

Investigation of Pi1 burst pulsations in response to dipolarization front in the magnetosphere

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In the Earth's magnetotail, dipolarizations signatures are often observed during magnetic reconnection. During these periods, bursty bulk flows toward the Earth and generates compressional oscillations as irregular pulsations in the Pi2 (7-25 mHz) frequency range. These signatures are abundant in the active geomagnetic conditions. In this study, we identify a rare signature of irregular pulsations in frequency range of Pi1 (0.2-5 Hz) as well as Pi2 range using induction coil magnetometer data from Indian low and equatorial stations. Two Pi1 bursts of frequencies of 1 Hz and Pi2s in the ranges of 10 mHz are observed at all the stations on 02 Sep 2018 during 21:00-23:00 UT. Using the interplanetary magnetic and electric field, solar wind speed, densities, solar wind dynamic pressure and activity indices confirmed that the event occurred during quiet geomagnetic condition. These pulsations are seen to be excited by the dipolarization front as revealed by the multispacecraft MMS satellite data. MMS satellite was crossing the magnetotail region at around 15 R_E (R_E : Earth's radius) in the night side. The radial component of the magnetic field from Fluxgate magnetometer (FGM on board MMS1) showed a change of 30 nT in MMS1 spacecraft at around 21:00 UT. The survey mode data also indicated presence of a bursty signatures. Flux gate magnetometers from low latitude ground stations also indicated a positive bays indicating the magnetosphere depolarization. Series of Pi2 bursts are recorded instantaneously at ground as well as RBSP satellites A and B. However, the Pi1 burst shows a delay of 20 minutes from the time of Dipolarization front. The electron and ion number densities from MMS are also investigated to understand the characteristics of dipolarization fronts.