COMPARISON of TRMM RAIN RATES USING NONPARAMETRIC STATISTICAL METHODS

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Abstract

The characteristics of the differences among TRMM precipitation algorithms are examined using six years (Jan. 1998 - Dec. 2003) of data over the TRMM domain ($40^oN - 40^oS$, $180^oW - 180^oE$) separately over land and ocean. The algorithms include TRMM Microwave Imager (TMI), Precipitation Radar (PR), Combined PR/TMI (TCA), 3B42 and 3B43. The Global Precipitation Climatology Center (GPCC) gauge analysis is used as a reference over land.

Nonparametric tests are used to test the normality assumption and to test the difference among algorithms. Kolmogorov-Smirnov two-sample test is performed to test the difference of the algorithms. Lilliefors test shows that the algorithms roughly follow a Gaussian distribution only over heavy rain areas at 5% significant level. Kolmogorov-Smirnov two-sample test detected ITCZ and SPCZ and ocean dry regions are two major areas to have the differences among algorithms. Finally, Empirical Orthogonal Function (EOF) analyses are performed to determine the robustness of the algorithms to detecting climate signals such as the El Niño / Southern Oscillation (ENSO). It is found that 3B43 is robust over both land and ocean and is suitable for studying climate variations at the interannual scale.

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