

GOES-19 ABI L2+ Rainfall Rate / QPE Release
Provisional Data Quality
February 13, 2025
Read-Me for Data Users

The GOES-R Peer/Stakeholder Product Validation Review (PS-PVR) for ABI L2+ Rainfall Rate / QPE (RRQPE) Provisional Maturity was held on February 5, 2025. As a result of this review, the PS-PVR panel chair declared that the GOES-19 ABI Rainfall Rate / QPE product has reached Provisional maturity.

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) and assigns each earth-navigated pixel a rainfall rate ranging from 0 to 100 mm/h. The RRQPE product is generated every 10 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) Volume 5: Level 2+ Products, located on OSPO's GOES-R documents webpage: <https://www.ospo.noaa.gov/Organization/Documents/goes-r.html>. The Baseline algorithm used to derive the RRQPE product from GOES-19 ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for Rainfall Rate / QPE", available at https://www.star.nesdis.noaa.gov/goesr/documentation_ATBDs.php.

Provisional maturity, by definition, means that:

- Validation 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; and
- Product is ready for operational use and for use in comprehensive calibration/validation 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-19 ABI Provisional maturity Rainfall Rate 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. This product is sensitive to upstream processing, such as the quality of the calibration and navigation.

Known product issues at the Provisional validation stage include:

1. 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;
2. 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). This is addressed in the Enterprise version of the RRQPE algorithm, which will replace the current operational Baseline version in the coming months.
3. 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.
4. 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). This is addressed in the Enterprise version of the RRQPE algorithm.

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

Contact for specific information on the ABI L2+ RRQPE product:

Jaime Daniels jaime.daniels@noaa.gov