



Rain Drop Size Distribution at a Tropical Location near Land-Sea Boundary

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Rain events can be characterized by Drop Size Distribution (DSD) that denotes the number of drops as a function of diameter per unit size interval and per unit volume of space. Rain DSD at ground level, a basic parameter for specifying rain events, describes the microstructure of precipitation during different phases of rain. DSD which varies both spatially and temporally can be influenced by the nature and origin of rain. DSD can also clearly provide some remote sensing applications such as microwave attenuation by rain particularly for high microwave frequency applications. DSD can be specified by three parameters namely, diameter of the drops, drop concentration, and the shape of the distribution. Past studies are mostly concentrated on the DSD variations with respect to locations and rain types, but only few studies are focused on the rain DSD difference between maritime and continental circulation. The main objective of this study is to realize the role of continental and maritime air motion that influences the precipitation structure near the land-ocean boundary. Dataset for the rain DSD analysis is collected from a ground based disdrometer located at the Institute of Radio Physics and Electronics of University of Calcutta (22.5°N, 88.4° E), which is a tropical location near land-sea boundary during the year of 2016-2017. The dataset is divided into two subsets namely, maritime and continental rainfall. Rainfall systems coming from the continent moving eastward (i.e., offshore), representing the continental subset. The other is composed of rainfall systems that developed over the sea and are moving westward (i.e., inshore), represents the maritime subset. Continental and maritime rain subsets are differentiated using five days' back trajectory analysis which can be utilized to scan the direction of motion of the air-flow before the occurrence of any rain event. The back trajectory analysis is performed on the NOAA Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT- 4) data using the GIS based platform software namely Trajstat. Variations of the DSD parameters using Gamma model is presented here showing the abundance of smaller drops during maritime rain events whereas dominance of larger raindrops in the case of the continental rain events. The Z-R relation is also found to be significantly different for these two types of rain. The present study reveals the microstructure of rain at a location where the influence of both land and sea climatic features prevail.