

A Study on the Geo-effective Solar Eruptive Events

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It is well known that severe space weather is driven by solar eruptive events such as coronal mass ejections (CMEs) and flares. We have made a systematic search for possible solar events that lead to major geomagnetic storms (defined as Dst<=-100). The observational data used include (1) in-situ space solar wind plasma and magnetic observations in near-Earth space from ACE and WIND experiments, (2) solar CME observations from the LASCO (Large Angle and Spectrometric Coronagraph) on SOHO, (3) coronal observations from the EIT (Extreme Ultraviolet Imaging Telescope) on SOHO, and (4) other synoptic solar observations including flares and filament eruptions. Solar wind data are necessary in the identification process because it provides constraints on the duration of backward search window. It has been found that a major geomagnetic storm can be caused by (1) a single halo CME, (2) multiple halo CMEs, or (3) CIR (corotating interaction region). The properties of geo-effective solar events will be discussed.