

# **Magnetosphere-ionosphere coupling initiated by dynamo action downstream of the cusp: An ACE-Wind-Cluster-FAST coordinated study**

**E. J. Lund** (1), C. J. Farrugia (1), P. E. Sandholt (2)

(1) Space Science Center, University of New Hampshire, Durham, USA, (2) Physics Department, University of Oslo, Norway (Eric.Lund@unh.edu / Fax: +1-603-862-0311)

In a pilot study, we have documented the occurrence of strong momentum transfer on old open field lines at high magnetopause latitudes downstream of the cusp. Field-aligned currents then couple this momentum to the ionosphere where they give rise to a flow channel whose associated Hall current causes magnetic variations at high latitudes (Svalgaard-Mansurov effect). This is a new element in M-I coupling studies in as much as it does not depend on the  $j \times B$  tension force associated with newly opened field lines. In this work we seek further confirmation of this mode of momentum transfer by examining signatures recorded at two altitudes by Cluster and FAST. Five years of Cluster data were surveyed when the spacecraft were traversing the poleward region of the cusp, and where simultaneously the spacecraft were in close magnetic conjunction with FAST. We discuss here three cases from this survey. The spacecraft data are supplemented by ground-based observations where necessary. The control of the strength of this coupling mode by the IMF is also investigated. This work places on a stronger foundation the results on M-I coupling reached in the pilot study.