

GOES-17 ABI L2+ Rainfall Rate / QPE Release

Beta Data Quality

October 9, 2019

Read-Me for Data Users

The GOES-17 Advanced Baseline Imager (ABI) L2+ Rainfall Rate / Quantitative Precipitation Estimate (RR/QPE) product was 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 ABI QPE product is generated from a single ABI image using ABI bands 8 (6.2 μ m), 10 (7.3 μ m), 11 (8.5 μ m), 14 (11.2 μ m), and 15 (12.3 μ m). The RRQPE product is generated every 15 minutes for every ABI Full Disk (FD) of the Earth.

A full description and format of the RRQPE 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 QPE product from GOES-17 ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for Rainfall Rate / QPE" (http://www.goes-r.gov/products/ATBDs/baseline/Hydro_RRQPE_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 QPE products 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.

The RRQPE product is sensitive to upstream processing that includes the quality of the calibration, navigation, and registration.

Known product issues (as of October 9, 2018) include:

1. Noisy data due to the ongoing Loop Heat Pipe (LHP) issue with the GOES-17 ABI. Even at a minimum Focal Plane Module (FPM) temperature, noise can be seen in close-up views of the rain rates; at FPM temperatures above 82 K rain rates above 10 mm/h may be significantly underestimated because the noise in the ABI bands has its greatest effect at the low IR brightness

temperatures that are generally associated with heavy rainfall. Efforts are being made to determine the degree to which these effects might be mitigated by modifying the channel selection.

2. Generally, the ABI Image Navigation and Registration (INR) performance is good, but occasional large anomalies can occur which can result in significant reductions and/or degraded quality in the QPE product;
3. The fixed calibration coefficients mean the algorithm is unable to adapt to changes between cool-season and warm-season rainfall regimes, and may lead to false rainfall signals in clear air over very cold land areas (e.g., Alaska and Canada).
4. Like all infrared (IR)-based algorithms, this algorithm performs best for convective rainfall and has a lower level of skill for stratiform rainfall. It should also be noted that the algorithm does not attempt to identify precipitation phase at the surface.
5. This version of the algorithm does not account for sub-cloud evaporation of hydrometeors; consequently, the rain rates may be excessive in arid regions (e.g., intermountain Western United States and Canada).
6. Each of 4 latitude bands (south of 30°S, 30°S – EQ, EQ – 30°N, north of 30°N) has a separate set of calibration coefficients for each of three cloud types. Although efforts have been made to balance consistency with accuracy, there will sometimes be discontinuities across the boundaries between latitude bands and / or cloud types.

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Contacts for specific information on the ABI RR/QPE data:

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