2017 Workshop: high latitude IT coupling

Long title
New Challenges in High-Latitude Ionosphere-Thermosphere Coupling
Conveners
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Description

Solar wind energy is dissipated in the ionosphere- thermosphere (IT) system through Joule heating and particle precipitation at high latitudes. The ionospheric currents heat the thermosphere through ion-neutral collisions with subsequent ion drag, while the energetic particles heat the thermosphere through ionization, excitation and dissociation of the neutral species. There is increasing evidence that heating of ions and neutrals occurs at very high latitudes besides in the auroral zones for both geomagnetic quiet and active times, which is not well described by models. We solicit presentations of high latitude IT coupling processes responsive to solar wind energy input. We encourage presentations with new results from numerical modeling and data analysis relevant to outstanding unsolved problems. These preliminary studies will help to improve our understanding of the IT coupling at high latitudes and to formulate new challenges in the community.

Agenda

Manbharat Dhadly (NRL) [Seasonal dependence of geomagnetic active time northern high-latitude upper thermospheric winds]

Bruce Fritz (UNH) Results from the Rocket Experiment for Neutral Upwelling 2 (RENU 2) (pdf)

Gareth Perry (University of Calgary) A comparison of neutral mass density perturbations and DC Poynting flux estimates, sorted by IMF clock angle (pdf)

Changsup Lee (KOPRI) Polar thermospheric winds and temperature observed by Fabry-Perot Interferometer at Jang Bogo Station, Antarctica (pdf)

Cheryl Huang (AFRL) Neutral density maxima at high latitudes (pdf)

Ildiko Horvath (The University of Queensland) Polar ionosphere and dayside cusp enhancements on 25 September 2000 (pdf)

Larry Lyons (UCLA) Driving of Strong Nightside Reconnection and Geomagnetic Activity by Polar Cap Flows: Application to CME Shocks and Possibly Other Situations (pdf)

Yanshi Huang (UNM) Contribution of small-scale variation on the high-latitude energy input estimation (pdf)

Andrew Gerrard (NJIT) Status of deep polar cap geospace measurements from the Antarctic (pdf)

Aaron Ridley (UM) [GITM results of high latitude heating]

Bill Lotko (Dartmouth) F-region IT heating when CHAMP small-scale fields are Alfvénic (pdf)

Justification

The workshop addresses the outstanding unsolved problems in the energy coupling processes of Earth's Ionosphere-Thermosphere (IT) system at high-latitudes. The goal is to improve the IT predicting and forecasting capabilities through raising and solving these problems. This workshop fits one of the themes in the CEDAR Strategic Planning for the Next Decade: variability in the Space-Atmosphere Interaction Region. The topics covered are related to several thrusts in the CEDAR Strategic Plan (2011) such as thrust #1: Encourage and Undertake a Systems Perspective to Geospace and thrust #2: Explore Exchange Processes at Interfaces and Boundaries. The questions of this workshop will be addressed through comprehensive studies of observational data and numerical model simulations. Current measurements of the high-latitude energy input (DMSP, CHAMP, SWARM etc.) and energy dissipation into neutral and plasma (radars, FPIs, GRACE etc.) are available to investigate the IT coupling processes. Numerical simulation results can be compared to the observations to test if the ionospheric and thermospheric heating is correctly specified in the models.

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