



An assessment of ionospheric variations over the Indian region using NavIC during the recent solar minima

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Abstract: An assessment of the large scale ionospheric variations has been performed using multiple NavIC dual frequency receiver stations situated at various latitudes along a longitude over the Indian region. This study brings out the ionospheric variations from the almost Geo-stationary NavIC satellites in terms the mean diurnal, seasonal and latitudinal variations in Total Electron Content (TEC) as observed during the lowest solar activity period from January to December 2020. The characteristics of the observed NavIC TEC have been established using the dual frequency S band (2492.028 MHz) and L5 band (1176.45 MHz) measurements for the NavIC satellite with PRN3 located at 83° E longitude. The measurements were recorded by stationary dual frequency NavIC receivers. A total of six sites were selected for carrying out the study which are located at geographic latitude ~8.3°N, ~12.9°N, 17.0°N, 23.3°N, 28.5°N and 32.2°N along a longitude of ~77°E and thus covering the latitudinal geomagnetic latitude (~0°N up to ~24°N) Indian region. These selected sites enabled us to characterize not only the equatorial anomaly region but the below and above region also along a single longitude passing through almost middle of India. The results elucidate the nighttime VTEC enhancement as well as large night-to-night background variability only during the summer months of 2020 while establishing conformity with previous studies with respect to other morphological character of VTEC variations. The results report for the first time, the continuous, high-elevation stable point VTEC variations, which will be useful for model comparison and validation in various other Space weather and Ionospheric studies.

Keywords: Ionosphere, Total electron content, Equatorial anomaly, NavIC satellites, Low latitude ionosphere.