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Characterization of shallow-to-deep convection transition during GoAmazon2014/5 experiment

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The tropical region plays a fundamental role in the global climate, contributing to the maintenance of the atmosphere general circulation and the hydrological cycle. Deep precipitation convection is ubiquitous in the tropical region and due to its wide range of time and spatial scales involved, numerical models parametrization still have problems in properly represent diurnal convective cycle. This work characterizes the shallow-to-deep convection transition using deep convection events during the Observations and Modeling of the Green Ocean Amazon (GoAmazon2014/5) field campaign in the Central Amazon, near Manaus-AM, Brazil (Martin et al., 2017). Selection of shallow-to-deep transition events was made by the selection of day time events (1100 LT up to 1900 LT) using GOES images from infrared channel. Composite analysis composed by 258 events shows water vapor convergence (PWV) about 4mm. The PWV convergence was measured by DOE/ARM′s microwave radiometer profiler (MWRP) and is compatible with previous studies (Adams et al. 2017) done with the GPS/GNSS network. Furthermore, we present the characteristic evolution of the composed event in terms of CAPE, cloud cover, lifting condensation level (LCL), level of free convection (LFC) and precipitation, using ground based instruments provided by DOE/ARM. Our results suggest that the deep convection event is already organized two hours before precipitation, indicating that it can no longer be reversed on both wet and dry seasons. We found that PWV convergence occurs gradually, unlike previous works that indicate two clear distinct regimes. In addition, contrary to what was expected, the analysis of the mean relative humidity (RH) profile in the rainy season does not indicate it plays an important role controlling the transition from shallow to deep convection in wet season.