Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

PEM08-P03 会場:コンベンションホール 時間:5 月 22 日 17:30-18:00

MAGDAS/CPMN の 210MM 沿い観測点磁場データからのプラズマ圏密度推定に向けて
Toward estimating plasmaspheric density along 210MM by using MAGDAS/CPMN stations

松山 清寿 [1], 河野 英昭 [1*], 阿部 修司 [2], 魚住 禎司 [2], 湯元 清文 [2], MAGDAS/CPMN グループ [2]
MATSUYAMA, Kiyotoshi[1], KAWANO, Hideaki[1*], ABE, Shuji[2], UOZUMI, Teiji[2], YUMOTO, Kiyohumi[2], MAGDAS/CPMN group[2]

[1] 九州大学理学部地球惑星科学科, [2] 九州大学宙空環境研究センター
[1]Dept. Earth Planet. Sci., Kyushu University, [2]Space Environment Research Center, Kyushu University

The ultimate goal of this study is to monitor the plasma density distribution in geospace by using ground magnetometers. A method for it is to use the field-line resonance (FLR) frequency, but it is often difficult to identify. Frequently-used methods to identify it, called ”two-station methods” below, need data from two closely neighboring stations. However, many ground stations are not close enough to each other to enable the two-station methods. Therefore, in this paper we focus on the H/D method (also called ”one-station method” below); it is a method which uses the data from a single station. However, it is known that this method can also detect events different from FLR events (called ”Type-B” events below). In this study, we improve the H/D method to decrease Type-B events, by using MAGDAS/CPMN data.

Among the CPMN stations, we have at least two pairs of stations close enough to each other, enabling the two-station method. We applied the two-station methods and the one-station method to those stations' data during 2001/8-2002/6, and by comparing the results, we improved the one-station method: That is, we set thresholds for the H/D value and for the H-component power spectral density (PSD). The optimum values for the two thresholds were found by numerical search so that as many Type-B events as possible were removed while as many ”Type-A” events as possible were kept (”Type-A” refers to the events identified by all of the two-station methods and the one-station method).

As a result, we found the following:
(1) We could remove 95% of the Type-B events.
(2) The thresholds for the H/D value and the H-component PSD depend on the L-value.
(3) The threshold for the H/D value depends on season.

By using the improved H/D method, we have estimated the plasma mass density as a function of the L-value using the CPMN stations along 210MM (210 degrees magnetic meridian). The result shows the same trend as the plasma mass density observed by past satellites (Gallagher et al., 2000).