



Mapping of ionospheric convection cell from multi-stations atmospheric measurements during magnetic disturbances over Antarctica: A case study

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The Potential Gradient (Δ PG) associated with the ionospheric convection pattern established by the interaction of the solar wind with the Earth's geomagnetic field over Vostok ($78^{\circ} 27' S$, $106^{\circ} 52' E$), Dome C ($75^{\circ} 06' S$, $123^{\circ} 20' E$) and Maitri ($70^{\circ} 45' S$, $110^{\circ} 44' E$) is presented in this work. The paper reports for the first time, the comparison of the contemporary observations of atmospheric electric field from two polar stations and one sub-auroral station from 2010 to 2011. Observations show that the amplitude of change in Potential Gradient (Δ PG) is higher in polar cap than the sub-auroral station. The observed PG and ionospheric potential obtained from the model is highly pronounced on the dawn side and negative perturbation on the dusk side of the magnetic polar caps. For sub-auroral station Maitri, the mapping is evident only on severe magnetic disturbances. The ionospheric convection is confined to polar cap by shielding charges in the Alfvén layer of the magnetosphere. But during rapid changes, it causes a temporary imbalance in these shielding charges and the high latitude field can cause immediate effects in the ionosphere at sub-auroral region. The intensity of perturbation seems to be related to the propagation of magnetosonic waves.