

Predictability of geomagnetic storms

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Geomagnetic storm is the greatest disturbances in solar-wind-magnetosphere-ionosphere system. Empirical model, neural network model, particle-tracing simulation have been proposed to predict the variations of geomagnetic storms from solar wind parameters. Every model can predict the variations of geomagnetic storm well for the particular period, which they referred. However, these models have not checked for the stability of prediction by using long durations of solar wind data, previously.

Using Burton's model with solar wind data for the year 1998 to 2000 and SYM-H (Dst) index, we examined the predictability of geomagnetic storms. As a result, Burton's model can predict variations of geomagnetic storms in general, without recovery phase.

However, we found that several storms does not predict well from Burton's model. These storms have the following characteristics; 1) Minimum value of Dst is between -100 nT and -200 nT. 2) Bz is from -10 nT to -20 nT and duration of southward Bz is from half day to 1day. 3) The solar wind speed is slow (about 400 km/s).

These storms, observation and prediction agree quite well during the main phase. In the recovery phase, the model predicts the development of storm since injection rate (VBs) is still high. Thus, there is a big difference between observation and prediction. We will present the results of detailed analysis of these special type of storm events.