

Three-dimensional structure of Storm Enhanced Density derived from GPS ionospheric tomography.

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Storm Enhanced Density (SED) is the phenomenon in the mid-latitude region during the geomagnetic storm period. The high density region of electron extends toward the northeast direction during geomagnetic disturbances occurs. SEDs have observed by ground-based GPS receivers and Millstone Hill IS radar. There are few observation of three-dimensional structure of SEDs because it is difficult to observe the whole structure over North America. SED over North America were studied with the three-dimensional distribution data of the electron density derived ionospheric tomography. The tomography algorithm uses the TEC (Total Electron Content) data observed by the ground-based GPS receivers. Hyper parameters in the algorithm were decided by ABIC (Akaike Bayes Information Criterion). Three-dimensional structure of SED derived from GPS ionospheric tomography were compared with electron density distribution observed by the Millstone Hill IS radar. The mechanism of SED was studied from the result of tomography.

Keywords: ionosphere, tomography, Storm Enhanced Density, Total Electron Content