S001-33 **会場: A** **時間: 11 月 25 日 12:05-12:20**

あらせ衛星と GNSS-TEC 観測データを用いた磁気嵐時のプラズマ圏・電離圏の時空間変動について

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Temporal and spatial variations of storm-time plasmasphere and ionosphere using Arase satellite and GNSS-TEC observation data

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In order to investigate characteristics of temporal and spatial variations of the plasmasphere and ionosphere during a geomagnetic storm, we analyze the 5-min average Global Navigation Satellite System (GNSS)-TEC data together with solar wind, interplanetary magnetic field, geomagnetic field, and electron density in the inner magnetosphere and ionosphere obtained from Arase High Frequency Analyzer (HFA) (subcomponent of Plasma Wave Experiment (PWE)) observation data. The electron density along the Arase satellite orbit is determined with high time resolution of 1 or 8 seconds from the upper limit frequency of the upper hybrid resonance (UHR) waves. In calculating the electron density, we use 8-sec spin-average total magnetic field intensity data obtained from the Magnetic Field Experiment (MGF) instrument. On the other hand, to identify the location of the mid-latitude trough minimum during a geomagnetic storm, we first subtract an average TEC data of 10 geomagnetically quiet days in April from the storm-time TEC data. As a next step, we identify a minimum value of the subtracted TEC in the mid-latitudes as a trough minimum in a TEC keogram. As a result, the location of the mid-latitude trough minimum moves equatorward from 60 to 48 degrees in geomagnetic latitude (GMLAT) within 4 hours after the onset of the main phase of the geomagnetic storm. The movement speed increases from 1.3 to 3.5 degrees of geomagnetic latitude per hour after the onset of a storm-time high-latitude geomagnetic disturbance. The enhancement of the speed means an abrupt shrink of the plasmasphere due to a sudden enhancement of convection electric field in the inner magnetosphere associated with the geomagnetic disturbance. The location of the nighttime mid-latitude trough is in good agreement with that of an abrupt drop of electron density in the inner magnetosphere detected by the Arase satellite. In this case, the electron density profile along the Arase orbit shows an irregular variation near the plasmapause. The geomagnetic longitude distribution of the location of the mid-latitude trough minimum shows a significant variation with a scale of 1000 – 2500 km. The feature can be found during a quiet time, but the pattern of the longitudinal variation is different between the storm and quiet times. This phenomenon has not yet been reported by previous studies due to limitations in the coverage density of GNSS receiver networks. After the start of the recovery phase of the geomagnetic storm, the location of the mid-latitude trough minimum rapidly moves poleward back to the quiet-time location within 4 hours in a geomagnetic longitude range of 310 – 360 degrees in geomagnetic longitude. The average speed of the poleward movement is 2.3 degrees of geomagnetic latitude per hour.