

Vertical Structure and Frequencies of Deep Convection during Active Periods of the West African Monsoon Season

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Abstract : Deep convective systems during active periods of the West African monsoon season have not been properly investigated over better temporal and spatial resolution in West Africa. Deep convective systems are investigated over seven climatic zones of the West African sub-region, which are; west-coast rainforest, dry rainforest, Nigeria-Cameroon rainforest, Nigeria savannah, Central African and South Sudan (CASS) Savannah, Sudano-Sahel, and Sahel, using data from Tropical Rainfall Measurement Mission (TRMM) Precipitation Feature (PF) database. The vertical structure of the convective systems indicated by the presence of at least one 40 dBZ and reaching (attaining) at least 1km in the atmosphere showed strong core (highest frequency (%)) of reflectivity values around 2 km which is below the freezing level (4-5km) for all the zones. Echoes are detected above the 15km altitude much more frequently in the rainforest and Savannah zones than the Sudano and Sahel zones during active periods in March-May (MAM), whereas during active periods in June-September (JJAS) the savannahs, Sudano and Sahel zones convections tend to reach higher altitude more frequently than the rainforest zones. The percentage frequencies of deep convection indicated that the occurrences of the systems are within the range of 2.3-2.8% during both March-May (MAM) and June-September (JJAS) active periods in the rainforest and savannah zones. On the contrary, the percentage frequencies were found to be less than 2% in the Sudano and Sahel zones, except during the active-JJAS period in the Sudano zone.

Keywords : active periods, convective system, frequency, reflectivity

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