2020 Workshop: Subauroral Science

Long title
Subauroral Science: STEVE, SAPS, SAID, and SAR arcs!
Conveners
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Description

The subauroral region is influenced by different driving forces such as the neutral winds, penetration electric fields, and polarization electric fields (SAPS/SAID). The electric fields interact with the inner magnetosphere, affecting plasma dynamics over a broad energy range. Stable auroral red (SAR) arcs, a 630.0 nm airglow emission, have been observed and studied in this region for decades and connections with SAPS/SAID have been found. More recently, a collaborative effort between the scientific community and citizen scientists has led to the discovery of a new phenomenon called Strong Thermal Emission Velocity Enhancement (STEVE) which appears to be the optical manifestation of extreme SAID. An increase in observational coverage from several ground and space-based instruments, such as all sky imagers, radars and satellites (e.g. TREx, POES, DMSP, SWARM, and Van Allen Probes), as well as advances in modeling techniques, such as self-consistent coupling between the ionosphere, thermosphere, and magnetosphere, provide an outstanding opportunity to study the subauroral region.

In this session we will focus on experimental, numerical, and/or theoretical studies that address outstanding questions on: (1) the physics of the STEVE phenomena and SAR arcs, including, what is the connection (if any) between the two phenomena, (2) plasma convection in the subauroral ionosphere and/or conjugate inner magnetosphere during quiet and geomagnetically active times., and (3) the significance of convection in terms of plasma dynamics across the energy spectrum.

Agenda

1) Neil Zeller (AAC) - Auroral photography of STEVE

2) Bill Archer (USaskatoon) - STEVE, ionospheric manifestation of SAIDs

3) Carlos Martinis (BU) - STEVE vs SAR arcs

4) Phil Erickson (MIT) - Contributions of Millstone Hill to STEVE

5) Gareth Perry (NJIT) - Ionospheric radar measurements of STEVE

6) Megan Gillies (UCalgary) - Spectrographic measurements of STEVE

7) Brian Harding (UC Berkeley) - Photochemical model of STEVE

8) Toshi Nishimura (BU) - Magnetospheric drivers of STEVE

9) Josh Semeter (BU) - Picket fence analysis

10) Liz MacDonald (NASA GSFC) - Historic citizen scientists observations of STEVE

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