

The estimation of the thickness of the dayside magnetopause current layer and dependence on the IMF intensity and orientation

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Using the magnetic field data which was transformed from GSM to LMN coordinate by the minimum variance method plasma moment one, we have estimated the thickness of current layer. From February 1994 to December 1995, about 500 events that the GEOTAIL spacecraft crossed the magnetopause were collected.

To estimate the magnetopause current layer, we have applied a method that Sergeev et al [1998] proposed to estimate the plasma sheet thickness.

As this result, the thickness of the magnetopause current layer is almost 20 - 30 [km].

As this cause, there is the difference of the data choice between this work and previous one.

Though we have examined the correlation between the IMF orientation, intensity and thickness, no clear correlation between them and the current layer thickness was seen.

The study of the structure of the magnetopause is of fundamental importance in understanding the microphysical processes involved in the solar wind interaction with the magnetosphere.

As the one of the important key parameters in this study, there is the estimation of the thickness of the magnetopause current layer.

Thus, the consideration of the parameters that control the thickness is also important.

The geomagnetic activity (e.g. Kp and Dst) and orientation of the magnetosheath magnetic field as the control parameter of the thickness were considered.

But there was no clear correlation between them and the current layer thickness in previous works.

Using the magnetic field data which was transformed from GSM to LMN coordinate by the minimum variance method and plasma moment one,

we have estimated the thickness of the current layer.

During about a year from February 1994 to December 1995, about 500 events that the GEOTAIL spacecraft crossed the magnetopause were collected.

To estimate the magnetopause current layer, we have applied a method that Sergeev et al [1998] proposed to estimate the thickness of the plasma sheet.

As this result, the thickness of the magnetopause current layer concentrated in 20 - 30 [km].

Compared with the previous works, this scale range is very small.

As the one of this cause, the difference of the data choice between this work and previous one is considered.

Thus, in order to examine whether the IMF orientation and intensity control the current layer thickness or not, the correlation between the IMF orientation, intensity and thickness was examined.

But there was no clear correlation between them and the thickness.

The fact that there is no clear correlation between the IMF orientation and current layer thickness was consistent with the previous works.