



## **Assessment of Ionospheric Anomaly Prior to the Large Earthquake: 2D and 3D Analysis in Space and Time for the 2011 Tohoku Earthquake (Mw9.0)**

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The ionospheric anomalies possibly associated with large earthquakes have been reported by many researchers. In this paper, Total Electron Content (TEC) and tomography analyses have been applied to investigate the spatial and temporal distributions of ionospheric electron density prior to the 2011 Off the Pacific Coast of Tohoku earthquake (Mw9.0). Results show significant TEC enhancements and an interesting three dimensional structure prior to the main shock. As for temporal TEC changes, the TEC value increases 3 [U+FF0D] 4 days before the earthquake remarkably, when the geomagnetic condition was relatively quiet. In addition, the abnormal TEC enhancement area in space was stalled above Japan during the period. Tomographic results show that three dimensional distribution of electron density decreases around 250 km altitude above the epicenter (peak is located just the east-region of the epicenter) and increases the mostly entire region between 300 and 400 km.