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In this work, we explore the statistical correlation of the intensity of geomagnetic storm (Dst index) and southward magnetic component (Bs) with the magnetic parameters of the source region (Space - weather HMI Active Region Patch, SHARP parameters) in solar cycle 24. Recently, Shanmugaraju et al. (2023) studied the relationship of kinematic characteristics of a set of 60 halo coronal mass ejections (CMEs) with magnetic parameters of the source active region (using SHARP parameters) during the period 2010-2016 in solar cycle 24. The main aim of the present work is to find the connection between the magnetic parameters of the source region and geo-effectiveness. Out of 60 halo CMEs from the disk-central region (heliolongitude ± 45 degrees), 18 halo CMEs produced geomagnetic storms during the period of 2011-2015. The following results are obtained in this analysis: (i) active regions with strong and complex magnetic field structures are found to be associated with weak to intense storms (-6 to -223 nT) (ii) the intensity of storm increases towards western longitudes (?) as Dst = -1.21 (?) - 84.21. (iii) Significant correlations are found between some magnetic parameters of the source active region with intensity of storm and southward magnetic field component. (iv) Empirical relations are derived for strom intensity and southward magnetic component in terms of important source region magnetic parameters. Furthermore, we got good correlations for the speeds of interplanetary coronal mass ejection (VICME) and Bs with the Dst index. These findings reveal the Sun-Earth connection of certain events and give some clues on improving our ability to connect the intensity of geomagnetic storms with CME kinematics and source region magnetic parameters.
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