UNIVERSITI TEKNOLOGI MARA

OBSERVATION OF IONOSPHERIC SCINTILLATION AND TOTAL ELECTRON CONTENT (TEC) CHARACTERISTIC AT EQUATORIAL

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ABSTRACT

The Ionosphere is a layer of Earth's atmosphere located at 60 km to reach 1000 km from the Earth's surface. The Earth's ionospheric layer contains free electrons that affect the propagation of radio waves. Ionosphere scintillation and total electron content (TEC) measurement were investigated in terms of value at Equatorial based on GPS/GNSS measurement to verify the characteristic due to Equinox and Solstice season, month to month, day and night. However, this characteristic does not fully understand due to few studies performed. This research present the analysis month-to-month variation of Scintillation (S4) and Total Electron Content (TEC) based on during night time and day time activity. In this research also present the analysis of scintillation (S4) and Total Electron Content (TEC) during equinox and solstice phenomena. The analysis presented from January to December 2016. The measurement and recorded data of scintillation (S4) and Total Electron Content (TEC) was done by GPS Ionosphere Scintillation and TEC Monitoring (GISTM), installed at UKM, Malaysia (2.92°N 101.78°E). Strong Scintillation (S4) was obtained from PRN 135 with S4 $\geq$ 0.4 (0.430368) on 11:33 UTC (19:33 LT). The maximum Total Electron Content (TEC) was found on midday, generally the daily peak is around 5:00 to 10:00 UTC (13:00 to 18:00 LT). April shows that the highest Total Electron Content (TEC) about 152 TECU. For Equinox and Solstice phenomena, Scintillation (S4) and Total Electron Content (TEC) highest on equinox and lowest on solstice. The disturbance will cause error in distance measurement for positioning and navigation.

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