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Response of polar cap convection and boundary to the changing IMF conditions

A. T. Aikio (1), J. M. Ruohoniemi (2), D. Fontaine (3), I. Dandouras (4), A. Kozlovsky (5), K. Mursula (1), and A. Fazakerley (6)

(1) University of Oulu, Department of Physical Sciences, P.O. Box 3000, 90014 University of Oulu, Finland (anita.aikio@oulu.fi), (2) The Johns Hopkins University Applied Physics Laboratory, Laurel MD, USA, (3) CETP/UVSQ, Velizy, France, (4) CESR/CNRS, Toulouse, France, (5) Sodankyla Geophysical Observatory, Sodankyla, Finland, (6) Mullard Space Science Laboratory, University College, London, UK

The high-latitude and polar ionosphere is monitored by the EISCAT VHF (Tromso) and ESR (Svalbard) radars on February 27, 2004, 19 -24 UT. The VHF radar is pointed at low elevation to the north, the ESR 42m antenna measures in the field-aligned direction and the 32m antenna is directed at low elevation to the north, to the central polar cap. The radar data is used for locating the polar cap boundary and its motions. The polar cap boundary fluctuates between 2000 and 2110 UT, during southward IMF conditions. As a result of a northward turning of the IMF, the boundary starts to move poleward. During the northward IMF conditions, a change from positive to negative By together with an increase in the solar wind density takes place at about 2230 UT. The IMF change is related to a sudden change in the ionospheric conditions of the polar cap: the dense cold plasma disappears from the field of view of the ESR and it is replaced by thin warmer plasma. Additional data are provided by Cluster and SuperDarn. Between 2200 and 2230 UT the Cluster s/c pass the latitude region of the EISCAT radars (slightly eastward) at an altitude of about 4.5 Re. The convection electric field as well as electron and ion particle boundaries from Cluster will be compared to those determined from the ground. The SuperDarn radar and IMF data are fed to the APL convection model, which produces the global convection map and estimate of the cross-polar potential. All these data are used to build up a global and local (in the vicinity of Svalbard) picture of the response of convection, polar cap boundary and plasma properties to the changes in the IMF.