

GOES-16 ABI Level 1b (L1b) and Cloud and Moisture Imagery (CMI) Release
Provisional Data Quality

July 10, 2017
Read-Me for Data Users

The GOES-R Peer Stakeholder - Product Validation Review for ABI L1b and CMI Provisional Maturity was held on June 1, 2017. As a result of this review, NOAA has confirmed that the ABI L1b and CMI data are at Provisional Validation Maturity as of June 1, 2017.

The ABI L1b data products are calibrated and geo-located radiances of the 16 ABI bands over the Full Disk (FD) of the Earth, the Continental United States (CONUS) region, the Mesoscale (MESO) regions, and certain instrument calibration and engineering data. The CMI data products are reflectances for bands 1-6 and brightness temperatures for bands 7-16.

Provisional validation means:

- Validation activities are continuing and the general research community is 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 establish product performance 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, and tested.

Users of the GOES-16 ABI L1B data bear responsibility for inspecting the data and understanding the known caveats prior to use. Below is the list of caveats that have been identified and are under analysis. Solutions are in development and testing:

1. Navigation may have errors up to 4 km.
2. Band-to-band co-registration errors may be up to 8 km. Larger errors occur between bands from the three groups of bands (1-6, 7-11, and 12-16 – they are in three different focal plane assemblies [FPA]).
3. Frame-to-frame registration may be unstable, causing features to “jump” in animation.
4. Image striping may occur across all 16 bands.
5. Band 2 radiances are about 7% brighter than comparable polar satellite observations.
6. The infrared (IR) radiance measurements for ABI Scan Mode 3 CONUS and MESO observations demonstrate an artificial periodicity of 15 minutes. The amplitude is uniformly small in terms of radiance but can exceed 1 K in terms of brightness temperature for cold scenes. This effect may be larger during some times of day as well as some bands.
7. Stray light exists for Visible and Near IR (VNIR) bands approximately one hour before and after satellite local midnight during the eclipse season before the vernal (spring) equinox and after

the autumnal (fall) equinox, and may exist in other days of the year. Total duration of impact is approximately twenty days twice per year. Band 7 experiences residual stray light effects during the same time frames.

8. The VNIR band radiometric calibration may cause frequent but minor discontinuities in radiance values following each solar calibration.

For CMI, all the caveats noted above for the radiances are valid, in addition to the following:

1. The maximum reflectance value is currently capped at 1.0 which causes dark patches within high reflectance scenes.
2. There may be artificially cold pixels surrounding hot spots.
3. The multiband files do not have the correct downscaling method listed in the metadata.
4. The kappa0 value reported in the product is inconsistent with the correct kappa0 value applied to the reflectance factors.
5. There are inconsistent data quality flag (DQF) values for off-Earth pixels.
6. On occasion, the start time of a single band file is different from the other bands by 0.1 seconds.

Advisory on Use of GOES-16 Data

While the GOES-16 ABI L1b and CMI data have reached provisional validation, the data from GOES-16 are **still** considered preliminary and are undergoing validation testing. NOAA is therefore requesting that any organizations that redistribute GOES-16 data -- before it is declared operational -- include the following disclaimer with the data:

"NOAA's GOES-16 satellite has not been declared operational and its data are preliminary and undergoing testing."

Users receiving these data through any dissemination means (including, but not limited to, PDA, GeoNetcast Americas, HRIT/EMWIN, and GOES Rebroadcast) assume all risk related to their use of GOES-16 data and NOAA disclaims any and all warranties, whether express or implied, including (without limitation) any implied warranties of merchantability or fitness for a particular purpose.

It is expected that GOES-16 data will be declared operational, approximately 6-12 months after launch, which occurred in November 2016.

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