

### 3D Structure of Ionospheric Disturbances Related to Large Earthquakes

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In this paper we have investigated the geomagnetic storms and Earthquake-related ionospheric disturbances. Following geomagnetic storms, the ionospheric peak electron density ( $N_{max}$ ) and total electron content (TEC) often increase or decrease very much from their quiet-time levels. These increase/decrease are known as positive and negative ionospheric storms. This paper deals with some extremely significant geomagnetic and Earthquake-related events in between 2000 and 2013 which involving positive and negative ionospheric variations having immense importance to space weather, with reference to TEC maps derived from a dual-frequency GPS receiver network (GEONET: GPS Earth Observation Network) built by the Geospatial Information Authority of Japan (GSI), as well as foF2 and hmF2 (maximum electron density height) derived from four ionosonde observatories in Japan and GNSS-RO data from COSMIC mission of NOAA/NSPO(USA-Taiwan joint mission). For comparison and discrimination of stormy and large Earthquake days, a 3D Structure of Ionosphere will be discussed in the presentation.

Keywords: Tomography, Ionospheric Disturbances, Geomagnetic Storms, Earthquakes, TEC