



Interaction between the MJO and Diurnal Cycle over the Maritime Continent

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This study aims to examine the relationships between diurnal and MJO scale variability of precipitation over the Maritime Continent (MC) using high resolution satellite observation. First, the large-scale modulation of the MJO on the amplitude and migrating feature of the diurnal cycle is investigated through the 16-year (1998-2013) analysis of the three-hourly combined microwave-IR precipitation provided by the TRMM 3B42 product and the ERA-Interim reanalysis. Our analysis confirms the “precipitation vanguard feature” ahead of the main MJO envelope propagating into the MC as shown in Peatman et al. (2014). This is attributed to the clearer skies and more humid environment ahead of the main MJO convection causing favorable conditions for stronger diurnal precipitation cycle, consistent with the modeling result of Birch et al. (2016). In addition, we found the change of precipitation around the major islands in the MC under different MJO phase exhibits distinct features between the windward and leeward side of mountains and in-land regions and surrounding coastal ocean. Parts of the change in the diurnal rainfall pattern can be explained by the advection effect of anomalous winds related to the MJO (Hung and Sui 2018). Second, the observation of TRMM Precipitation Radar (PR) is further examined to investigate the detailed precipitating features, such as the partition between convective and stratiform precipitation, and the three-dimensional structure of the precipitating clouds dominating the diurnal precipitation cycle in the MC big islands and surrounding coastal ocean.