



Transpolar arcs and the Dungey cycle: A multi-instrument study

G. Provan (1), S. Eriksson (2), M. Lester(1), S. Massetti(3) and B. Anderson(4)

(1) Department of Physics and Astronomy, University of Leicester, University Road, Leicester, UK., (2) Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO, USA., (3) INAF/IFSI, via del Fosso del Cavaliere 100, Rome, Italy, (4) Applied Physics Laboratory, Johns Hopkins University, Laurel, MD, USA.

On 14 February 2003, a transpolar arc was observed simultaneously by the Polar UVI spacecraft and ground based all-sky cameras. In this paper we present a detailed multi-instrument study of this event. The IMF was predominantly strongly northward during this interval. Simultaneous particle precipitation data were obtained from the DMSP F13 spacecraft. This spacecraft also provided the cross-track ion drift vectors, whilst the SuperDARN radars imaged the global high latitude convection pattern. Data from the Iridium constellation of satellites, the DMSP F13, F15 and the CHAMP satellites were used to derive a global field-aligned current system during the hour when the TPA was observed. Preliminary results suggest that the transpolar arc is associated with high-energy electron precipitation, and lies on sunward flow within a clockwise rotating lobe cell. The transpolar arc is found within a large-scale upward field-aligned current of an NBZ current system, driven by the ongoing lobe reconnection. We will discuss the effects of changes in the IMF By conditions on the lobe reconnection site and thus the location and deflection of the joint sunward flow channel and NBZ system.