



Spatial and Temporal Characteristics of the Pre-Seismic Ionospheric Anomaly and Post Solar-Terrestrial Event over Japan

Sanaka Saito (1), Katsumi Hattori (2), Chie Yoshino (3), and Jann-Yenq Liu (4)

(2) Chiba University, Graduate School of Science, Chiba, Japan (hattori@earth.s.chiba-u.ac.jp), (1) Chiba University, Graduate School of Science and Engineerings, Chiba, Japan (aena1927@chiba-u.jp), (4) National Central University, Taiwan (tigerjyliu@gmail.com), (3) Chiba University, Graduate School of Science, Chiba, Japan (chie@earth.s.chiba-u.ac.jp)

There are many reports on Ionospheric electron distribution anomalies possibly related to large earthquakes. In this paper, Total Electron Content (TEC), Ionosonde, 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 3-4 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. The Ionospheric electron distribution caused by solar-terrestrial events have been also analyzed. Detail characteristics and differences will be shown in the presentation.