

HF Doppler 多点観測による磁気嵐の夜側過遮蔽電場

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Night-side overshielding electric fields during the geomagnetic storm as observed with HF Doppler sounders

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Prompt penetration electric field on the night-side was investigated using HF Doppler sounders (HFDs) at multipoint during the intense geomagnetic storm on 22-23 June, 2015. The storm was initiated by a storm sudden commencement at 1833 UT and immediately after that, storm main phase developed and reached a minimum SYM-H of -207 nT. The global magnetometer networks, NICT chain, INTERMAGNET showed that the DP2 currents and equatorial electrojets (EEJs) developed on both the day- and night-sides during the storm main phase. The global ionospheric current suddenly decreased during the time period of 1950 UT to 2010 UT because of the sudden northward turning of the interplanetary magnetic field. We found anomalously strong overshielding electric fields on the nightside at the beginning of the recovery phase based on the HFD observations in Iidate, Japan (0500 MLT) and Prague, Czech (2130 MLT). The overshielding electric field was eastward with the intensity of 9.9 mV/m at Iidate and 14.8 mV/m at Prague and the duration was about 17 minutes. On the other hand, the midlatitude SuperDARN radar in the American sector (Blackstone) observed anti-sunward plasma flows at latitudes lower than 47 degrees GM after 2010 UT, equatorward of the expanded dusk convection cell, indicating that the overshielding occurred due to the northward excursion of the IMF. It is remarkable that the overshielding caused westward counter-electrojet (CEJ) at the dayside equator and eastward equatorial electrojet (EEJ) on the nightside. Based on the HF radio and magnetometer observations, we suggest that the intense overshielding electric field penetrated near-instantaneously to the mid- and low-latitudes and caused the EEJ/CEJ on both the day- and night-sides during the geomagnetic storm.