Global Ionospheric Response to CIR/HSS Induced Geomagnetic Storms

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The solar wind is one of the main drivers for the thermosphere-ionosphere, affecting both long-term trends and short-term variability. In this study, we investigate the global ionospheric impact of high-speed solar wind streams/corotating interaction regions (HSS/CIR). Ten such events are identified between December 1st 2007 and April 16th 2008, based on solar wind speed, density and magnetic field measurements. Each event triggered a geomagnetic storm, highlighted by the temporal evolution of the SYM-H and AE geomagnetic indices. The ionospheric response to these storms is investigated using 28 globally distributed ionosonde stations, providing NmF2 and hmF2 measurements. Spectral peaks associated with 27-, 13- and 9-day periodicities are identified at most locations, highlighting the global nature of the ionospheric response. The amplitude of the ionospheric diurnal variability is also shown to vary, to a large extent correlated with the HSS/CIR induced geomagnetic storms.