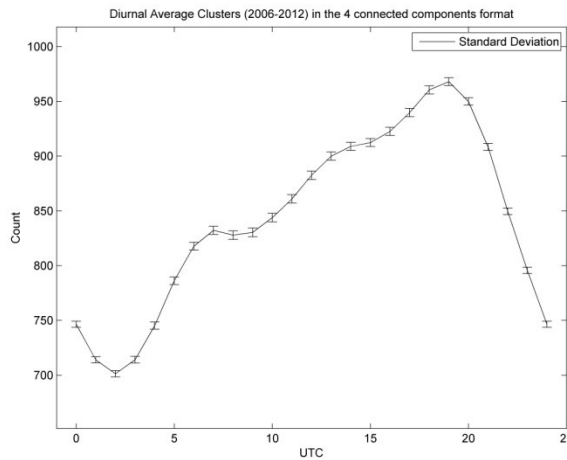


The diurnal cycle of global thunderstorm clusters

Intended for the Global Electric Circuit session

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The global electric circuit is maintained by a potential gradient between the conducting atmosphere and Earth's surface. Nearly a hundred years ago it was hypothesized that the "Carnegie Curve" measurements of the daily variations of the fair weather electric field are maintained by thunderstorm activity. Over the years it was suggested that other factors, like shower clouds, contribute to the circuit. We test the contribution of global thunderstorm clusters to this cycle by a clustering scheme that utilizes lightning strikes detected by the World Wide Lightning Location Network (WWLLN). For our basic cluster parameters (such as minimum size, lightning density, and time) we performed correlations with observations of cloud temperature taken from the Meteosat satellite. Our findings suggest that there is a significant relationship between the fair weather electric field at the surface and the daily variability in the number of global electrified thunderstorms.



The diurnal average number of clusters (2006-2012). Resolution: $0.15^\circ \times 0.15^\circ$, 1 lightning strike per hour.