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TRMM-DERIVED RAINFALL CHARACTERISTICS OVER SALEM

Abstract

In this paper an attempt is made to study rainfall over Salem, a city in Tamil Nadu, India. The alarming signals of climate change all over the globe have acted as a motivation behind this study. Earlier, Salem used to witness rainfall in the month of April, locally called as mango rain. Over past few years, Salem district and the adjoining areas have not witnessed it. Moreover, rainfall over Salem during the south-west monsoon has drastically reduced. In this paper an attempt is made in particular, to check if there is a change in rainfall pattern over the city. For this purpose, the rainfall is classified into various categories, viz., very low(¡0.25 mm/h,low (0.25-1.0 mm/h,intermediate(1.0-4.0 mm/h),heavy(4.0 -16.0 mm/h),very heavy(16.0-50.0 mm/h)and extreme(¿50.0 mm/h).The frequency of occurrence of these categories and the contribution of each category of rainfall to total rainfall is found out. Moreover, whether any changes have taken place in these parameters over years,is also investigated. In addition to this, the cumulative distribution of rainfall over Salem has been studied. The data required for this study are the rainfall data obtained from the Tropical Rainfall Measuring Mission(TRMM)satellite. The rainfall data so obtained have been validated against the ground truth. For this purpose, rainfall data measured by rain gauge at the India Meteorological Department(IMD), Salem have been used. The attenuation and cross polarization prediction methods(ITU-R1990)require 1-minute rainfall rate as an input parameter. However, rainfall values at such a higher resolution,are not readily available. Rainfall values are normally available on hourly basis.However,the rain gauges have poor spatial resolution.The TRMM –estimated rainfall values have much improved spatial resolution. The TRMM provides the rainfall values in the latitudinal range of 35N-35S in the 180E-180W longitudinal belt. But,the TRMM has very poor temporal resolution. The TRMM has overpass over a location, only once, or rarely, twice a day. Because of the extremely high spatial resolution, the TRMM stands out to be an outstanding source of rainfall data.

However, the poor temporal resolution needs to be compensated. Hence, the authors seek to establish a conversion formula between the daily rainfall values provided by the TRMM and the 1-minute rainfall required for attenuation and cross polarization estimation. In this paper the authors aim to seek a conversion formula between the two.