



## **Investigation of temporal stability of magnetic and electric fields in the auroral region**

Tomas Karlsson and Per-Arne Lindqvist

KTH Royal Institute of Technology, Department of Space and Plasma Physics, School of Electrical Engineering and Computer Science, Stockholm, Sweden (tomas.karlsson@ee.kth.se)

Cluster data from ten years' worth of aurora oval crossings are used to quantify the temporal variations of magnetic field signatures of field-aligned currents (FAC), and associated electric fields. The method is based on the cross-correlation between pairs of spacecraft as a function of the temporal separation of the auroral crossings by the respective spacecraft. When the method is applied to the large-scale variations of magnetic fields associated with whole auroral passes, it gives results consistent with those of earlier studies using smaller data sets. The electric field is shown to have lower correlations, indicating that the electric field is less temporally stable. We then apply the method to study the temporal stability of the fields as a function of latitude, local time, and the scale size of the field variations. The use of a variation of this method to discriminate between temporal and spatial variations is discussed.