B010-09 **会場: A** **時間: 11月4日 15:25-15:40**

FLR 地上磁場観測と TEC 観測からのプラズマ圏 3 次元密度分布推定法

河野 英昭 [1]; 才田 聡子 [2]; 上野 玄太 [3]; 樋口 知之 [3]; 中野 慎也 [4]; 湯元 清文 [5]
[1] 九大・理・地球惑星; [2] 新領域融合研究センター; [3] 統数研; [4] 統数研; [5] 九大・宙空環境研究センター

A method to estimate three-dimensional distribution of plasmaspheric density from ground-observed FLR frequency and TEC

Hideaki Kawano[1]; Satoko Saita[2]; Genta Ueno[3]; Tomoyuki Higuchi[3]; Shin'ya Nakano[4]; Kiyohumi Yumoto[5]
[1] Earth and Planetary Sci., Kyushu Univ.; [2] Research Organization of Information and Systems; [3] ISM; [4] The Institute of Statistical Mathematics; [5] SERC, Kyushu Univ.

The plasmasphere is the region of corotating plasma, close to the Earth. The plasmasphere is filled with ionosphere-origin cold plasma. It is important to monitor three-dimensional plasma distribution in and near the plasmasphere; for example, the plasmasphere can affect the progress of magnetic storms via plasmasphere-ring current interactions.

Measures to monitor the three-dimensional density distribution in and near the plasmasphere include ground magnetometers and GPS satellites, as follows. From ground magnetometer data one can identify the eigenfrequency of the field line running through the magnetometer. From thus identified frequency (so-called FLR frequency, where FLR stands for "field line resonance"), one can obtain information on the plasma mass density along the field line. Ground coverage by magnetometers is getting thicker day by day toward two-dimensional (2D) ground coverage, from which one can obtain information on three-dimensional (3D) plasma density distribution in the region threaded by the field lines running through the ground surface.

Each GPS satellite provides TEC (total electron contents) along the line of sight from the satellite to a GPS receiver; from the TEC one can obtain information on the electron density distribution along the line of sight. There are 24 GPS satellites, and the coverage by GPS receivers (located on the ground and in space) is getting thicker day by day, from which one can obtain information on three-dimensional electron plasma density distribution in the region covered by the line of sights from the GPS satellites to the GPS receivers.

In this paper we present a method to evaluate FLR frequencies and TEC at the same time and obtain a unified 3D profile of plasma density distribution. In essence, the method calculates the differences between the observations and the corresponding quantities calculated from the estimated plasma distribution, and minimizes the sum of the differences for the two types of observations. Details will be given at the presentation. We first realize this method in an iterative manner by using the quasi-Newton method. We have so far tested it with simulated data in a manner similar to twin experiments, and obtained favorable results; we will show them at the meeting. Further tests with sample data are ongoing.