



Contribution ID: 666

Type: **Invited Speaker / Conférencier invité**

Anisotropic ion temperatures and ion flows adjacent to auroral precipitating electrons

Tuesday, 16 June 2015 15:45 (30 minutes)

Large ion temperature anisotropies (temperature perpendicular to magnetic field larger than parallel to magnetic field) in narrow regions of enhanced ion flow have been identified by the Electric Field Instruments on board the Swarm satellites as a persistent feature of the high latitude midnight-sector auroral zone. These flow channels typically span less than 100 km latitudinally with ion flows of several kilometres per second. The largest observed temperature anisotropy ratios exceed the values predicted by currently used cross sections in theories of collisional heating in strong flows by a factor of 2. Coincident optical measurements from ground-base all-sky imagers indicate that these flow channels are immediately adjacent to regions of precipitating electrons, likely in the vicinity of the ionospheric projection of the open-closed boundary.

We will be presenting ion velocity, ion temperature, and magnetic field measurements in and around these regions of enhanced ion flow from December 2013. The orbit of the Swarm satellites during this time result in measurements near the Harang discontinuity. The Electric Field Instruments on board the Swarm satellites are ideally suited for analysis of ion temperature anisotropy. The pearls-on-a-string configuration held by the Swarm satellites during these first weeks of the Swarm mission provides a unique opportunity to distinguish temporal from spatial variation in this dynamic region.

Primary author: ARCHER, William (University of Calgary)

Co-authors: Dr JACKEL, Brian (University of Calgary); Dr JOHNATHAN K., Burchill (University of Calgary); Dr STOLLE, Claudia (GFZ German Research Centre for Geosciences); Dr KNUDSEN, David (University of Calgary); Dr SPANSWICK, Emma (University of Calgary); Dr DONOVAN, Eric (University of Calgary); ST.-MAURICE, Jean-Pierre (University of Saskatoon)

Presenter: ARCHER, William (University of Calgary)

Session Classification: T3-3 Ground-based / in situ observations and studies of space environment III (DASP) / Observations et études de l'environnement spatial, sur terre et in situ III (DPAE)

Track Classification: Atmospheric and Space Physics / Physique atmosphérique et de l'espace (DASP-DPAE)