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Tropical rainfall climatology analyzed from satellite measurements

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Precipitating clouds are known to be a key element of the water and energy cycle in the Tropics. This talk focuses on the regional and temporal variability in a broad spectrum of tropical precipitation systems and their role in the tropical climate system. The analysis utilizes four storm categories (Shallow, Cumulus Congestus, Deep Stratiform, and Deep Convective) determined from Tropical RainfallMeasuring Mission (TRMM) Precipitation Radar (PR) echo-top height andVisible/Infrared Scanner (VIRS) infrared radiance. Deep Stratiform and Deep Convective systems are found to be clearly correlated with large-scale circulation, exhibiting a distinct difference between the ascending and descending branches of the Walker circulation. The Shallow category is practically the only component of tropical oceanic rainfall for cold sea surfaces, while it gives way to deeper systems as SST exceeds 28-29C. Cloud correlation scale length (CSL) and rain CSL are defined as a statistical measure of the horizontal organization of precipitation systems. The cloud CSL of Deep Convetive and Stratiform systems tends to be increasingly extensive relative to the rain CSL as the system becomes larger. Potential applicability of the present analysis method to future satellite programs such as the Global Precipitation Measurement (GPM) is also discussed.