Probing a post monsoon Mesoscale Convective System (MCS) and the generated Transient Luminous Events (TLEs) over Indian Region

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A Mesoscale Convective System (MCS), consisting of three Super Cells formed over South-east Indian, is assessed in detail with satellite and ground based data-sets. The MCS under investigation generated a total of Ten (10) upward electrical discharges (9 Sprites and 1 Gigantic Jet) commonly named as Transient Luminous Events (TLEs). The TLEs were recorded from TLE observation station located at Allahabad, India. The event occurred in the Post-Monsoon period of 2013 on October 7, during 15-23 UT hours. The MCS was spread over a region of 25000 sq. Kilometers. A lowest cloud top temperature value of -84.7 0 C was observed in the mature stage of the MCS, during 2130 UT hours, and the cloud top altitude was reaching 17.6 km. The coldest cloud top region was covering an average area of 13000 sq. Km. The measured Convective Available Potential Energy (CAPE) value was 606.9 J/kg at 00 UT on 7 th October which dropped to 211 J/kg at 00 UT on 8 th October. The mean lightning flash rate during the formation and maturity stages of the MCS was around 46.03 min -1 . During the entire lifespan of the thunderstorm, peak currents were found to be reaching ±400 kA. Such high electric currents, extreme cold temperature and towering altitudes of the convective complexes show how much a MCS is dynamically active and the TLEs which it produced are known to electrically connect the lower atmosphere to the upper space environment.