



Transpolar ionospheric currents derived from Ørsted and from ground

P. Stauning (1), J. Watermann (1), O. Troshichev (2)

(1) Danish Meteorological Institute, Copenhagen, Denmark, (2) Arctic and Antarctic Research Institute, St. Petersburg, Russia (pst@dmi.dk / Phone: + 45 39157473)

The concept of deriving transpolar currents from using Ampère's integral law on magnetic precision measurements conducted from polar orbiting satellites, originally introduced by Suzuki and Fukushima [1982] based on Magsat data, was used in a modified form by Stauning and Primdahl [2000] using data from the Ørsted satellite. In short the observations revealed the transpolar Pedersen currents linking the downward field-aligned current (FAC) at the morning side of the polar cap to the upward FAC emerging from the evening side. It was also shown that these currents are proportional to the solar wind merging (or geoeffective) electric field (MEF) taking into account the seasonally varying ionospheric conductivities. In the central polar cap the geomagnetic perturbations measured from ground are mainly related to the transverse Hall currents in the ionosphere. A parameter to describe these currents is the Polar Cap (PC) index originally introduced by Troshichev and Andrezen, [1985] in order to derive the merging electric field on basis of available ground-based polar magnetic observations. The presentation shall briefly outline the derivation of transpolar currents from polar orbiting satellite observations and the calculation of PC index from ground-based geomagnetic observations: PC-North from Thule and PC-South from Vostok data (Troshichev et al., 2006). The transpolar Pedersen currents and the PC indices are compared to each other and to values of the merging electric field derived from ACE interplanetary satellite observations.