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Geo-synchronous Magnetopause Crossing(GMC) and geomagnetic DP2 type variation

Tohru Araki^{1*}, Takashi Kikuchi², Atsuki Shinbori²

¹Polar Research Institute of China, ²STE Laboratory, Nagoya University

We analyzed an event in which a DP2-variation and a geo-synchronous magnetopause crossing (GMC) simultaneously occurred. During this event the IMF-Bz showed a negative rectangular pulse. The ground geomagnetic variations started simultaneously with the southward turning of the IMF-Bz and gradually developed to the peak in several tens of minutes. The GMC began about ten min after the IMF-Bz southward turning.

The interplanetary electric field (IEF) associated with the rectangular IMF-Bz pulse should penetrate into the magnetosphere in a few minutes. We consider that the gradual increase of the DP2-variation observed on the ground was caused by the inward movement of the magnetopause due to magnetic erosion.

This suggests that the DP2 variation might depend upon the amplitude and duration of the negative rectangular pulse of IMF-Bz. We now study the dependence by analyzing several negative IMF-Bz pulses.

Keywords: geo-synchronous magnetopause crossing, geomagnetic DP2 type variation, southward IMF, solar wind-magnetosphere interaction, field aligned current