2017 Workshop: High Latitude System Frontiers

Long title
The High Latitude Geospace System: Frontiers in science and sensing
Conveners
Joshua Semeter
Matthew Zettergren
Cheryl Huang
Yanshi Huang
Jeffrey Thayer
Description

We invite participation from investigators seeking to advance our understanding of the high-latitude M-I-T system—in particular, those whose work incorporates observations from heterogeneous or distributed instruments, both ground-based and space-based. Contributions are welcome in the form of brief presentations. The session will include time for an open strategic planning discussion, as the CEDAR community continues to explore concepts for next-generation geospace facilities.

Justification

The magnetosphere, ionosphere, and thermosphere act as a coherently integrated system to solar drivers. This ‘system science’ approach is well recognized as the path forward for advancing space weather predictive capabilities as embraced by the CEDAR Strategic Plan, the NRC Decadal Survey, and, most recently, the OSTP Space Weather Action Plan. Nowhere is this systems approach more necessary than at high geomagnetic latitudes, where solar wind power dissipates within the geospace system through a cascade of ineracting processes, with physical scales ranging from 1000’s of kilometers (e.g., global convection, region 1 and 2 currents) to 10’s of meters (e.g., dispersive Alfven waves, plasma instabilities).

Recent years have witnessed a rapid expansion of networked instrumentation deployed to the geomagnetic polar regions. These observations are supported by increasingly sophisticated models and conjugate observations from orbital platforms (ePOP, SWARM, DMSP, Cubesats). Efforts to reconcile ground- and space-based perspectives have called into question our understanding of four key areas: (1) electromagnetic energy input and transfer in the geomagnetic polar regions, (2)

sources and impacts of instabilities and turbulence on the high-latitude I-T system, (3) affects of extreme gradients on electrodynamic coupling with the polar magnetosphere, and (4) sources and mechanisms of high-latitude plasma escape. The purpose of this grand-challenge workshop is to provide a forum for the community of investigators addressing these and related processes in Earth’s open geomagnetic field region from disparate perspectives.

View PDF