

SENSING OF THE IONOSPHERE DYNAMICS OVER THE INDONESIAN REGION USING GNSS OBSERVATIONS

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Abstract: Network of ground-based GNSS (Global Navigation Satellite System) receivers has been widely used to sensing the Earth's ionosphere with high spatio-temporal resolution. GNSS can accurately observe total electron content (TEC) which is one of the important ionospheric parameters. By continuously observing such parameter, ones could be able to investigate the ionosphere dynamics.

This research investigates spatio-temporal variations in Vertical-TEC (VTEC) observed by receivers at two IGS stations: NTUS (Longitude (E) 103.6799, Latitude (N) 1.3458, and Height (m) 79.0000) and BAKO (Longitude (E) 106.8500, Latitude (N) -6.4900, and Height (m) 158.1800). Correlation of VTEC with solar activity is also be investigated. The used GNSS data at NTUS station are from January 2008 to December 2012, while those at BAKO station are from January 2010 to December 2012.

Results from the data processing indicate that solar heating affects the ionosphere and it is found that the value of VTEC varies highly. At both stations minimum TEC values (~25 TECU) occurs between 04:00 to 05:00 LT, while maximum ones (~80 TECU) occurs in between 14:00 to 16:00 LT. Correlation with the sunspot number showed a positive correlation with the coefficient is 0.922 for NTUS and 0.77 for BAKO stations. The results also indicate that there are several scintillation phenomena. In general, the ionosphere activity is increasing during the period of 2008 – 2012.

Keyword : Ionosphere, GNSS, TEC, Sunspot Number