TRMM Rain Rate Statistics

Long S. Chiu (Center for Earth Observing and Space Research,
School of Computation Sciences, George Mason University and Goddard Earth Science Enterprise
Distributed Active Archive Center, NASA/Goddard Space Flight Center)
lchiu@gmu.edu

Abstract

The complex temporal and spatial structure of rainfall poses major challenges to operational weather forecast and hydrology. The Tropical Rainfall Measuring Mission (TRMM) is a joint U.S.-Japan satellite mission to monitor tropical and subtropical (40 S - 40 N) precipitation and to estimate its associated latent heating. The TRMM satellite carries the first space-borne precipitation radar (PR), a microwave imager (TMI), and a visible Infrared Scanner and provides the first detailed dataset on the four dimensional distribution of rainfall over vastly undersampled tropical and subtropical oceans and continents. TRMM data are processed by the TRMM Science Data and Information System (TSDIS) and archived and distributed by the NASA Goddard Earth Science Enterprise Distributed Active Archive Center (DAAC). To facilitate access and user interactions, GDAAC develops Remote Sensing Information Partners (RSIP) that act as secondary data distribution sites. The first RSIP is the Earth Data Analysis Center (EDAC) at the University of New Mexico.

In this presentation, we will describe the data and access tools for TRMM. Rain rate statistics derived from the TRMM algorithms will be presented, with emphasis for New Mexico. In collaboration with EDAC RSIP, we computed rain rate statistics such as mean rain rate, rain frequency and rain probability over 0.5×0.5 degree grids and examined diurnal, seasonal and inter-annual variability over New Mexico based on three years of TRMM data. These satellite estimates are compared with the gage data collected by a network of rain gages maintained by EDAC and with the monthly 0.5x0.5 degree gage analyses produced by Willmott and Matsuura of the University of Delaware.

The boost of TRMM satellite to a higher altitude extends the mission life to 2007. This ten-year data set will advance our knowledge of the space and temporal structure of rainfall.