



## **GPM Ground Validation: Pre to Post-Launch Era**

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NASA GPM Ground Validation (GV) activities have transitioned from the pre to post-launch era. Prior to launch direct validation networks and associated partner institutions were identified world-wide, covering a plethora of precipitation regimes. In the U.S. direct GV efforts focused on use of new operational products such as the NOAA Multi-Radar Multi-Sensor suite (MRMS) for TRMM validation and GPM radiometer algorithm database development. In the post-launch, MRMS products including precipitation rate, accumulation, types and data quality are being routinely generated to facilitate statistical GV of instantaneous (e.g., Level II orbit) and merged (e.g., IMERG) GPM products. Toward assessing precipitation column impacts on product uncertainties, range-gate to pixel-level validation of both Dual-Frequency Precipitation Radar (DPR) and GPM microwave imager data are performed using GPM Validation Network (VN) ground radar and satellite data processing software. VN software ingests quality-controlled volumetric radar datasets and geo-matches those data to coincident DPR and radiometer level-II data. When combined MRMS and VN datasets enable more comprehensive interpretation of both ground and satellite-based estimation uncertainties.

To support physical validation efforts eight (one) field campaigns have been conducted in the pre (post) launch era. The campaigns span regimes from northern latitude cold-season snow to warm tropical rain. Most recently the Integrated Precipitation and Hydrology Experiment (IPHEX) took place in the mountains of North Carolina and involved combined airborne and ground-based measurements of orographic precipitation and hydrologic processes underneath the GPM Core satellite. One more U.S. GV field campaign (OLYMPEX) is planned for late 2015 and will address cold-season precipitation estimation, process and hydrology in the orographic and oceanic domains of western Washington State. Finally, continuous direct and physical validation measurements are also being conducted at the NASA Wallops Flight Facility multi-radar, gauge and disdrometer facility located in coastal Virginia.

This presentation will summarize the evolution of the NASA GPM GV program from pre to post-launch eras and place focus on evaluation of year-1 post-launch GPM satellite datasets including Level II GPROF, DPR and Combined algorithms, and Level III IMERG products.