



Plasma wave occurrences during substorm events

Trunali Shah¹, Veenadhari Bhaskara¹, Yoshiharu Omura², Biswajit Ojha¹, Satyavir Singh¹, and Yusuke Ebihara²

¹Indian Institute of Geomagnetism, India (trunalishah151996@gmail.com)

²Research Institute for Sustainable Humanosphere (RISH), Kyoto University, Kyoto, Japan

The Earth's magnetosphere is a dynamic system subject to various disturbances, among which substorms play a significant role in influencing its impact on the surrounding plasma environment. Close to the substorm onset satellites flying in the night side often observe reconfiguration of magnetic field lines from tail like to quasi-dipole like. This phenomenon is called magnetic field dipolarization. Studying the particle and wave dynamics during this phenomenon is crucial to understand as it accelerates the ion population and alters the generation condition of waves associated with it. Using the Electric and Magnetic Field Instrument Suite (EMFISIS) onboard the Van Allen Probes spacecraft, the present study investigates the magnetic field fluctuations corresponding to substorm onset. We examine thirteen substorm occurrences with $L < 6.6$ and within wide a range of MLT (18:00 to 06:00). Our investigation reveals significant magnetic field fluctuations exhibiting power from gyrofrequency of O^+ extending up to gyrofrequency of H^+ . We additionally calculate the plasma and magnetic pressures, providing insight into the mechanism triggering ion injection during these occurrences. The role of heavy ions (He^+ and O^+) in the disappearance of stop bands and the corresponding mechanisms involved in this phenomenon it will we presented.