

**CICS-MD Science Meeting**  
November 12-13, 2014  
College Park, MD

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5-2 Advances in AMSR2 Precipitation Retrievals

Efforts are underway to characterize and validate global rainfall calculations from the Advanced Microwave Scanning Radiometer 2 (AMSR2). The official precipitation product produced by NOAA/STAR uses the Goddard Profiling Algorithm 2010 Version 2.0 (GPROF2010V2) as part of the Joint Polar Satellite System (JPSS).

Validation over CONUS is performed using NCEP's Stage IV Quantified Precipitation Estimates (QPE) and NSSL's National Mosaic & Multi-Sensor QPE (NMQ). Over the ocean, measurements from TRMM provide reference ground-truth measurements for instantaneous rain rate measurements. Root mean square error for AMSR2 precipitation measurements over land and ocean is 3.6 and 1.4 mm·hr<sup>-1</sup>, respectively. Further comparisons using monthly accumulations from the Global Precipitation Climatology Project (GPCP) demonstrate that GPROF2010V2 produces realistic and accurate hydrological measurements on seasonal timescales. GPROF2014 was introduced with the launch of the Global Precipitation Measurement (GPM) Mission. Initial measurements using GPROF2014 for AMSR2 will be compared to GPROF2010V2, and evaluated as a potential replacement as the operational algorithm for AMSR2 precipitation retrievals.

Additionally, applications and visualization tools have been developed for AMSR2 to leverage the anticipated data from GOES-R. Lightning data is used to determine storm motion, which can be used to transport AMSR2 precipitation fields to near real-time. Intensification and initiation of convection estimates, as measured by cloud-top temperatures and lightning activity, can be used to modify previously observed rain fields to better estimate current conditions. These efforts aim to exploit the strengths of individual satellite observation systems, to create a more accurate and consistent representation of the atmosphere.