

CASE STUDY OF THE TEC ANOMALY OBSERVED BEFORE THE NEW ZEALAND EARTHQUAKE OF NOV. 22, 2004 USING NUMERICAL MODELING

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An attempt has been made to find out and reproduce in the model calculations the main features of the TEC (total electron content) disturbances prior to the strong seismic event of Nov. 22, 2004, 20.26UT (07.26LT), New Zealand (46.69 S; 164.78 E), M 7.1, D=10 km as possible pre-earthquake signatures. Seismo-ionospheric TEC anomalies have been defined as deviations of current values from the running medians and detected on the basis of the Global Ionosphere Maps (GIM, <ftp://cddisa.gsfc.nasa.gov/pub/gps/products/ionex/>). During Nov. 21, 2004 there has been a decrease of the TEC in the area shifted from the epicenter position to the north-west and the opposite sign TEC variation in the area disposed north-eastwards from the TEC-decreased region. Similar effects are also manifested at the magneto-conjugated areas but they are weaker in magnitudes. These TEC disturbances disappear in the day of the shock seismic event.

In assumption that electric field of seismic origin is the principle reason for the observed anomalous TEC disturbances we have carried out a series of calculations by means of the global 3D first-principle numerical self-consistent Earth's Upper Atmosphere Model (UAM). We have testified different types and spatial configurations of the additional electric field sources and have found out the ones revealing the best agreement with the observed TEC anomalies.

seismo-ionospheric earthquake precursors, seismogenic electric field

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