

Overshielding of the Convection Electric field in the sub-aural ionosphere

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Using magnetometer data from the polar cap to mid-latitudes (IMAGE, INTERMAGNET) and SuperDARN radar data, we have examined development of the shielding electric field in the ionosphere for the event of February 8, 2000. The shielding electric fields caused overshielding at magnetic latitudes lower than 65 degrees at 18 MLT after the DP2 current developed for 2.5 hours. We found that the eastward electrojets and sunward plasma flow were enhanced at auroral latitudes between 66 and 71 degrees, concurrently with the overshielding at mid latitudes. The overshielding has been attributed to reduction in the electric field at auroral latitudes due to northward turning of the interplanetary magnetic field (IMF). However, the overshielding event we analyzed was associated with enhancement of the electric field. It is suggested that sudden development of the Region-2 field-aligned currents (R2 FACs) caused both the overshielding at mid latitudes and the enhanced plasma flow in the auroral ionosphere. The development of the R2 FACs might be associated with the substorm that occurred in the midnight.