A study on ionospheric irregularity observed over Japan during geomagnetic storm on Novermber 10, 2004

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Ionsopheric irregularity observed over Japan during geomagnetic storm was studied with ground-based GPS data, and in-situ measurements data. Plasma instability can cause ionspheric irregularity at middle- and low- latitude. Penetration of electric field or advection of plasma into the middle-latitudinal region from higher or lower latitude can contribute to plasma instability. In a geomagnetic storm on November 10, 2004, Dst reached -289nT at 0900UT. Perturbation of Total electron contents (TEC) was observed with ground-based GPS receivers network named as GPS Earth Observation Network (GEONET). Amplitude of the perturbation was 20TECU(TECU=10^{16}/m^2). The perturbation started after the sunset which was 1030UT, and lasted until 2000UT. The perturbation was also seen in Australia, which located at the geomagnetic conjugate point of Japan. The characteristic is similar to that of medium-scale traveling ionospheric disturbance. The area where the TEC fluctuation was observed was between 160E and 120E. In this area, fluctuations of ion density were observed with the DMSP satellites, which flew 850km altitude. TEC enhancement was observed after the sunset with GEONET data. This TEC enhancement could contribute to plasma instability that could generate the TEC disturbance.