
Correlative Study between Solar Flares, Disappearing Filaments, and Coronal Holes and Geomagnetic Indices

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In the present work we have made correlation studies between solar origins (X-ray flares, disappearing filaments, and corona holes) and geomagnetic indices (Storm Sudden Commencement(SSC) and daily mean Ap Index) using Solar Geophysical Data from 1975 to 1995. The event time of corona holes was set to the central meridian passage of the holes. The resulting cross-correlation analyses show that (1) the most probable traveling time from the Sun to the Earth is estimated to be about 40 hours for the solar major (X and M class) flares, about 80 hours for the disappearing filaments and unclear for the corona holes, (2) the most probable traveling time of solar X-ray flare strongly depends on its heliolongitude, (3) the most probable time delay between SSC and three hourly averaged geomagnetic ap index is about 1.5 days and (4) solar X-ray flares and coronal holes are correlated with Ap index which is preceded by SSC, while disappearing solar filaments are not. These findings will be interpreted and assessed in terms of geomagnetic activity prediction and identification of geo-effective solar origins.