[구SE-13] Statistical study on nightside geosynchronous magnetic field responses to interplanetary shocks

Jong-Sun Park[1], Khan-Hyuk Kim[1], Tohru Araki[2],
Dong-Hun Lee[1], Ensang Lee[1], and Ho Jin[1]
[1] *School of Space Research, Kyung Hee University, Yongin 446-701, Korea*
[2] *SOA Key Laboratory for Polar Science, Polar Research Institute of China, Shanghai 200136, China*

When an interplanetary (IP) shock passes over the Earth's magnetosphere, the geosynchronous magnetic field strength near the noon is always enhanced, while the geosynchronous magnetic field near the midnight decreases or increases. In order to understand what determines the positive or negative magnetic field response at nightside geosynchronous orbit to sudden increases in the solar wind dynamic pressure, we have examined 120 IP shock-associated sudden commencements (SC) using magnetic field data from the GOES spacecraft near the midnight (MLT = 2200~0200) and found the following magnetic field perturbation characteristics. (1) There is a strong seasonal dependence of geosynchronous magnetic field perturbations during the passage of IP shocks. That is, the SC-associated geosynchronous magnetic field near the midnight increases (a positive response) in summer and decreases (a negative response) in winter. (2) These field perturbations are dominated by the radial magnetic field component rather than the north-south magnetic field component at nightside geosynchronous orbit. (3) The magnetic elevation angles corresponding to positive and negative responses decrease and increase, respectively. These field perturbation properties can be explained by the location of the cross-tail current enhancement during SC interval with respect to geosynchronous spacecraft position.

[구SE-14] Effects of plasmaspheric density structure on the characteristics of geomagnetic ULF pulsations

Jiwon Choi, Dong-Hun Lee, Khan-Hyuk Kim, and Ensang Lee
Kyung Hee University

The structure of plasmasphere plays an important role in determining properties of geomagnetic ULF pulsations such as Pi 2 pulsations and field line resonances (FLRs) in the Earth's magnetosphere. We have performed a 3-D MHD wave simulation to investigate the generation and propagation of ULF waves in dipole geometry. Various 3-D density structures are assumed, which include a relatively sharp density gradient and gradually less slopes at the plasmapause. The former condition can refer to the plasmasphere from local midnight to dawn, whereas the latter represents the region near noon to dusk where it bulges out. We show how Pi 2 pulsations and FLRs differentially appear at both multi-point satellite locations and ground stations for different local times. Our results suggest that 1) the local radial density structure significantly affects the peak frequencies for Pi 2 oscillations, while the polarization changes remain similar in the radial direction, and 2) the radial location of strong FLRs varies for different density profiles. It is also suggested how multi satellite measurements and ground-based observations can confirm this differential feature in space.