

CHARACTERIZATION OF LOW LATITUDE GPS-TEC DURING CURRENT LOW SOLAR ACTIVITY PHASE AND IMPLICATIONS

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The low latitude ionosphere exhibits several variabilities such as diurnal, 27 days solar rotation, seasonal, annual, and solar cycle dependent variation. Apart from these, the atmosphere-ionosphere interaction is also responsible for dynamics and variability of electron density in different ionospheric regions. Total electron content (TEC) is an important parameter for characterization and modeling of low latitude ionosphere. GPS has provided us with an opportunity to study the ionosphere with better spatial and temporal resolution and coverage. The crest of equatorial ionization anomaly (EIA) exhibits maximum variability during quiet periods all over the globe. We analyze and present four years of GPS-TEC data from October, 2004 to October, 2008 recorded at Udaipur, near the crest of EIA in India, using a GPS receiver GSV4004A. The data has been analyzed only for the geomagnetically quiet periods and the results have been presented in terms of variation in the location of the EIA crest in Indian zone, from year 2004 to 2008 during decreasing solar activity and in terms of diurnal, monthly, seasonal and solar flux variation of low latitude TEC. Our study suggests that the crest of EIA has shifted equatorward with the declining solar activity. Substantial shift in the crest of EIA has important implications for systems like SBAS for GPS positioning, which use TEC models. Also, it indicates the variability in EEJ. From the statistical analysis of the data, it is found that the variation in TEC shows good correlation with solar 10.7 cm flux for the concerned period.

Total electron content, Global Positioning System, Equatorial ionization anomaly

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