

Morphology of TLE's producing thunderstorm over Indian region

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Transient Luminous Events (TLEs) are short lived flash of light observed above large thunderstorms in the lower regions of earth's atmosphere and affecting "space plasma" (ionosphere) by providing direct electrical connection between cloud top to ionosphere. TLEs remains unexplored over Indian subcontinent despite being major lightning active region in the world. Hence it has become important to re-examine our present understanding of thundercloud/storm system over this regions. In this case study we present more than 30 sprites which were recorded during six hours on 07 October 2013. The recorded sprites appeared in groups and are in carrot shape followed by the column form. All the four reported morphological types of TLE's were recorded on this particular night. We have extensively analyzed data from MTSAT (Multi-Function Transport Satellite) satellite lightning detection network, Global Lightning Data (GLD360) lightning data and ground based ELF-VLF data to understand thunderstorm/lightning characteristics. The thunderstorm characteristics studied are cloud type, height, temperature, pressure, and lightning characteristics analyzed are lightning type, polarity, and energy radiated. GLD360 data shows more than 75 % of detection of sprite parents lightning and ~54 % sprites are associated with positive cloud to ground lightning. The peak current of sprite producing lightning varies from 16-122 kA, which is comparatively less from the reports of other parts of world. The cloud top temperature (CPT) data from MATSAT satellite shows that maximum sprite appeared when CPT reached its minimum values of -65 °C with cloud top height of ~11-14 km. Over all the result are first from Indian region and provided detailed information of microphysical structure of sprite producing thunderstorm.