GOES-16 ABI L2+ Volcanic Ash (VAA) Release, Beta Data Quality
September 22, 2017
Read-Me for Data Users

The GOES-R Peer/Stakeholder Product Validation Review (PS-PVR) for ABI L2+ Volcanic Ash (VAA) Beta Maturity was held on June 8, 2017. At the review, the PS-PVR panel recommended that the ABI Volcanic Ash products be declared Beta after replacing ABI channel 14 in favor of ABI channel 13 and making an update to a lookup table. This band swap and lookup table update was completed and the ABI VAA products officially became Beta at 1916 UTC on September 13, 2017.

The ABI L2+ volcanic ash product determines for each earth-navigated pixel the likelihood the pixel contains volcanic ash using confidence categories. The confidence categories, while not a requirement or official product, are used to determine which pixels to perform volcanic ash height and mass loading retrievals, which are the official volcanic ash products. The volcanic ash height retrievals have units of km and volcanic ash mass loading retrievals have units of tons / km^2. The ash height retrievals are for the highest ash cloud layer if multiple layers are present and mass loading is a column integrated quantity. The volcanic ash algorithm uses only infrared channels. The volcanic ash products are generated for every ABI Full Disk (FD) of the Earth—as dictated by the ABI requirements—volcanic ash products are NOT generated for the CONUS or Mesoscale domains. A full description and format of the VAA 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 algorithms used to derive the VAA product from GOES-16 ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for Volcanic Ash (Detection and Height)" (http://www.goes-r.gov/products/ATBDs/baseline/Aviation_VolAsh_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-16 ABI Beta maturity Volcanic Ash 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, navigation and cloud mask.

Known issues being resolved include:

1. Missing values occur randomly due to upstream L1b issues

2. The validation analysis has been significantly limited by the lack of volcanic clouds observed by GOES-16 that are coincident with "truth" data sets such as lidars. Lessons learned so far indicate that the ash cloud height is biased low and the ash mass loading is biased high.
3. The baseline GOES-R ABI volcanic ash algorithm was finalized in 2010 and does not represent the latest state of the science (e.g. the VOLcanic Cloud Analysis Toolkit (VOLCAT)). The science has evolved significantly since 2010, so users are cautioned that the baseline GOES-R volcanic ash products were not designed for advanced applications such as eruption alerting and integration with dispersion models.