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Storm Time Geomagnetic Characteristics at Low Latitudes Under Varied Interplanetary Conditions

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Occurrence of solar transient eruptions is known to increase enormously during the solar maximum period. Solar cycle-23 evidenced many successive intense X-ray solar flares and coronal mass ejections (CME). Some of these emissions had large solar energetic particle events associated with them. Instabilities in sun's magnetic field in the form of twisting and shearing of magnetic field lines result in the release of tremendous amount of electromagnetic energy and mass. Transfer of solar energy into the Earth's magnetosphere takes place through the dominant mechanism of magnetic reconnection between interplanetary magnetic field (IMF) lines and geomagnetic field lines. The most favourable conditions for magnetic reconnection are prolonged southward orientation ($\sim$3 hrs) of IMF 'Bz' ($\sim$ -10 nT) and dusk-ward orientation of IMF 'By' component. Impact of shock driven by fast CMEs, on the magnetosphere leads to the generation of various current systems. Subsequently, perturbation in geomagnetic field is triggered, which is identified as geomagnetic storm phenomena. Interplanetary conditions play a crucial role in guiding the generation and development of geomagnetic storms. Effect of irregular variability of interplanetary conditions can be distinctly seen in ground magnetic records as each storm event differs from other. Present work deals with changing conditions of interplanetary magnetic field and solar wind characteristics with their effects as evidenced by the low latitude magnetic variation. Several intense storm events (Dstmin $<$ -150nT) of solar cycle-23 have been analyzed for ascertaining and interpreting the contribution from the meridional and zonal interplanetary magnetic field components in guiding the buildup of intense main phase.