

GOES-17 ABI L2+ Derived Motion Winds Release
Beta Data Quality
September 14, 2018
Read-Me for Data Users

The GOES-17 Advanced Baseline Imager (ABI) L2+ Derived Motion Winds (DMW) 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 series ABI DMW product is generated from a sequence of images and provides an estimate of atmospheric motion (Speed, Direction, Height) for a set of targeted tracers (cloud edges or moisture gradients in clear air conditions) viewed in selected spectral bands. Winds are retrieved separately from ABI bands 2 (0.64um), 7 (3.9um), 8 (6.2um), 9 (6.9um), 10 (7.3um), and 14 (11.2um). Collectively, the winds retrieved from all of these bands make up the DMW product. The DMW product is generated once an hour for every ABI Full Disk (FD) of the Earth, every 15 minutes over the Continental United States (CONUS) region, and every 5 minutes over the Mesoscale (MESO) regions.

A full description and format of the DMW 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 DMW product from ABI observations is described in detail in the "GOES-R Advanced Baseline Imager (ABI) Algorithm Theoretical Basis Document for Derived Motion Winds" (http://www.goes-r.gov/products/ATBDs/baseline/Winds_DMW_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 DMW 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 DMW product is dependent on the L1b product and a number of L2 products (e.g., cloud mask, cloud phase, and cloud-top pressure). The quality of the DMW product, therefore, is sensitive to the quality of these predecessor products.

Known GOES-17 DMW product issues (as of September 14, 2018) include:

1. Wind speeds at high levels of the atmosphere (e.g., above ~ 300 hPa) are biased slow (up to 1.5 m/s) relative to radiosondes. Work is in progress to implement an updated cloud height algorithm in the ground system. This updated cloud height algorithm has been demonstrated to improve the quality of the cloud heights, which in turn, improves the heights assigned to the derived winds. This update will significantly reduce the slow speed bias associated with the winds above 300 hPa.
2. Occasional blocks of missing Band 2 visible winds over the full disk can occur. This issue is being worked.
3. Focal Plane Module (FPM) overheating impacts the longwave infrared (LWIR) channels of the GOES-17 ABI. This has the following consequences for the DMW products:
 - a. The upstream Clear Sky Mask (CSM) and cloud-top height products are impacted by the overheating of the ABI LWIR focal plane. This in turn, may affect the availability and/or quality of the DMW products between 6Z and 14Z. What is meant by availability is that the number of winds and their geographic coverage will be impacted to varying degrees during the affected time period. In some cases, the wind products will be missing. The length of the affected time period varies as a function of the day of year and will be largest during the spring and fall equinoxes and will be the shortest during the summer and winter solstices.
 - b. Assessments of GOES-16 and GOES-17 winds (generated from all bands) against radiosonde and aircraft winds over the period August 14-September 3, 2018, indicate that the quality of the GOES-17 winds at 12Z are measurably worse (0.5-1.0 m/s) during the impacted time period when the ABI FPM temperatures are very warm and/or changing very rapidly. For winds generated outside the affected time period, the availability and quality of the GOES-17 winds are comparable to the quality of the GOES-16 winds.

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