



## Oxygen ion outflow observed at high altitude

**M. Waara** (1), H. Nilsson (1), S. Arvelius (1), O. Marghitu (2), M. Yamauchi (1), G. Stenberg (3), M. André(3), H. Réme (4), I. Dandouras (4), M. B. Bavassano-Cattaneo (5), G. Paschmann (6), A. Korth (7), L. M. Kistler (8), G. K. Parks (9)

(1) IRF-Kiruna, Sweden, (2) ISS, Bucharest, Romania; also at MPE, Garching, Germany, (3) IRF-Uppsala, Sweden, (4) CESR, Toulouse, France, (5) IFSI, Roma, Italy, (6) MPE, Garching, Germany, (7) MPS, Lindau, Germany, (8) UNH, Durham, New Hampshire, USA, (9) SSL, Berkeley, California, USA

(martin.waara@irf.se / Fax: +46 980-79050 / Phone: +46 980-79115)

The results of a case study of significant perpendicular heating of oxygen ion using Cluster data obtained at high altitude above the polar cap are reported. The questions we want to answer with this case study are: What are the structures and physical mechanisms for such heating? In this case study high altitude, heated oxygen data is observed. The perpendicular temperature for oxygen is at least twice as big as the parallel temperature and the ratio remains similar for a comparatively long time, 20 minutes. The long case is compared with some of the shorter cases. Multi spacecraft measurements are used to investigate the spatial and temporal structures of the perpendicular heating events. The wave activity during the cases has been examined. The statistical distribution of the temporal duration of heating events has also been investigated.