

Observation of total electron content derived from GEONET data

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Absolute values of total electron content (TEC) have been studied with more than one thousand of GPS receivers of GEONET in Japan.

Subtracting biases from original data, we can derive absolute value of TEC over Japan in every 30 seconds with about 25km spatial resolution. These high resolution TEC data reveal that a large scale traveling ionospheric disturbance (LSTID) which was up to 600m/s and southward during geomagnetic disturbance on September

22, 1999. And an anomalous enhancement of TEC was also appeared. We will discuss the physical mechanism of these temporal and spatial variations of TEC.

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Total electron content (TEC) along the path between a GPS satellite and a receiver is obtained from the velocity difference of two-frequency carrier waves. These values of TEC, however, contain instrumental biases of each satellite and receiver. We estimate these biases for each satellite-receiver pair with the least squares method. The absolute value of TEC estimated with this method is found to agree with integration of electron density measured with the MU radar, and their diurnal variation is found to be similar to diurnal variation of foF2. Subtracting biases from original data, we can derive absolute value of TEC over Japan in every 30 seconds with about 25km spatial resolution. These high resolution TEC data reveal that a large scale traveling ionospheric disturbance (LSTID) which was up to 600m/s and southward during geomagnetic disturbance on September 22, 1999. And an anomalous enhancement of TEC was also appeared. We will

discuss the physical mechanism of these temporal and spatial variations of TEC with other observational techniques, such as networks of ionosondes and magnetometers. Validity of the derivation method of TEC values are also evaluated using the other observations.