

Analysis of Ionosphere Anomaly Before Great Earthquake in Java on 2009 Using GPS Tec Data

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Abstract : Ionosphere's anomalies as an effect of earthquake activity is a phenomenon that is now being studied in seismo-ionospheric coupling. Generally, variation in the ionosphere caused by earthquake activity is weaker than the interference generated by different source, such as geomagnetic storms. However, disturbances of geomagnetic storms show a more global behavior, while the seismo-ionospheric anomalies occur only locally in the area which is largely determined by magnitude of the earthquake. It show that the earthquake activity is unique and because of its uniqueness it has been much research done thus expected to give clues as early warning before earthquake. One of the research that has been developed at this time is the approach of seismo-ionospheric-coupling. This study related the state in the lithosphere-atmosphere and ionosphere before and when earthquake occur. This paper choose the total electron content in a vertical (VTEC) in the ionosphere as a parameter. Total Electron Content (TEC) is defined as the amount of electron in vertical column (cylinder) with cross-section of 1m² along GPS signal trajectory in ionosphere at around 350 km of height. Based on the analysis of data obtained from the LAPAN agency to identify abnormal signals by statistical methods, obtained that there are an anomaly in the ionosphere is characterized by decreasing of electron content of the ionosphere at 1 TECU before the earthquake occurred. Decreasing of VTEC is not associated with magnetic storm that is indicated as an earthquake precursor. This is supported by the Dst index showed no magnetic interference.

Keywords : earthquake, DST Index, ionosphere, seismoionospheric coupling, VTEC

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