

ANALYSIS OF THE IONOSPHERIC CHARACTERISTICS IN THE INDIAN REGION FOR GNSS APPLICATIONS

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Abstract.

At equatorial latitudes the ionospheric activity can become a significant problem on GNSS systems. In order to analyze the equatorial ionospheric effects on satellite navigation systems, a 13-years dual frequency GPS dataset from 7 IGS stations located in the vicinity of the Indian region was processed. Maximum ionospheric TEC values and gradients, as well as rate of TEC (RoT) values were analyzed as a function of time, elevation and geomagnetic location.

Residual positioning errors may persist in regions of steep TEC gradients. At low latitudes (near the equatorial anomaly) and during periods of solar maximum an enhancement of large-scale TEC gradients is observed. In this paper, maximum temporal and spatial TEC gradients have been estimated and analyzed using IONEX Total Electron Content values.

Ionospheric irregularities can be detected and characterized by calculating the rate of TEC. In this paper RoT values were computed by differencing the phase measurements over 60 seconds after cycle slips removing. Mean, RMS, maximum and minimum RoT values were analyzed for different hours, months, year, elevations and geomagnetic locations in order to characterize and quantify the Indian ionospheric irregularities. Possible multipath effects will be taken into account when analyzing the results.