



## Study of lightning induced phenomena using ground and space-based techniques

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Lightning is a huge instantaneous electrical discharge in the tropospheric height can radiates electromagnetic waves in the low frequency ranges. These waves can travel through the earth-ionospheric waveguide and sometime leak through it travel across a magnetic field line and received in the conjugate region. Further, lightning events, also increase in the number of high-energy particles in the inner region of the VAB ( $L < 2$ ). Thus, produces a coupling between troposphere, ionosphere and magnetosphere. During the propagation of the waves along the geomagnetic field lines they interact with the trapped electrons inside the radiation belt through a wave-particle interaction. Such interaction causes redistribution of pitch angles of the electrons thereby resulting in lowering of the heights of their mirror points ultimately leading to particle precipitation. The precipitation process can be measured by two unique methods. Some of the precipitated electrons can reach to the lower ionospheric height and produced a secondary ionization. This secondary ionization can be detected through Very Low Frequency (VLF) wave propagation methods. The radiation belt electron precipitation can also be recorded using the NOAA low earth orbital satellite measurements. In this work, we study the lightning activities over India region using the World Wide Lightning Location Network (WWLLN) and examine the LEP events using VLF navigational transmitter signals recorded over receiving station at Dehradun. We compute the electron precipitation from used Medium Energy Proton and Electron Detector (MEPED) instrument from NOAA-15 satellite. We try to observe the relationship between the location of the lightning and its magnetic conjugate points and establish a correlation between count number and lightning energy.

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