An prediction of Dst index for a period of high-density plasmas in magnetic clouds

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We study geomagnetic effects of high-density plasmas in magnetic cloud observed in interplanetary space.

In order to clarify its geomagnetic effect we try to estimate Dst based on solar wind parameters by adopting different methods of including effects of interplanetary parameters.

The important point focused on in this study is not only the sense of Dst variation but also not its magnitude.

The estimation are done by adopting Fenrich and Luhmann(1998)'s formula and the O'Brien and McPherron(2000)'s ring current decay time with setting thresholds for interplanetary electric field and plasma density. The estimated Dst variations are found to be in good agreement with the provided Dst.

We suggest that for forecasting the geomagnetic disturbances it is important to take into account of not only the effect of the interplanetary electric field but also the effect of the density carried with magnetic cloud.