

Comparison of Raindrop Size Distributions in Equatorial Indonesia during Convectively Inactive and Active MJO

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The variability of rainfall and drop size distributions (DSDs) as a function of MJO phases and storm characteristics is investigated using measurements from the Equatorial Atmosphere Radar (EAR) facility at Koto Tabang, Indonesia. Observations are obtained from a 2D-Video Disdrometer (2DVD) with a near continuous record of operation over eight consecutive years (2003-2010). Vertical profile of DSD is investigated using a Micro Rain Radar (MRR) measurement. Bulk rainfall characteristics are partitioned according to convective and stratiform precipitation classifications, and MJO phase. Notably, on average, the DSD during the inactive phases tends to have the higher concentration of medium and large-size drops ($D > 3$ mm) than the active counterpart. But, the DSD during the active phase has more small raindrops with $D < 2$ mm. The evidence of intraseasonal variation of DSD becomes more obvious during heavy rain. Differences in the DSD for the two MJO phases may indicate the difference in characteristics of microphysical process accompanying the formation and evolution of DSD during each phase. The microphysical processes are investigated using vertical profile of precipitation from 1.3 GHz wind profiler, brightness temperature from satellite, lightning from the World Wide Lightning Location Network (WWLLN), cloud properties from daily MODerate resolution Imaging Spectroradiometer (MODIS), and vertical air motion from EAR measurement.

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