2022 Workshop: Subauroral Science

Long title
New Results in Subauroral Science
Conveners
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Description

In this session, we will focus on experimental, numerical, and theoretical studies that address outstanding science questions at subauroral latitudes, such as: (1) sub-auroral convection including subauroral polarization streams (SAPS), subauroral ion drifts (SAIDs), and quiet-time flows; (2) the physics of the Strong Thermal Emission Velocity Enhancement (STEVE) phenomena and stable auroral red (SAR) arcs, including, what is the connection (if any) between the two phenomena; (3) the response of the neutral atmosphere to SAPS and SAID; and (4) the complex interaction between dynamics, chemistry, and energetics in the coupled inner magnetosphere-subauroral ionosphere region. We would like to invite all the expertise in the field to address these issues together in this session. We welcome contributions that feature the latest advances in the modeling of these dynamic feedback signatures across the coupled magnetosphere-ionosphere-thermosphere system, as well as new analysis of ground-based and in situ observations. Both event studies and statistical/climatological studies are welcome.

Agenda

First half (13:30 to 14:30): Talks

1. Intro to the session (***Phil Erickson***)
2. Subauroral polarization streams (SAPS): Intrinsic response of geospace during storm time (***Wenbin Wang***)

3. Bistatic SAPS convection measurements (***Simon Shepherd***)
4. High Latitude Ionospheric Electrodynamics During STEVE and non-STEVE Substorm Events (***Tomoko Matsuo***)
5. Preliminary results on the penetration electric field in both hemispheres for the 17 March 2015 storm (***Marc Hairston***)
6. Traveling Ionospheric Disturbances in the vicinity of storm-enhanced density at midlatitudes (***Shun-Rong Zhang***)
7. On turbulence and vorticity induced by rapid ion drifts (***Josh Semeter***)
8. TBD (***Megan Gillies***)

Second Half (14:30 to 15:30): Discussion, questions, and future directions

Justification

The subauroral region is influenced by different driving forces such as the neutral winds, penetration electric fields, and polarization electric fields which drive SAPS and SAID. The plasma dynamics of this region is controlled by the energy and momentum transfer between the coupled magnetosphere-ionosphere-thermosphere system. This area remains a dynamic and vital research focus for the geospace community, with well-known electrodynamic and wave-driven signatures such as storm enhanced density (SED), SAPS, SAID, main ionospheric trough, decameter scale irregularities, neutral wind disturbances, SAR arcs, and STEVE. This session relates directly to a key CEDAR science goal of understanding system response within the coupled Space-Atmosphere Interaction Region. The proposed workshop addresses CEDAR Strategic Thrust #2: Explore Exchange Processes at Boundaries and Transitions in Geospace as well as Strategic Thrust #3: Explore Processes Related to Geospace Evolution.

Related to CEDAR Science Thrusts:
Explore exchange processes at boundaries and transitions in geospace
Explore processes related to geospace evolution
Workshop format
Short Presentations
Keywords

MIT coupling, Subauroral, Observations, Modeling

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