

Characteristics of raindrop size distribution (DSD) are studied by Rao et al. (2009) during the southwest (SW) and northeast (NE) monsoon seasons using 4 1/2 years of Droplet Size Distribution (DSD) measurements made at Gadanki (13.5°N, 79.2°E) by an impact-type disdrometer. The observed DSD is found to be distinctly different in the NE monsoon from that of the SW monsoon. The stratified DSD (based on rain rate) shows more small drops and fewer bigger drops in the NE monsoon compared to the SW monsoon, particularly in the low rain rate regimes.

## **2.8. Thunderstorms/ Lightning**

During the NE monsoon season, the south Peninsula experiences large scale thunderstorm activity. A good review of thunderstorm activity over India using station data is given in a recent paper by Omvir Singh and Bharadwaj (2017). A detailed study on lightning activity over the Indian region was published by Ranalkar and Chaudhari (2009) using the TRMM Lightning flash data. The average number of thunderstorm days during October, November and December are given in Fig. 2.14 a, b and c respectively. These plots are taken from the IMD Climate Hazards and Vulnerability Atlas of India (2022) (<https://imdpune.gov.in/hazardatlas/index.html>). The data from 1981-2010 have been used to prepare these spatial maps.

During October, some districts in coastal Andhra Pradesh, Tamil Nadu and Kerala experience more than 4 thunderstorm days. Over south interior Karnataka and Rayalaseema, average number of thunderstorm days is between 2 and 3. During November, thunderstorm activity is reduced in Coastal Andhra Pradesh. However, Tamil Nadu and Kerala still experience thunderstorms with average number varying between 3 and 7 days. Over the coastal Andhra Pradesh, south interior Karnataka and Rayalaseema, thunderstorm activity is slightly reduced. By December, thunderstorm activity is further reduced. During December, maximum thunderstorm days are observed over Kerala and southern parts of Tamil Nadu.

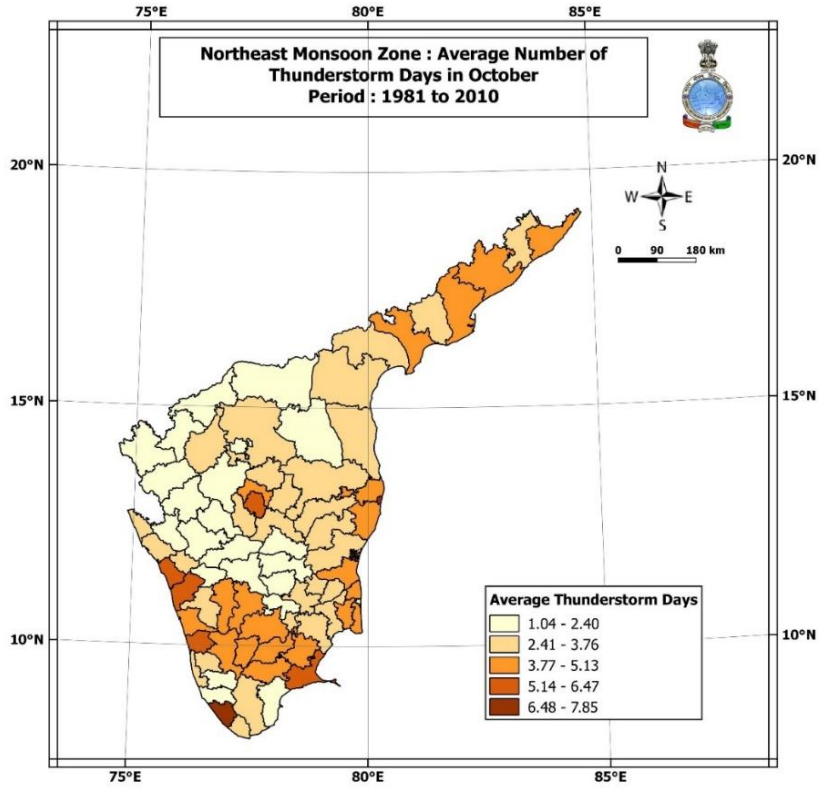


Fig. 2.14 a. Average number of Thunderstorm Days during October, 1981-2010. (Source: IMD Climate Hazards and Vulnerability Atlas of India, 2022).

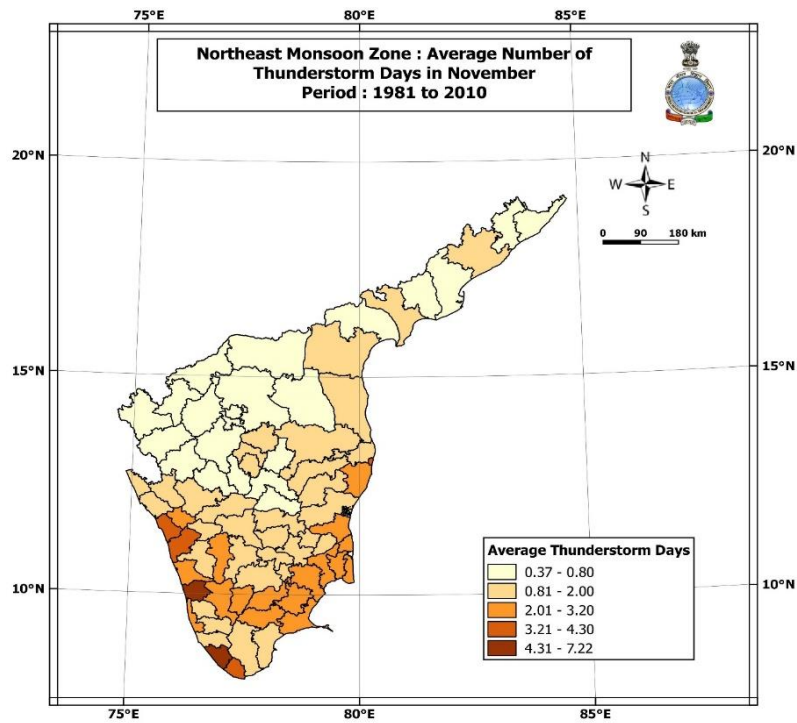


Fig. 2.14 b. Same as Fig 2.14 a, but for November.

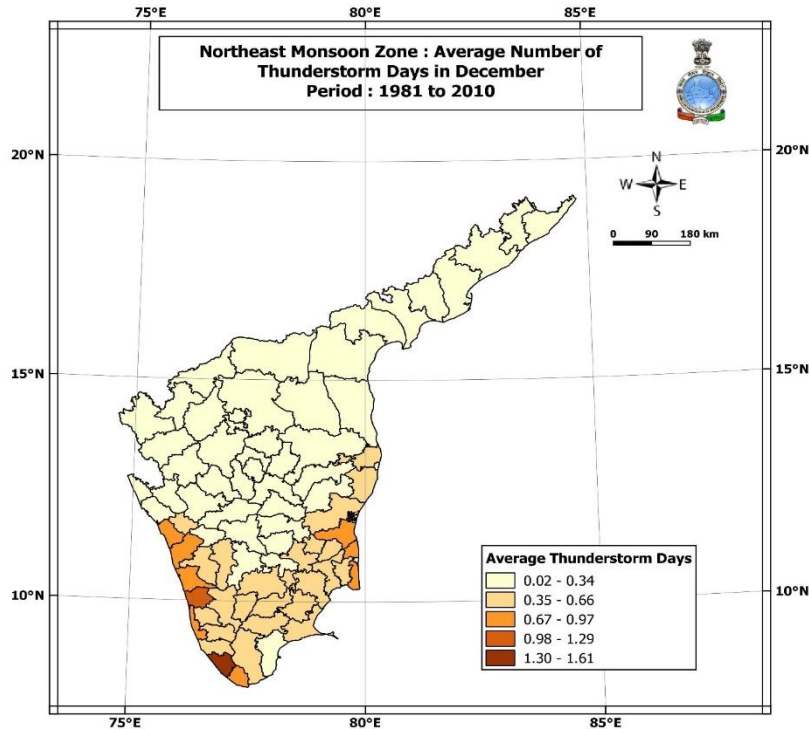


Fig. 2.14 c. Same as Fig 2.14 a, but for December.

Fig. 2.15 a, b and c show the spatial pattern of the average number of lightning flashes per sq km per day during October, November and December respectively. These plots are also taken from the IMD Climate Hazards and Vulnerability Atlas of India (2022). During October, maximum lightning activity is observed over the interior parts of Tamil Nadu and the northern parts of Kerala. During November, lightning flash activity is mostly confined to Kerala and adjoining south Tamil Nadu. During December, the lightning activity is mostly confined to Kerala. Thus, during the NE monsoon season, the state of Kerala witnesses maximum lightning activity. This could be related to proximity to the Arabian Sea, thus abundant moisture transport and orography along the west coast supporting deeper convective activity.

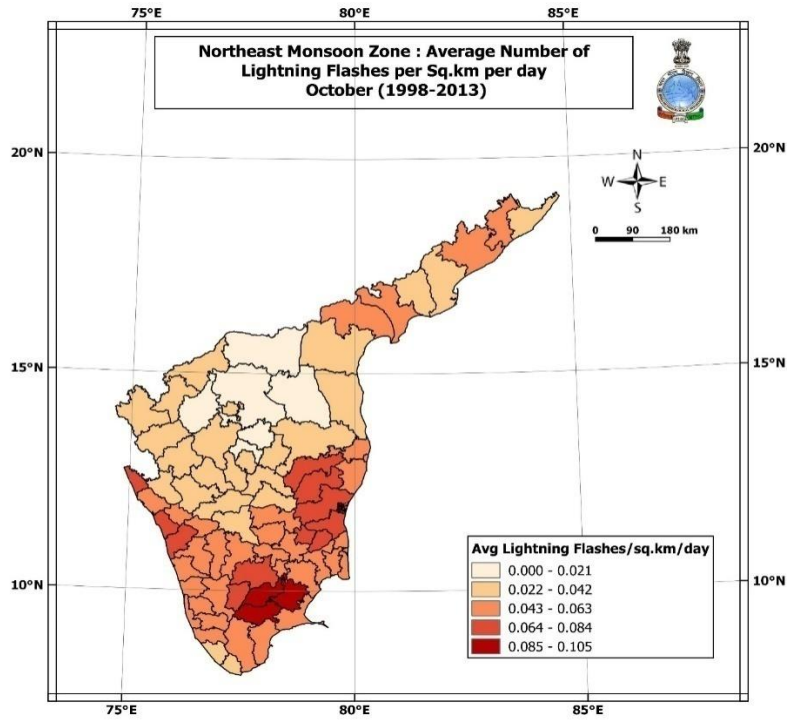


Fig. 2.15 a. Average number of Lightning flashes per sq km per day during October. (Source: IMD Climate Hazards and Vulnerability Atlas of India, 2022).

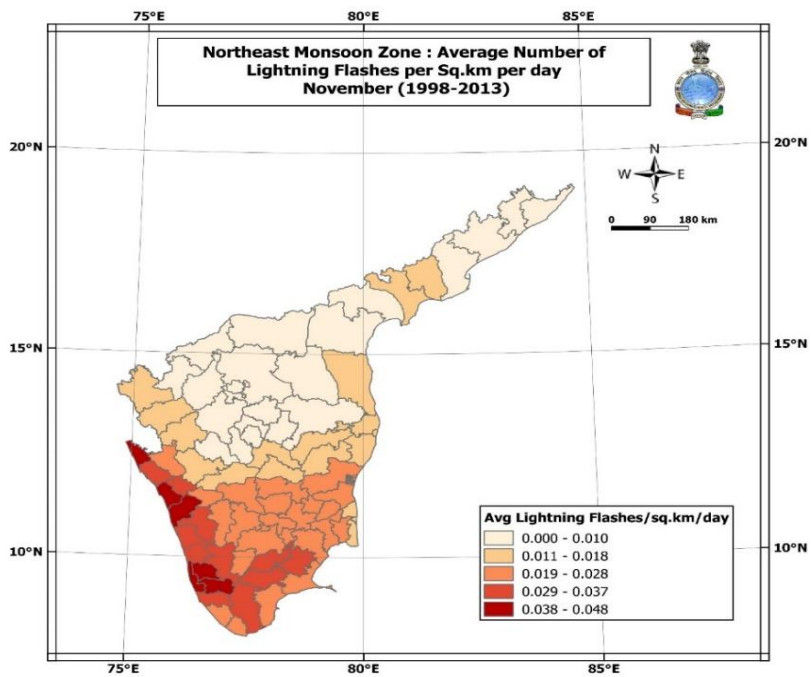


Fig. 2.15 b. Same as Fig. 2.15 a, but for November.

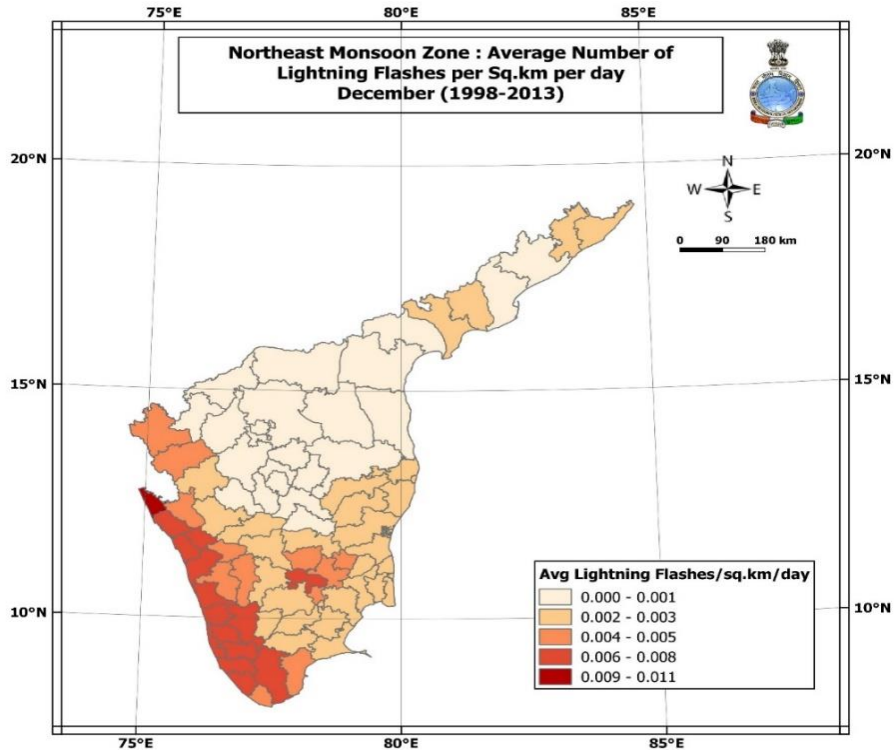


Fig. 2.15 c. Same as Fig 2.15 a, but for December.

## 2.9. Extreme Wind Speed

For providing wind speed forecasts for specific purposes to users, it is important to know the climatology of extreme wind speed during the NE Monsoon season. Fig. 2.16 a, b and c shows the spatial distribution of Extreme surface wind speed (in m/sec) in October, November and December respectively. The surface wind speed is normally measured at a height of 10.0 m. These maps are also derived from the IMD Climate Hazards and Vulnerability Atlas of India, 2022.

During October, extreme surface wind speeds exceeding 18 m/sec are observed over the north coastal Andhra Pradesh and interior parts of Tamil Nadu. Over other parts of the south Peninsula, extreme surface wind speed varies between 12 and 18 m/sec. During November, east coast of Tamil Nadu and coastal Andhra Pradesh has maximum risks due to extreme surface wind speeds. This region experiences tropical weather systems like depressions and cyclonic storms every year. Over this region,