

Penetration of high Latitude ionospheric electric Field to the equatorial Region: a Case Study based on SuperDARN Data and the IMech Model

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In a recent paper, Huang et al. (JASTP, 2007) described in detail, for the April 5, 2003, event, the penetration of the interplanetary electric field to the equatorial ionosphere as measured by the Jicamarca incoherent radar. On this event, we reconstructed and carefully examined all SuperDARN convection maps in the 1400-2200 UT time period for the southern and northern hemispheres and calculated as a function of time the southern and northern Cross Polar Cap Potentials (CPCP's). We find a clear correlation between the SuperDARN CPCP and the Jicamarca electric field observations, confirming the possible penetration of high latitude ionospheric electric field to the equatorial region. Moreover, we performed a reconstruction of the global ionospheric potential using the IMech model for two 2 min periods during the event, corresponding to a maximum and a minimum of the equatorial electric field measured at Jicamarca. For that purpose, we fed field aligned currents computed from SuperDARN data to the IMech model. Such reconstruction shows equatorial an increase of the modelled equatorial electric field of 0.25 mV/m, which is in agreement with the electric field increase by 0.3 mV/m observed at Jicamarca