Raindrop size distributions and electrical characteristics of thunderstorms over Pune during monsoon season

(Topic: Electrical Effects on Microphysics)

V Gopalakrishnan, S D Pawar, P Murugavel
Indian Institute of Tropical Meteorology, Pune

The Raindrop Size Distribution (DSD) is one of the major parameter as it gives complete description of rain. Knowledge of DSD and its variability is essential for understanding various processes associated with growth of precipitation and cloud microphysics. DSD characteristics depend on the microphysical, dynamical and other processes involved in rain formation. Variation in DSD within precipitation events which can be related to type of precipitation, cloud microphysics, cloud height etc. The electrical characteristics of thunderstorm can alter the microphysical characteristics of the thunderstorm. Cloud electrification can effect a change in processes responsible for collision, coalescence and breakup thereby modifying the size distribution of hydrometeors. We present here measurement of the raindrop size distributions in the size range of 0.3 to 26 mm diameter obtained by using an optical disdrometer and associated electrical field measured by using a field-mill made at Pune during two thunderstorms – one each in south- west monsoon and north-east monsoon and study the rainfall-lighting relationship during these two thunderstorms. While the thunderstorm during southwest monsoon season produce high lighting flashes, the one during northeast monsoon is less electrically active and just 1-2 lightning flashes per minutes is observed. Further, the time lag between initial lighting stroke and initiation of rain at ground is more for northeast monsoon thunderstorm than for southeast monsoon thunderstorm. The electrical characteristics and RSD of these two thunderstorms observed in two different seasons are totally different. While the thunderstorm during southwest monsoon season produce high lighting flashes, the one during northeast monsoon is less electrically active and just 1-2 lightning flashes per minutes is observed. Further, the time lag between initial lighting stroke and intiation of rain at ground is more for northeast monsoon thunderstorm than for southeast monsoon thunderstorm.