

EGU2020-20611

<https://doi.org/10.5194/egusphere-egu2020-20611>

EGU General Assembly 2020

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Lightning Clustering to Study Regional Variations in Thunderstorm Characteristics

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Many studies have shown that the characteristics of lightning such as size and peak current differ by geographical region as well as between ocean and continental thunderstorms. For example, several studies have shown that the lightning in oceanic thunderstorms are generally larger and have lightning with higher peak currents than in continental thunderstorms. In this study, as opposed to individual lightning flash characteristics, we focus on how thunderstorm characteristics change for various regions. We develop a lightning clustering algorithm that takes individual lightning strokes and creates thunderstorms based on their spatiotemporal proximity. We use lightning data from the Earth Networks Total Lightning Network and compare storms throughout regions of the U.S.A. and Europe. Once these thunderstorms are obtained, we can regionally categorize them and compare various characteristics (size, duration, flash rate, polarity, IC/CG ratio, etc.) to determine if any differences stand out. In this presentation, we will discuss the clustering algorithm used, analyze the results of the study, and discuss implications.