



Investigation of Ionospheric Response to Geomagnetic Storms over a Low Latitude Station, Ile-Ife, Nigeria

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Abstract

Due to several complexities associated with the equatorial ionosphere, and the significant role which the total electron content (TEC) variability plays in GPS signal transmission, there is the need to monitor irregularities in TEC during storm events. The GPS SCINDA receiver data at Ile-Ife, Nigeria, was analysed with a view to characterizing the ionospheric response to geomagnetic storms on 9 March and 1 October 2012. Presently, positive storm effects, peaks in TEC which were associated with prompt penetration of electric fields and changes in neutral gas composition were observed for the storms. The maximum percentage deviation in TEC of about 120 and 45% were observed for 9 March and 1 October 2012, respectively. An obvious negative percentage TEC deviation subsequent to sudden storm commencement (SSC) was observed and besides a geomagnetic storm does not necessarily suggest a high scintillation intensity (S_4) index. The present results show that magnetic storm events at low latitude regions may have an adverse effect on navigation and communication systems.

Key words: geomagnetic storm, prompt penetration electric field, total electron content, scintillation, percentage deviation.