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Lessons Learned in V07 IMERG

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The Global Precipitation Measurement (GPM) mission combines passive microwave (PMW) and infrared (IR) satellite data, together with other data to create the Integrated Multi-satellite Retrievals for (IMERG) precipitation product on a (nearly) global 0.1° half-hour grid. Experience with Version 06 datasets revealed deficiencies that the algorithm team has addressed in creating the new Version 07 datasets.

Input precipitation estimates from the Goddard Profiling (GPROF) algorithm (which retrieves precipitation from passive microwave sensor data), the GPM Combined Radar-Radiometer Algorithm (CORRA), and the new Precipitation Estimation from Remotely Sensed Information Using Artificial Neural Networks–Dynamic Infrared Rain Rate (PDIR) algorithm (retrieving precipitation from IR data) all represent advances over the V06 inputs. For V07, several issues have been addressed, and many algorithm improvements have been implemented. These include refining the Kalman filter to approximately preserve the local histogram of precipitation rates (Scheme for Histogram Adjustment with Ranked Precipitation Estimates in the Neighborhood, or SHARPEN), and applying the Kalman filter even when a PMW overpass occurs. Furthermore, a long-standing bug in the geolocation that shifted grid values 0.1° to the east in the latitude band 70°N-S has been corrected. Other changes in V07 include a hierarchical selection among motion vector sources to address deficiencies in the precipitation propagation near orography, an update to the precipitation phase specification for improved consistency with current inputs, and climatological adjustment of the near-real-time Early and Late Runs to the Final Run (which includes monthly precipitation gauge analyses). Extensive development work was directed at unexpected biases in the V06 products, leading to 1) calibrations that now employ the entire swath widths of CORRA and GPROF GPM Microwave Imager (GMI) precipitation estimates (rather than spatially coincident data), and 2) coarsening the CORRA resolution to approximately match the GPROF-GMI footprint scale. The latter provides more consistent histograms for building the calibrations.

It is anticipated that the retrospective analysis for V07 will be well underway at the time of the meeting. Changes between V06 and V07 will illustrate the cumulative result of the improvements implemented in V07. The current status of processing and plans for future development will also be discussed.