# Study of Total Electron Content And Electron Density Profile Using Cosmic Satellite Data During Geomagnetic Storms

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## ABSTRACT

Detail study of the ionospheric Total Electron Content (TEC) and electron density variations has been carried out using the COSMIC satellite data during geomagnetic storms in four different locations: South Atlantic Ocean (24˚W-14˚W, 25˚S-10˚S), Suriname and Guiana (53˚W-46˚W, 04˚N-14˚N), Tasman Sea (161˚E-165˚E, 42˚S-34˚S), and South Pacific Ocean (135˚W-120˚W, 39˚S-35˚S). The solar wind parameters (north-south component of inter planetary magnetic field, Bz, plasma velocity, $V_{sw}$, AE, Dst and Kp indices) were used to study the geomagnetic storms. The TEC and vertical electron density profiles with altitude have been studied for four different events of geomagnetic storms. The results reveal that TEC and the altitude of peak electron density are significantly affected by the strength of geomagnetic storms. The peak electron density is observed in altitude ranges of about 250 km - 300 km that vary with the geomagnetic storm. From the cross-correlation studies between interplanetary magnetic field, Bz and Kp, TEC and vertical electron density profile show that they are well correlated to each other's. The results also show that the solar wind parameters are the means of knowing ionospheric state of disturbances.

**Keywords:** Ionosphere, Total Electron Content, Electron density, Interplanetary magnetic field