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Association of Geomagnetic Storms with Coronal Mass Ejections during 1997-2012

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Abstract : Coronal Mass Ejections (CMEs) are mostly reached on Earth from 1 to 5 days from the Sun. As a consequence, slow CMEs are accelerated toward the speed of solar wind and fast CMEs are decelerated toward the speed of the solar wind. Coronal mass ejections (CMEs) are bursts of solar material i.e. clouds of plasma and magnetic fields that shoot off the sun's surface. Other solar events include solar wind streams that come from the coronal holes on the Sun and solar energetic particles that are primarily released by CMEs. We have studied geomagnetic storms (DST ≤ - 80nT) during 1997-2012 with halo and partial halo coronal mass ejections and found that 73.28% CMEs (halo and partial halo coronal mass ejections) are associated with geomagnetic storms. The association rate of halo and partial halo coronal mass ejections are found 67.06% and 32.94% with geomagnetic storms respectively. We have also determined positive co-relation between magnitude of geomagnetic storms and speed of coronal mass ejection with correlation co-efficient 0.23.

Keywords : geomagnetic storms, coronal mass ejections (CMEs), disturbance storm time (Dst), interplanetary magnetic field (IMF)
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