# MAGDAS/CPMN地上磁場からの210°磁気子午面上プラズマ圏密度推定：一点法による初期結果

# 河野 英昭 [1]; 松山 清寿 [2]; 阿部 修司 [3]; 魚住 禎司 [4]; 太田 聡 [5]; 湯元 清文 [3]; MAGDAS/CPMN グループ 湯元 清文 [6]
[1] 九大・理・地球惑星; [2] 九大・理・地惑; [3] 九大・ICSWSE; [4] 九大・イクセイ; [5] 九大・理・地惑; [6] -

# Estimation of the plasmaspheric density on the 210MM plane by using MAGDAS/CPMN: Initial results

# Hideaki Kawano[1]; Kiyotoshi Matsuyama[2]; Shuji Abe[3]; Teiji Uozumi[4]; Satoshi Ohta[5]; Kiyohumi Yumoto[3]; Yumoto Kiyohumi MAGDAS/CPMN Group[6]
[1] Earth and Planetary Sci., Kyushu Univ.; [2] Earth and Planetary Sciences, Kyushu Univ.; [3] ICSWSE, Kyushu Univ.; [4] ICSWSE, Kyushu Univ.; [5] Dept. Earth Planet. Sci., Kyushu University; [6] -

From the frequency of the field-line resonance (FLR), which is equal to the eigen-frequency of the magnetic field line which is under FLR, one can estimate the plasma density along the field line. FLR can be observed by ground magnetometers, thus one may estimate the magnetospheric plasma density from the ground. However, it is known that FLRs are often difficult to identify in the ground magnetometer data because of superposed non-FLR signals which often have amplitudes comparable to FLR-generated signals.

A frequently-used countermeasure against this problem uses two closely neighboring stations; by dividing the data from one station by that from the other, the non-FLR signals tend to be cancelled out and FLR-generated signals are extracted.

However, many of CPMN ground stations along the 210MM (210 degrees magnetic meridian, which runs through Japan) are not close enough to each other to enable the above-stated two-station method. 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 paper we have improved the H/D method to decrease Type-B events, as follows.

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 method and the one-station method to those stations' data during 2001/8-2002/6, and by comparing the results, we have found that we can discard many of the Type-B events by setting thresholds to the H/D value and the H-component power spectral density (PSD). The optimum values for the two thresholds have been found by numerical search so that as many Type-B events as possible are removed while as many 'Type-A' events as possible are kept ('Type-A' refers to the events identified by both the two-station method and the one-station method).

As a result, we have 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.

We have also conducted a case study in which we have applied the improved H/D method to the CPMN stations along the 210MM and estimated the plasma mass density on the 210MM plane as a function of the L-value. The result shows the same trend as the plasma mass density observed by past satellites (Gallagher et al., 2000).