



Improved and Consistent Calibration Methodologies for IMERG V08

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NASA's Integrated Multi-satellitE Retrievals for GPM (IMERG) is a widely used high resolution global precipitation product. IMERG relies on retrievals from passive microwave (PMW) sensors as the primary input precipitation estimates, so it is vital that they are first homogeneously calibrated to the core observatory GMI radiometer and finally to the GPM Combined Radar–Radiometer Analysis (CORRA-G/T) for the GPM/TRMM eras respectively. Inspections of IMERG V07 illustrate a very close calibration of the PMW estimates to V07 CORRA-G/T as result of several improvements in V07 IMERG calibrations, however the final CORRA-G/T calibration of all V07 GPROF PMW precipitation did not account for surface-type dependencies, and the GMI/TMI-to-other-satellite calibration did not fine tune regional dependencies. Also, both calibrations did not take advantage of limiting the spatial comparison domain for regions of high precipitation detection by both sensors.

Despite the improved calibration procedure, systematic biases and inhomogeneities remain in the satellite precipitation products used as input for V07 IMERG. Evaluations of V07 IMERG indicate discontinuities in certain regions near coastlines relative to CORRA-G/T. Specifically, for these regions the differential character of the respective CORRA-G/T land/ocean algorithms are not always captured correctly in the final calibration of the GPROF land/ocean algorithms. In V08 IMERG the final CORRA-G/T calibration of all PMW differentiates a land/ocean calibration by only using matchup retrievals from each surface type. Also in certain regions, noticeable disparities of spatiotemporal matches of GMI to other satellite GMI-calibrated GPROF precipitation is certainly a result of latitude band calibrations used in V07 [and previous versions] that do not necessarily capture the regional relationships. In V08 IMERG the regional/seasonal GMI-to-other-satellite calibrations markedly improve the regional/seasonal relationships between GMI and other sensors by regionally restricting matchups.

Unlike previous versions, in V08 IMERG a spatial search restriction of precipitation frequency detection is used for both calibrations. By using minimum thresholds of precipitation detection, regional dependencies are preserved by terminating the outward spatial search of precipitation occurrences from both the calibrating source and precipitation set for calibration, once the criteria are met by both for stable calibrations. We plan to work with the GPROF and CORRA teams to finalize these corrections as part of V08.

