

## Strong southward IMF associated with geomagnetic storms

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Continuous solar wind observation from L1-point enables to predict geomagnetic disturbances before approximately one hour using several techniques now. It is known that strong southward IMF with long duration is important for occurrence of geomagnetic disturbances. We need to study cause of strong southward IMF formation in order to predict geomagnetic storms before one or two days. Here, we report the formation of strong southward IMF associated with geomagnetic storms with Dst index less than  $\sim 100$  nT. In some cases the strong southward IMF carried from the Sun as magnetic clouds. In other cases the strong southward IMF was formed by interaction between background solar wind and ejecta. The geomagnetic storms associated with the interaction were often observed.

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