



## **Ionospheric Total Electron Content Variability due to the North Sumatra Earthquake of 26 December 2004**

M. Abdullah(1), M. H. Jusoh(1), A.F.M. Zain(2), S. Abdullah(2), Z. A. Rhazali(3), M. J. Homam(2)

(1) Department of Electrical, Electronic and Systems Engineering, Faculty of Engineering, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia, (2) Wireless and Radio Science Centre (WARAS), Tun Hussein Onn University College of Technology, 86400 Parit Raja, Johor, Malaysia, (3) Faculty of Engineering Universiti Tenaga Nasional, 43009 Kajang, Selangor, Malaysia

The anomalous electric field penetrating into the ionosphere affects the electron concentration that can be measured experimentally from the ground by an ionosonde or a dual frequency Global Positioning System (GPS) receiver. This effect has been detected, and statistically proven, that several days before the seismic shock, the level of the change of electron concentration increases at the station closest to the epicenter. This paper reports on the variability of the total electron content (TEC) during the North Sumatra earthquake of 26 December 2004 with a magnitude of 9.3 Richter scale. TEC is measured 7 days before and 6 days after the earthquake, i.e. is from 19 to 31 December 2004. The GPS data is taken from the Malaysian Mapping and Geodesy Department located in the north of Malaysia, Lat.  $4^{\circ} 6' N$ , Long.  $99^{\circ} 48' E$  near North Sumatra. Four sets of data are selected from different GPS satellites that passed near the earthquake location. The early morning and nighttime TEC are plotted to see their variations before and after the earthquake. The geomagnetic  $K_p$  index is also reported to evaluate the geomagnetic activity during the observation period. Results show that earthquake precursors can be seen at nighttime and early morning beginning from 21 December 2004, which is five days before the occurrence of earthquake until one day before the earthquake, which is on 25 December 2004. The results show a good agreement with other researchers who studied other earthquakes.