

Primary analyses on super intense geomagnetic storm caused by interaction between coronal hole high speed stream and magnetic cloud

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It is well known that long duration of large southward interplanetary magnetic field is the primary cause of intense geomagnetic storms. There are variety sources of triggering intense southward interplanetary magnetic fields (IMF), and it has been an key problem on geomagnetic storm prediction. The typical source of Bz southward component is thought for coming from the internal magnetic field of coronal mass ejections (CMEs). Recently, there are a number of researches about another two sources of intense IMF Bz southward component. Both of them are caused by compression. One of them is caused by the compression between ICMEs, another is caused by the compression between ICME and slow speed solar wind. In this paper, we analyze another source of intense Bz southward component, that is the interaction between coronal hole high speed stream and magnetic cloud. Two super intense geomagnetic storms which took place in Oct. 22, 1999 (Dst= -237nT) and Aug. 24, 2005 (Dst= -216nT) were studied in this paper. Through analyzing the details of their interplanetary sources and their solar surface origins, we found that: the intense southward IMF Bz component which caused by the interaction between coronal hole high speed stream and magnetic cloud also can trigger super intense geomagnetic storm. This mechanism might be an important role triggering super intense geomagnetic storm in solar minimum.