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Relationship Between Amplitude of Diurnal Variation and Parameters of Rain/Cloud Systems Using Trmm Data

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Relationship between the amplitude of diurnal variation of rainfall and the fraction of convective and heavy rainfall, echo top height, peak local time of rainfall amount are was investigated using the Tropical Rainfall Measuring Mission (TRMM) data for boreal summer seasons during 1998-2003. The amplitude of diurnal variation of rainfall was shown by an index of the normalized differential rainfall index (NDRI). The strong diurnal variations (large NDRI) appear over the Sahel, the Tibetan Plateau, western North America, the Gulf of Mexico, the maritime continent, and so on. On the contrary, the diurnal variations over the open ocean such as ITCZ and northwestern Pacific are weak. Convective rainfall generally dominates over the regions of strong diurnal variation except for the Tibetan Plateau. The distribution for the peak echo top height is much similar to that for the rainfall amount than that for the NDRI both over land and over ocean. However, some regions for the high echo top height correspond to that for high frequency of convective rainfall. Over the regions for large NDRI, the peak local time of rainfall has systematic shifts in the order of Precipitation Radar (PR), TRMM Microwave Imager (TMI) and Visible and Infrared Scammer (VIRS). The time shifts may be caused by the different signature among the sensors related to the stage of convective precipitation system depending on the regions.