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Reliability of ionospheric models with the occurrence on TIDs over equatorial region

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Total Electron Content (TEC) plays an important role in the study of ionospheric behavior especially over equatorial region. Furthermore TEC can be determined easily from globally available GPS data where this method is well established among ionospheric researchers. This paper describes a reliability of ionospheric models compared with real data during the occurrence of traveling ionospheric disturbances (TID). GPS (Global Positioning System) data is taken from the Parit Raja station (1˚ 52' N, 103˚ 48' E) in the south of Malaysia. For the purpose of comparison, measurements are taken during geomagnetic quiet and storm days. Ionospheric models such as the IRI2001, NeQuick, and IONEX are used in this study. Simulation results are compared with measured TEC data, obtained from the dual frequency GPS receiver at the Parit Raja station as a reference. Results show that the occurrence of TID can be seen in the data collected from IONEX. However, due to the small number of earth stations used in IONEX , TEC value is less than the measured value from Parit Raja. For both models, IRI2001 and NeQuick, the predicted TEC is affected by the value of the sunspot number and are suitable for geomagnetic quiet condition. It is recommended that IRI and NeQuick models should include ionospheric disturbances for more reliable TEC calculations.