

Variability of Rain Microstructure over Sumatra from Micro Rain Radar Observation

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The vertical profile of rain microstructure such as raindrop size distribution (DSD) is important for understanding rain formation processes and to improve the accuracy of radar-derived rainfall estimates. The variability in the DSD substantially limits the accuracy of the DSD application. The aim of the present study is to investigate the natural variability of vertical profile of DSDs as a function of large-scale atmospheric conditions and storm characteristics using measurements from the Equatorial Atmospheric Radar (EAR) facility at Kototabang, west Sumatra, Indonesia. This study is a follow-up of our previous work on the DSD variability over Sumatra [1,2]. The vertical profile of DSD is obtained from a Micro Rain Radar (MRR) with a near continuous record of operation over four consecutive years (2011-2014). The DSDs from the radar are compared with those from an optical disdrometer. The data are partitioned according to diurnal, convective and stratiform precipitation classifications, monsoonal regime, and MJO phase. Findings support previous Sumatra studies suggesting a significant diurnal and DSD parameter signal associated with both convective-stratiform and MJO phase regime classification. Negligible monsoonal phase influence is determined for the DSD over the Kototabang location. The natural variability of vertical profile of DSDs leads to variability of Z-R relationships in rain column.

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