

Ionospheric Variability During Low – Medium Solar Activity at a Low Latitude Station in Fiji

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The ionosphere supports satellite and navigational communications which is an important form of communication in the remote areas of the South Pacific region. However, the variability of the ionosphere due to the day – to – day, solar and geomagnetic variations affects the trans-ionospheric communication. The Total Electron Content (TEC) of the ionosphere using the dual frequency signals from the Global Positioning System (GPS) recorded at Suva (18.2° S, 178.4° E, Geomag. Lat. 22.1°S), Fiji, a low latitude station during the low to medium solar activity period from 2010 – 2012, has been analysed. The vertical TEC (VTEC) analysis for the diurnal, monthly and seasonal variations shows increasing values of VTEC with increasing phase of the solar cycle. The results show that the VTEC varies from a minimum at around 04:00 LT to a maximum at around 14:00 LT. Higher values of VTEC are observed during the hot and wet season compared to the cold and dry season. The variability index (ν) is introduced to examine the diurnal and seasonal variability of VTEC at this station during quiet and disturbed geomagnetic conditions. The results show greater variability during the local daytime with maximum variability occurring at noon around 14:00 LT and minimum variability at post mid-night at around 03:00 LT. Among the main sources of VTEC variability of solar photons, solar wind and meteorological parameters the meteorological factors seems to be the important source of variability at the tropical low latitude such as that of Suva as lightning activity is also maximum around noon time in Fiji.