

Rain Dropsize Distribution from Individual Storms and Variability in Nigeria Topical Region

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Abstract : The microstructure of rainfall is important for predicting and modeling various environmental processes, such as rainfall interception by vegetation, soil erosion, and radar signals in rainfall. This rain microstructure was studied with a vertically pointing Micro Rain Radar (MRR) located at a tropical location in Akure South West Nigeria (7° 15' N, 5° 15' E). This research utilizes two years of data (2018 and 2019), and the data obtained comprises rainfall parameters such as Rain rates, radar reflectivity, liquid water content, fall velocity and Drop Size Distribution (DSD) based on vertical profiles. The measurement and variations of rain microstructure of these parameters with heights for different rain types were presented from ground level up to the height of 4800 m at 160 m range gates. It has been found that the convective, stratiform and mixed, which are the three major rain types, have different rain microstructures at different heights and were evaluated in this research. The correlation coefficient and the regression line equation were computed for each rain event. The highest rain rate and liquid water content were observed within the height range of 160-4800. It was found that a good correlation exists between the measured parameters. Hence it shows that specific liquid water content increases with increasing rain rate for both stratiform and convective rain types in this part of the world. The results can be very useful for a better understanding of rain structure over tropical regions.

Keywords : rain microstructure, drop size distribution, rain rates, stratiform, convective.

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