

Variations of Total Electron Content over High Latitude Region during the 24th Solar Cycle

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Abstract : The effect of solar cycle and seasons on the total electron content has been investigated over high latitude region during 24th solar cycle (2010-2014). The total electron content data has been observed with the help of Global Ionospheric Scintillation and TEC monitoring (GISTM) system installed at Indian permanent scientific 'Maitri station' [70°46'00"S 11°43'56" E]. The dependence of TEC over a solar cycle has been examined by the performing linear regression analysis between the vertical total electron content (VTEC) and daily total sunspot numbers (SSN). It has been found that the season and level of geomagnetic activity has a considerable effect on the VTEC. It is observed that the VTEC and SSN follow better agreement during summer seasons as compared to winter and equinox seasons and extraordinary agreement during minimum phase (during the year 2010) of the solar cycle. There is a significant correlation between VTEC and SSN during quiet days of the years as compared to overall days of the years (2010-2014). Further, saturation effect has been observed during maximum phase (during the year 2014) of the 24th solar cycle. It is also found that Ap index and SSN has a linear correlation ($R=0.37$) and the most of the geomagnetic activity occurs during the declining phase of the solar cycle.

Keywords : high latitude ionosphere, sunspot number, correlation, vertical total electron content

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