Twelve-Year (1998-2009) Tropical Rainfall Climatology Based on a Composite of TRMM Products

Robert F. Adler1  Jian-Jian Wang2,3  Guojun Gu1,2  George Huffman2,4  David Bolvin2,4
1ESSIC, University of Maryland College Park; 2NASA/GSFC; 3University of Maryland Baltimore County; 4SSAI

1. Introduction

One of the main goals of the Tropical Rainfall Measuring Mission (TRMM) has been to accurately define the climatological surface rainfall in the tropics. This TRMM Composite Climatology (TCC) consists of a merger of selected TRMM rainfall products over both land and ocean to give a “TRMM-best” climatological estimate.

Selected TRMM Rain Products

Ocean:  
1) TMI (2A12)  
2) Radar (2A25 Near Surface)  
3) Combined (2B31)  

Land:  
1) Multi-satellite with gauges (3B43)  
2) Radar (2A25 Near Surface) [Adjusted for boost]  
3) Combined (2B31)  

Over land the rainfall estimates from the TRMM Multi-satellite Precipitation Analysis (TMPA, 3B43) are used to replace those from the TMI, because the land estimates from 2A12 (Version 6) are known to overestimate surface rainfall during the warm season.

2. Twelve-Year TRMM Composite Climatology (TCC)

A simple mean of the three TRMM products is calculated at 0.5° latitude-longitude resolution from 36°N to 36°S, using twelve years (1998-2009) of TRMM V6 data to produce the final TCC estimate.

The variation among the three TRMM estimates (in terms of the standard deviation) at each point is also calculated to give an estimate of the error in the estimated mean value, at least in a relative sense.

3. TRMM Composite Monthly (TCM) & Anomaly (TCA)

The mean of the three TRMM products is also calculated at 2.5° latitude-longitude resolution from 36°N to 36°S for each individual month during 1998 and 2009. Consider the sampling issues of TRMM, we used TMPA (3B43) to disaggregate among three months to get the TRMM composite monthly rainfall (TCM).

A new climatology of tropical surface rain is calculated based on a composite of twelve years of precipitation retrievals and analyses from the TRMM. This TRMM Composite Climatology (TCC) consists of a combination of selected TRMM rainfall products over both land and ocean.

It is hoped that this new climatology will be useful as a summary of surface rain estimates from TRMM (not replacing the individual products) and will be useful to the user community as a ready comparison with other non-TRMM analyses and for comparison with numerical models, including those used for retrospective "re-analysis" and for climate simulations.

The TCC data is available at: http://pps.gsfc.nasa.gov/tsdis/tcc/TCC.html

Reference:

Contact: radler@umd.edu; Jian-Jian.Wang@nasa.gov