GOES-16 ABI L2+ Hurricane Intensity Estimate (HIE) Algorithm Release
Beta Data Quality
September 25, 2017
Read-Me for Data Users

The GOES-16 Peer/Stakeholder Product Validation Review (PS-PVR) for the Advanced Baseline Imager (ABI) Hurricane Intensity Estimate (HIE) Algorithm Beta Maturity was held on September 25, 2017. The PS-PVR panel recommended that the ABI HIE product be declared Beta validated after reviewing and discussing the current HIE performance leading up to Beta Maturity designation. Beta Maturity validation was conducted for the HIE algorithm during the Hurricane Irma lifecycle from August 30 to September 11, 2017 utilizing imagery west of 30W.

The GOES-16 ABI HIE product is generated from a single ABI image using ABI band 13 (10.3µm). The HIE product was generated every 15 minutes for every ABI Full Disk (FD) of the Earth during the Beta Maturity validation period, although the official HIE requirement is to operate at 30-minute resolution.

A full description and format of the HIE 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 HIE product from GOES-16 ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for Hurricane Intensity Estimation" (http://www.goes-r.gov/products/ATBDs/baseline/Winds_HIE_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 HIE 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 HIE product is sensitive to upstream processing that includes the quality of the input image calibration, navigation, and registration.

Known product issues (as of September 25, 2017) include:

1. A file generation issue exists when switching between Mode-3 and Mode-4 processing, resulting in bogus information/data being placed in the derived netCDF files containing the HIE algorithm

output.   A fix for this issue has been implemented in the DE/OE but still needs to be tested. Once tested and validated, this will satisfy the HIE PLPT Beta Maturity Support Events ABI-FD_HIE02 and HIE03.

2. Processing HIE intensity estimates at the required 30-minute interval needs to be implemented in Mode-3, Mode-4, and Mode-6 processing instead of at the different time resolutions of FD images obtained during the various processing modes (e.g. 15, 5 and 10 minutes, respectively).

3. Additional file generation issues were noted within output files for other North Atlantic and East Pacific storms (non-Irma, the Beta validation case) when five storms had accumulated in the activated validation period. As with Issue #1, a fix has been implemented in the DE/OE, but still needs to be tested and validated in real-time.

4. A minor coding issue has been discovered in the delivered code from CIMSS to Harris that affects the results obtained when using GOES-16 during an HIE Curved Band scene type determination and intensity calculation process. A fix to this issue has been sent by CIMSS to AWG/ASSISTT and the fix should be implemented into the HIE algorithm prior to the next Ground System (GS) code update handover.

5. During Beta Maturity testing it was noted that the HIE automated storm center determination logic was not utilized for the entire Hurricane Irma evaluation/processing period. A dialog between the Beta Validation Team and the GS algorithm programmers has been initiated, with a detailed evaluation of the HIE algorithm currently underway to assess why the scheme was not accessed and/or utilized during the intensity estimation process.

6. As was discussed during the Beta Maturity panel review, the current version of the HIE is not using information provided from microwave sensors as an additional input option. It is unclear if this enhancement to the HIE algorithm will be implemented in the future.