Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

PEM32-P17 Room:Convention Hall Time:May 23 17:15-18:15

The observation of plasmapause using topside TEC data by LEO satellite

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The plasmasphere was observed using the TEC data which derived from the ground based GPS receivers and the GPS receivers on board the low earth orbit satellites.The plasmasphere react the geomagnetic activity directly. During geomagnetic disturbed time, the plasmasphere shrinks and the location of plasmapause move to lower latitude region immediately. IMAGE satellite revealed that the distribution of helium ion in the plasmasphere by EUV imager. CREES satellites observed that the plasmapause move to lower latitude region during geomagnetic disturbed time. In preceding study, the topside TEC data which derived from the low earth orbit satellites observed the plasmapause and the Storm Enhanced Density (SED). It is difficult to observe that the altitudinal structure of the plasmapause and the SED, because TEC data and images is the integrated to the electron density and the intensity. Our purpose is to reveal the altitudinal structure of the plasmapause and the SED. TEC data between LEO satellite and GPS satellite (LEO-TEC) is the integration value of the electron density in plasmasphere and topside ionosphere. The mid-latitude TEC enhancement was observed by TEC data which derived from GRACE satellites and COSMIC satellites. the amplitude of the mid-latitude TEC variation was compared using GRACE-TEC data and COSMIC-TEC data.

The mid-latitude variation was observed at 8:29UT on June 15, 2006. The TEC enhancement which observed by GRACE satellite appeared at 60N, 129E and the amplitude of that was about 1.8TECu. The TEC enhancement which observed by COSMIC appeared at 60N, 135E and the amplitude of that was about 1.5TECu. This result indicates that there was much contribution of the ionosphere in the mid-latitude TEC enhancement.

Keywords: plasmasphere, TEC, LEO satellite