

POLAR CAP IONOSPHERIC CONVECTION AND FIELD-ALIGNED AURORAL CURRENTS DURING RECURRENT BAY EVENTS

PETER STAUNING (1), Oleg Troshichev (2), Alexander Janzhura (2)

1 Danish Meteorological Institute, Copenhagen, Denmark

2 Arctic and Antarctic Research Institute, St. Petersburg, Russia

The relations between polar cap ionospheric plasma convection and field-aligned auroral currents have been investigated for a large number of well-defined magnetic bay or substorm occurrences during 1995-2005 on basis of ground-based magnetometer observations supplemented by data from the polar orbiting Oersted and CHAMP satellites. A particular group of events occurring during steady solar wind conditions has been isolated. This group comprises the so-called “saw-tooth” events of recurrent disturbances occurring during strong and steady forcing of the magnetosphere by the solar wind. During such steady solar wind conditions the magnetic bay or substorm-related depressions and enhancements of convection intensities, as expressed by the polar cap (PC) index, to the solar wind electric field are more pronounced than during average substorm conditions. When adjusted for the varying convection level and direction the disturbance patterns are remarkably similar during sequences of these events and provide the basis for a detailed study of the spatial and temporal development of related ionospheric and field-aligned currents. The implications of these results for the modelling of solar wind-magnetosphere interaction processes are discussed.

Polar cap convection, auroral currents, substorms

Peter Stauning, Danish Meteorological Institute, Lyngbyvej 100, DK-2100 Copenhagen, Denmark. e-mail: pst@dmi.dk, phone: +45 39157473