Geophysical Research Abstracts
Vol. 15, EGU2013-3042, 2013
EGU General Assembly 2013

Modelling probability distributions of vorticity in the polar ionosphere and its use in estimating the probability of extreme field-aligned currents

Gareth Chisham and Mervyn Freeman
British Antarctic Survey, Cambridge, United Kingdom (gchi@bas.ac.uk, +44 1223 221532)

Spatiotemporal variations of ionospheric vorticity are a measure of the dynamical coupling of the magnetosphere to the ionosphere via field-aligned currents (FACs). We have determined probability distributions of ionospheric vorticity using 6 years (2000-2005) of measurements from 6 SuperDARN radars in the northern hemisphere and shown that the spatial variation of these probability distributions is well organised according to the well-established large-scale magnetic field-aligned current (FAC) structure in the polar ionosphere. The distributions at all locations are highly leptokurtic and can be well modelled by either q-exponential or Weibull probability distributions, depending on location. We show how the parameters of these model distributions vary across the polar ionosphere. These model distributions can be used to estimate the probability of occurrence of extreme vorticity, and hence of extreme FACs, in the different large-scale FAC regions.