

Relations between total lightning flash rate and radar reflectivity in convective storms

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Utilizing the total lightning data, which includes both Intra-cloud (IC) and cloud-to-ground (CG) flashes, from Earth Network's Total Lightning Network (ENTLN), this study relates the total lightning flash rates from the lightning flash cells to the peak radar reflectivity derived from the Doppler radars of NWS. The study is based on the radar and lightning data from the thunderstorms within CONUS covering March 2011 to November 2011. Comparing the total lightning flash rate and the highest radar reflectivity (dBZ) of each flash cell through the evolution of the cells, this study shows clear relationships between the two factors. The quantitative relations are derived statistically for different climate regions in different seasons, and the statistical models are used to create "synthetic radar" maps from the lightning data. The results from this study can be used to enhance the radar data to identify thunderstorm cells or create the proxy radar data in regions or countries without radar coverage.