

Study of Ionospheric Response to an Intense Geomagnetic Storm over Polar Regions

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During, the minimum phase of Solar Cycle 24, a few geomagnetic storms occurred in this year and the shock related to it arrived at Earth's magnetosphere, which resulted an intense storm of 26 August 2018¹. This storm is significant not only because of the extremely high magnetic activity, but also due to its great impact on the geo-magnetosphere. The ionospheric response to this storm has been investigated using 07 GPS receivers at the Polar Regions in Antarctica sectors. Analysis of GPS-TEC data during the geomagnetic storm found positive and negative storm effect over high latitudes. The enhancement in VTEC data before the commencement of the geomagnetic storm is observed over all the locations which is attributed to the pre-storm solar induced events like CMEs, proton events. Observed storm effects whether it is positive or negative during the period of geomagnetic storm could be caused by prompt penetration of electric field, disturbance dynamo electric field, neutral wind composition changes, and storm-induced wind lifting effects which are discussed in this paper.

Disturbance in ionospheric TEC during the geomagnetic storm is a major issue in navigation / aviation / communication application using GPS and other satellite communication system at high latitudes and advance knowledge of such disturbances is useful to improve them.

References

- [1] G. A. Mansilla, *et al.*, *Advances in Space Research*, **69(1)**,48-58, (2022).
- [2] A. O. Akala, *et al.*, *Space Weather*, **19**, e2021SW002734, (2021).

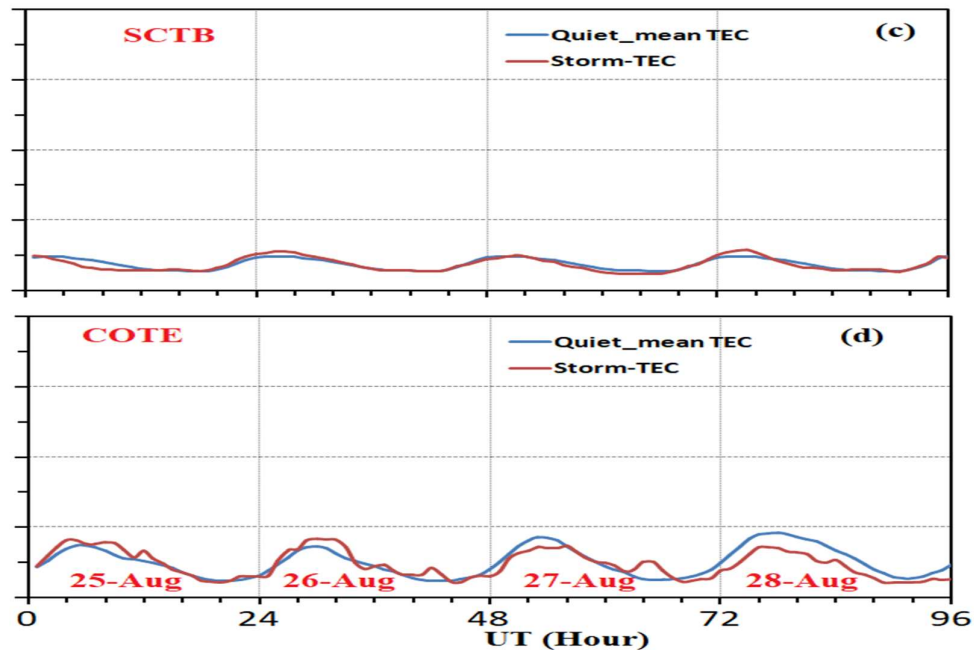


Figure 1: Variation of VTEC along with quiet mean VTEC in longitude sector $165^{\circ} \pm 5^{\circ}$ E. Quiet mean VTEC is estimated by taking average during 7 quiet days of August 2018. Figure shows variation of VTEC at low latitude for high latitude region at SCTB (c), COTE (d) in Antarctica.