

Solar Activity Variations of Ionospheric NmF2

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Daily averaged solar EUV data from SEM/SOHO measurements from 1996-2005, solar proxies, and routine vertical sounding foF2 data now available at 20 stations in the East Asia/Australian sector are collected to investigate the solar activity dependences of the ionospheric peak electron density (NmF2). The SEM/SOHO solar EUV has a nonlinear relationship with F107 and can be better represented by the solar activity factor P=(F107+F107A)/2 than F107. Observations reveal that noon time NmF2 responds nonlinearly to solar EUV fluxes and P and the ionospheric saturation effect is presented in NmF2 with solar EUV, which suggests that the saturation effect in NmF2 can not be simply attributed to the nonlinear representation of EUV by F107. Seasonal and latitudinal differences are found in the solar activity variations of NmF2 in the East Asia/Australian sector, i.e., the F2-layer is generally more of solar sensitivity in equinoxes and winter than in summer and at low latitudes than at mid latitudes. Calculations confirm that neutral atmospheric consequences of solar activity variations may induce the ionospheric saturation effect and find that, besides solar EUV changes, atmospheric consequences and the ionospheric height changes with solar activity should substantially contribute to the solar activity variations of NmF2. This research was supported by the KIP Pilot Project (kzcx3-sw-144) of Chinese Academy of Sciences, National Natural Science Foundation of China (40574071) and National Important Basic Research Project (G2000078407).