

On the Influence of Warm Rain Systems on Tropical Deep Convection

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Warm rain systems are prevalent throughout the Tropics and are an important element of the tropical hydrologic cycle and radiation balance. A recent study by Lau and Wu (2004) indicates that precipitation efficiency from warm systems may increase with the underlying sea surface temperature (SST). These warm rainfall systems contribute not only to the total tropical rainfall and the radiation budget, but also serve to moisten and precondition the environment for deep convection. A change in these systems could have important implications for the atmospheric preconditioning period in climate change scenarios. Tropical Rainfall Measuring Mission (TRMM) satellite measurements are used to investigate the relationship between clouds, precipitation, water vapor and the underlying SST. Pixel-level Visible and Infrared Scanner (VIRS) 10.8 μm brightness temperature data and Precipitation Radar (PR) data from TRMM are collocated and matched to determine individual cloud areas. Each cloudy pixel is then matched to water vapor data and the underlying SST. These data are used to examine the preconditioning period between deep convective events and determine how it is related to SST, precipitation efficiency, and changes in water vapor. Preliminary results support the Lau and Wu (2004) finding that precipitation efficiency from warm rain systems increases with SST.