

GOES-17 ABI L2+Legacy Atmospheric Profile (LAP) Release
Beta Data Quality
September 28, 2018
Read-Me for Data Users

The GOES-17 Advanced Baseline Imager (ABI) L2+ Legacy Atmospheric Profile (LAP) products were declared Beta maturity on August 27, 2018. No formal review was conducted because the algorithms are identical to the ones running with GOES-16, so the Beta declaration of the ABI L1b and CMI flows down to the ABI L2+ products.

The GOES-R series ABI LAP products provide Legacy Vertical Temperature Profile (LVT), Legacy Vertical Moisture Profile (LVM), Total Precipitable Water (TPW), and Derived Atmospheric Stability Indices (DSI) over each 5x5 ABI pixels box with clear sky infrared band radiances.

DSI includes five atmospheric instability indices: Lifted Index (LI), Convective Available Potential Energy (CAPE), Total Totals Index (TT), K-Index (KI), and Showalter Index (SI). The GOES-R series ABI LAP products are retrieved based on the ABI infrared band radiance measurements with NWP (NOAA GFS) short range forecasts as first guess and background information in a one-dimensional variational (1Dvar) process. The LAP products are generated every 15 minutes over the ABI Full Disk (FD), every 5 minutes over the Continental United States (CONUS) region, and every 1 minute over the Mesoscale (MESO) regions.

A full description and format of the LAP products 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 LAP products from GOES-R series ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for Legacy Atmospheric Moisture Profile, Legacy Atmospheric Temperature Profile, Total Precipitable Water, and Derived Atmospheric Stability Indices," (https://www.goes-r.gov/products/ATBDs/baseline/Sounding_LAP_v2.0_no_color.pdf).

Beta maturity, by definition, means that:

- Rapid changes in product input tables / algorithms can be expected;
- Product quick looks and initial comparisons with ground truth data were not adequate to determine product quality;
- Anomalies may be found in the product and the resolution strategy may not exist;
- Product is made available to users to gain familiarity with data formats and parameters;
- Product has been minimally validated and may still contain significant errors; and
- Product is not optimized for operational use.

Beta 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 Beta-maturity LAP products for any reason, including

but not limited to scientific and technical investigations, are encouraged to consult the NOAA AWG scientists for feasibility of the planned applications.

Known issues being investigated include the following:

1. An anomaly with the ABI Loop Heat Pipe (LHP) prevents the instrument cooling system from maintaining sufficiently cool temperatures during certain parts of the day and year. Data quality will fluctuate seasonally depending on the amount of solar radiation absorbed by the instrument. During the instrument's "cool" seasons (near the summer and winter solstice), all channels are expected to be nominal 24 hours per day. During the instrument's "warm" seasons (before and after the vernal and autumnal equinox), during times when IR bands saturate, no LAP products are generated.
2. Significant stray light exists for VNIR channels approximately one hour before and after satellite local midnight for approximately forty days during the eclipse season before the vernal (spring) equinox and after the autumnal (fall) equinox, and may exist in other days of the year. This can affect the cloud mask, which LAP use.
3. There are periodic infrared calibration anomalies (PICA) present in the data that can be seen as regular and repeating pulses in infrared brightness temperatures. The infrared calibration may produce an error with a periodicity depending on timeline.
4. Image striping may occur across all 16 channels, especially at times of the Loop Heat Pipe heating, that said, the LAP use an box averaged value, so while the pixel level striping may not be seen, but users should know that those values have been averaged with the box.

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