

Effects of Converging Neutral Winds on Low and Mid Latitude Ionosphere During Geomagnetic Storms

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The effects of equatorward converging symmetric and asymmetric neutral winds on the low and mid latitude ionosphere during super geomagnetic storms are investigated using the Sheffield University Plasmasphere Ionosphere Model (SUPIM) observations. The investigation is for the super storms of 07-10 November 2004 when combined effects of the converging winds and multiple (and single) daytime eastward prompt penetration electric field (PPEF) events are observed in Ne, Nmax and TEC. The observations show (1) strong positive ionospheric storms in both north and south in the longitudes of converging symmetric winds, (2) strong positive storms in the hemisphere of equatorward winds in the longitudes of asymmetric winds, and (3) abnormal increase in plasma density over the equator soon after the end of PPEF. The model results qualitatively reproduce the observations, and reveal that the converging winds alone can produce stronger positive ionospheric storms than together with the PPEF. The effects on the low-mid latitude ionosphere of running the model (SUPIM) at 5-minute and 15-minute time-step during PPEF are also illustrated.