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The Updated TRMM Composite Climatology of Tropical Rainfall with Version 7 Data

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The first-time use of both active and passive microwave instruments onboard the Tropical Rainfall Measuring Mission (TRMM, launched in late 1997) has made TRMM the foremost satellite for the study of precipitation in the tropics. One of the key goals of TRMM has been to define the spatial and seasonal climatological rainfall in the tropics as accurately as possible in order to quantify this key component of the hydrological cycle.

A climatology of tropical surface rain has been developed based on a composite of thirteen years (1998-2010) of precipitation products from TRMM Version 6 (V6) data (Adler et al. 2009, JMSJ). The TRMM Composite Climatology (TCC) V6 consists of a merger of selected TRMM rainfall products over both land and ocean to give a "TRMM-best" climatological estimate. Over ocean, the TCC inputs include the passive microwave retrieval using data from the TRMM Microwave Imager (TMI), the active microwave retrieval using data from the Precipitation Radar (PR), and the combined TMI-PR product, a separate retrieval with different assumptions. Over land, the TMI V6 estimates are known to overestimate surface rainfall, especially in the warm season. Therefore, the TRMM Multi-satellite Precipitation Analysis (TMPA) was used to replace the TMI .

A new version 7 (V7) of the TRMM data was released recently in late 2011. It is our intention to update the current TCC product using the V7 dataset. Our initial analysis of the TCC components indicates that compared to TMI V6, TMI V7 rainfall estimates over land are reduce significantly and have much better agreement with the PR and the combined TMI-PR products. Consequently, we could use the TMI V7 estimates as one of the components in the updated TCC over land, at least as a test. In addition to the mean precipitation estimate, the TCC also includes the variation among the three estimates at each point to give an estimate of the error in the mean value. For evaluation and validation purposes, a series of inter-comparisons will be carried out among the TCC (V6 and V7), its components, and ground-based observations.

The TCC may have broad applications and should be useful to the user community interested in climate monitoring, climate variability studies, model initialization and verification, and comparison with other non-TRMM rainfall analyses.