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Characterization of cloud microphysics during rainy cases over the tropical coastal station

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Cloud microphysics involves the processes that lead to the formation of clouds and precipitation particles [1]. Proper understanding of the cloud microphysical and precipitation processes is critical for the simulation of weather and climate in atmospheric models [2]. Liquid water clouds play an important role in Earth's climate through the reflection, absorption and emission of radiation and hence accurate information of the cloud water content is highly essential to account for its radiative impact. The convective part of the cloud characterized with the large rain drops and intense rainfall and hence large reflectivity values and more attenuation whereas stratiform part is characterized with the small rain drops and weak rainfall and hence lesser reflectivity values with less attenuation which has been delineated using the methodology based on the radiometric brightness temperature difference threshold [3]. Remote sensing by ground based microwave radiometer (MRP) is a potential tool to study the cloud liquid water (CLW) and integrated liquid water (ILW) in synergy with micro rain radar (MRR) which provide rain rate and reflectivity derived from back scattered signals from hydrometeors and with Ka-band beacon receiver which provide rain attenuation. Collocated observations from MRP, MRR and Ka- band receiver have been used to study the liquid water content variability and humidity variability and attenuation during rainy events and thereby understanding the cloud microphysics during different rainy cases during the period 2015-2018. The knowledge of rainfall associated with stratiform or convective clouds is important in observational, modeling, and remote sensing studies since the microphysical processes and latent heat release are different for these cloud types.

References

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