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Seasonal variation of solar flare induced GNSS TEC change over low latitude Indian region during peak of solar cycle 24

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Present work investigating the effect solar flares occurred during peak of solar cycle 24. Solar flares are an essential part of the solar cycle that took place in the sun's active area. The whole ionosphere is impacted by the solar flare's enhanced ionization. We have examined solar flares during peak of solar cycle 24 (2013, 2014 & 2015) and have analyzed X, M, and C-class solar flares events, with an emphasis on the GNSS induced DVTEC (Differential Vertical Total Electron Content) variability. In the ascending phase of 2013, the peak year of 2014, and the descending phase of 2015, we examined 520 solar flares in total. The goal of this research was to assess the seasonal variation of solar flares in TEC in the low latitude area GNSS services network station in Bangalore, India (geographic latitude 13.02oN, geographic longitude 77.57oE) with every day of the year 2013, 2014 and 2015 have been considered for the research of solar cycle 24 has had its TEC variation examined in this study. The findings include observations on seasonal variations of DVTEC, mean DVTEC values for equinoxes and winters across the years, and comparisons of VTEC variations between summer and winter seasons. Additionally, the study discusses the impact of solar activity on electron density distribution, particularly during solar maxima, and its correlation with Extreme Ultraviolet (EUV) flux. The results contribute to understanding the relationship between solar phenomena and GPS TEC variations. The neutral dynamic processes account for the higher ΔDVTEC during the equinox season. The modifications to the dissociation recombination process and vertical advection in the F layer caused the 2014 winter anomaly. The correlation between EUV flux and ΔDVTEC had the highest value (0.40) among the solar indices examined.

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