

GOES-18 ABI Level 1b Radiances and Level 2 Cloud and Moisture Imagery
Beta Data Quality
May 27, 2022
Read-Me for Data Users

On May 11, 2022, the GOES-R Program Scientist declared that GOES-18 ABI Level 1b (L1b) Radiances and Cloud and Moisture Imagery (CMI) products met the criteria for Beta maturity.

The GOES-18 ABI L1b and CMI data products are calibrated and geo-located radiances of the 16 ABI bands over the Full Disk (FD) of the Earth, the Contiguous United States (CONUS) region, the Mesoscale (MESO) regions, and certain instrument calibration and engineer data.

By definition, Beta Maturity means that:

- Initial calibration applied (L1b);
- Rapid changes in product input tables / algorithms can be expected;
- Product quick looks and initial comparisons with ground truth data 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-18 ABI Beta maturity L1b products for any reason, including but not limited to scientific and technical investigations, are encouraged to consult the NOAA ABI calibration scientists for feasibility of the planned applications.

Known issues being investigated include:

1. Channels 12 – 16 (9.6 – 13.3 μm) have navigation errors of 3.6 km to the west and 2.3 km to the north.
 - a. Navigation error for Channel 11 (8.4 μm) is variable (up to 0.4 km).
 - b. Since Channels 1–10 are reasonably well navigated, these also imply a general channel-to-channel co-registration error.
2. Significant stray light may exist for VNIR channels approximately one hour before and after satellite local midnight for approximately forty days before and after the vernal (spring) and autumnal (fall) equinox, and may exist at other times of the day and in other days of the year. This has been confirmed with previous ABI but not specifically verified for GOES-18 ABI. There is no requirement for stray lights for VNIR channels, although some users may want to be aware of its presence.
3. Stray light is expected for Band 7 (3.9 μm) within the Zone of Reduced Data Quality (ZRdq) approximately one hour before and after satellite local midnight for approximately forty days

before and after the vernal (spring) and the autumnal (fall) equinox. Stray light was detected for Band 7 within the ZRDQ between April 21 and May 3. The residual stray lights for GOES-18 ABI are less intense than those for GOES-16 and GOES-17 ABI, which meet the requirements. Nevertheless, some applications may still find the reduced data quality undesirable.

4. Other than where indicated, Channels 1-6 (0.47 – 2.23 μm) are reasonably well calibrated at this stage of maturity, with the caveat that errors in calibration files (“INST-CAL”) may reduce the accuracy and certainty of any assessments regarding these channels.
5. Weak stripes were occasionally observed in B02 (0.64 μm) images over cold scenes. Striping in images of other channels are even less noticeable and frequent.
6. B02 is $\sim 7\%$ brighter than it should be, as anticipated.
7. Radiances for most IR channels have a small change at the satellite midnight and a smaller but opposite change at the satellite noon.
8. B04 radiance is $\sim 1.2\%$ higher than it should be because of an outdated value for a calibration parameter (power term for this channel’s integration factor).
9. The VNIR radiance has errors of up to 1.5% (Channel 5) because of an outdated value for a calibration parameter (E_{sun} or 100% albedo radiance).
10. The instrument-to-spacecraft alignment will be updated. This may affect the ABI solar calibration.

Note that all the issues associated with the ABI Level 1b product apply to CMI. Additionally, the CMI conversion coefficients (to reflectance factor or brightness temperature) have not been updated for GOES-18. There may also be inconsistencies between the mean (scene) radiances and brightness temperature values for the Full Disk files.

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

For specific information about the GOES-18 ABI L1b Radiance and CMI data, contact:

Fred Wu (L1b) xiangqian.wu@noaa.gov

Tim Schmit (CMI) tim.j.schmit@noaa.gov