
Can a halo CME from the limb be geoeffective?

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Abstract

The probability for a halo coronal mass ejection (CME) to be geoeffective is assumed to be higher the closer the CME launch site is located to the solar central meridian. However, events far from the central meridian may produce severe geomagnetic storms, like the case in April 2000. In this presentation, we show a study about the possible geoeffectiveness of full halo CMEs with the source region situated at solar limb. For this task, we select all limb full halo (LFH) CMEs that occurred during solar cycle 23, and we search for signatures of geoeffectiveness between 1 and 5 days after the first appearance of each CME in the LASCO C2 field of view. When signatures of geomagnetic activity are observed in the selected time window, interplanetary data are carefully analyzed in order to look for the cause of the geomagnetic disturbance. Finally, a possible association between geoeffective interplanetary signatures and every LFH CME in solar cycle 23 is checked in order to decide on the CME's geoeffectiveness. After a detailed analysis of solar, interplanetary, and geomagnetic data, we conclude that of the 25 investigated events, there are only four geoeffective LFH CMEs, all coming from the west limb. The geoeffectiveness of these events seems to be moderate, turning to intense in two of them as a result of cumulative effects from previous mass ejections. We conclude that ejections from solar locations close to the west limb should be considered in space weather, at least as sources of moderate disturbances.

Keywords: ICMEs, Geoeffectiveness

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