



On the relationship between sprites and lightning activity in an exceptional South West England thunderstorm.

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A thunderstorm is a complex phenomenon where dynamical, microphysical and electrical processes interact. Observations of the stratosphere and mesosphere show the occurrence of 23 sprites during a thunderstorm in Devon in south-west England on May 27, 2017. This is surprising for the type of convective organization, latitude and time of year of the thunderstorm. A first analysis shows that the meteorological conditions for convection to occur could be similar to Japanese thunderstorms (Adachi et al., 2005). Hence a fine mesh model archive will be used to provide more details on the convective organization. A first analysis emphasizes the prominent meteorological features of the thunderstorm, similar to a prefrontal single-cell, and the specific geo-location of the sprite parent lightning flashes along the northern Cornwall/Devon Coastline.

Two different time scales are proposed to analyze sprites: sprite scale time (0.01 s) and thunderstorm duration, close to 2 hours. In the first analysis, a correlation between parent positive cloud-to-ground lightning discharge (CG+) peak intensity and sprite relative luminosity is presented. Subsequently, satellite observations from the geostationary satellite Meteosat MSG3, such as cloud top temperatures (Soula et al., 2016), will be analyzed to compare the development of the varying stages of the convection with the evolution of lightning flashes and the sprite occurrences in this prominent thunderstorm. Finally, others correlations like between CG+ producing sprite and CG+ peak intensity will be also investigated for this particular case.