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### THE DIURNAL MARCH OF THE CONVECTION OBSERVED DURING TRMM-WETAMC/LBA

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Radiosonde, satellite data, TOGA radar 2 km CAPPI and rainfall collected from the TRMM-WETAMC/LBA experiment have been used to investigate the diurnal cycle of the tropical convection. GOES satellite images were used to describe the diurnal modulation of the total/high/convective cloud fraction and the diurnal evolution of the size spectrum and initiation/dissipation of the convective systems. Radar 2km CAPPI were used to describe the diurnal cycle of the rain fraction for different thresholds and the diurnal evolution of the size spectrum and initiation/dissipation of the rain cells. An average over the four rain gauge networks was applied to describe the average hourly rainfall. The upper air network dataset was used to compute the thermodynamic variables: equivalent potential temperature ($\theta_e$), convective available potential energy (CAPE), thickness of positive buoyancy, instability and convective inhibition. High and convective cloud areas fractions reach their maximum some hours after the maximum rainfall detected by rain gauge and radar 2 km – CAPPI. The minimum cloud cover occurs only a few hours before the maximum precipitation and the maximum cloud cover occurs during the night. The maximum rainfall takes place at the time of the maximum initiation of the convective systems observed by satellite and rain cells. At the time of maximum precipitation the majority of the convective systems and rain cells are small sized and present the maximum increasing area fraction rate. The diurnal evolution of $\theta_e$ also presents a very clear diurnal variation with maximum occurring in the beginning of the afternoon. The CAPE is well related to $\theta_e$; when $\theta_e$ is high CAPE is high, the atmosphere is unstable and has a deep layer of positive buoyancy and small convective inhibition. These results suggest the following mechanism controlling the diurnal of convection: in the morning, cloud cover decreases as the solar flux reaching the surface increases and consequently $\theta_e$. In the beginning of the afternoon convection rapidly develops, high and convective clouds fractions increase rapidly and the maximum precipitation and initiation is observed. After convection is developed the atmosphere profile is modified reaching a nearly saturated state; the water vapor flux decreases in the boundary layer which becomes very stable, which inhibits surface fluxes and consequently extinguishes the convection.