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An Earth Networks Lightning Climatology Using Thunder Hours

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Lightning data are often used to measure the location and intensity of thunderstorms. Long term trends of thunderstorm activity can be a helpful tool for understanding our changing climate. This study presents data from the Earth Networks Global Lightning Network (ENGLN) in the form of thunder hours. A thunder hour is defined as an hour during which thunder can be heard from a given location. Thunder hours are an intuitive measure of lightning since the one-hour interval represents the life span of most airmass thunderstorms. Examining long-term lightning patterns in the context of thunder hours lends insight into thunderstorm activity without being heavily influenced by individual storm intensity, shedding light on patterns in storm activity associated with weaker thunderstorms. Thunder hour observations also reduce network performance dependencies in the dataset, making thunder hours particularly useful for studying climatology. Thunder hours have been calculated for the entire globe using 5 years of data from the ENGLN. To translate lightning flash locations to thunder hours, we converted the entire globe to a 0.05° grid, and we have slightly modified the definition of thunder-hour to an UTC hour during which lightning was located within 15 km of a given grid point. The 15 km criteria here is based on the approximate range at which thunder can be heard from a lightning flash. This study will examine global thunderstorm activity, highlighting diurnal and seasonal patterns observed across the globe.