

Correlation between nightside DP2 fluctuations and the interplanetary electric field

Kayoko Imamura[1]; Manabu Shinohara[2]; Kiyohumi Yumoto[2]; Yumoto Kiyohumi Circum-pan Pacific Magnetometer Network Group[3]

[1] Space and Earth Electromagnetism, Kyushu Univ.; [2] Space Environ. Res. Center, Kyushu Univ.; [3] -

DP2 fluctuations are characterized by quasi-periodic variations with time scale from about 20 minutes to a few hours. The amplitude is enhanced at the dip equator in dayside, which is believed to be an evidence of the penetration of dawn-to-dusk electric fields in the solar wind (E_{y_sw}). To better understand how the solar wind effects are transferred to the magnetosphere, ionosphere and ground, it is important to globally study DP2 fluctuations.

As a new approach to DP2, in this study we investigated nightside magnetic variations when DP2 occurred in dayside. We considered dayside DP2 events with the amplitude enhanced widely (more than 20nT) at the dip equator. The data from Circum-pan Pacific Magnetometer Network (CPMN) stations, Ancon (ANC; M.lat=0.77 G.lon=-77.15), Davao (DAV; M.lat=-1.2 G.lon=125.40) and Mutinlupa (MUT; M.lat=6.79 G.lon=121.02) were used for this analysis. To identify the dayside DP2 events, the dayside records of DAV (which is located at the dip equator) and MUT (which is located at low latitude) were used. The nightside records of ANC (which is located at the dip equator) were used for investigating nightside DP2 fluctuations. To investigate the association with the solar wind variations, magnetic and velocity data from the ACE satellite were used. The analysis period covered two months, Jan. and Feb. 2003. There were 35 dayside DP2 events.

The following are our results.

- (1) About half of the dayside DP2 events accompany the nightside DP2 of similar wave form.
 - (2) The number of nightside DP2 (which correlates with the dayside DP2) decreases toward midnight.
 - (3) Amplitude of the nightside DP2 has a good correlation with the intensity of the dawn-to-dusk electric field in the solar wind (E_{y_sw}).
 - (4) Amplitude of the dayside DP2 without nightside DP2 has no correlation with the E_{y_sw} .
- In the present paper we will discuss a generation mechanism of the nightside DP2.