performance of the product. The LST AWG team is working with the PRO and ASSISTT to fix it.

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

Contacts for specific information on the ABI L2 LST product:

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