2019 Workshop: Next Gen Thermospheric Wind Observations

Long title
Current Status and Needs For 21st Century Thermospheric Wind Measurements: The 2019-2020 Thermospheric Winds SWOT Analysis.
Conveners
Patrick Dandenault
Sovit Khadka
Description

As outlined in the NSF CEDAR: The New Dimension Strategic Vision [2011] roadmap, the most recent NSF and NASA Decadal Surveys, and the White House Office of Science and Technology Policy National Space Weather Strategy and Action Plan (released in October 2015), there are an enormous number of compelling geospace phenomena that impact our current technological developments and have yet to be resolved. Many of these topics, ranging from equatorial spread-F, mid-latitude quasi-periodic echoes, HR radio disruption, neutral thermospheric helium upwelling, LEO spacecraft drag, auroral-zone heating, gravity, planetary, and tidal waves, region 0, 1, and 2 current systems, ULF wave heating, impact of particle precipitation, etc. fundamentally require measurements of the thermospheric wind, over a full diurnal cycle, in order to be resolved.

The purpose of this ~2-year workshop series, to start in CEDAR 2019, is to bring together various experimental and modeling stakeholders interested in advancing our understanding of thermospheric winds and their variability. To wit, we seek to perform a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis on our current understanding of thermospheric winds. Such an analysis requires 1) a review of our current understanding of thermospheric winds, 2) the identification of needed measurements, 3) identification of unanswered problems, and 4) assessment of closure in the next 10-years. The workshops will be run so as to produce a community-accessible traceability matrix associated with this SWOT analysis.

Agenda

1. Sovit Khadka (NJIT) - "Current Understanding of the SOFDI Winds"

2. Qian Wu (NCAR/HAO) - "HIWIND Observations of Daytime Thermospheric winds from the June 2018 Flight"

3. Manbharat Dhadly (NRL) - "Synthesis of High-Latitude Thermospheric Wind Data"

4. Brian Harding (UC Berkeley) - "ICON update; Lessons learned from NATION/RENOIR vertical winds study" (pdf)

5. John Noto (CPI) - "MerCI: Meridian Chain of Interferometers”

6. John Meriwether (NJIT) – “The strange case of auroral vertical wind dynamics”

7. Pat Dandenault (JHU/APL) - "Using MerCI observations to improve I-T modeling " (pdf)

Justification

The tasks outlined here satisfy a number of strategic thrusts outlined in the most recent CEDAR strategic plan [CEDAR The New Dimension, June 2011], including: • Strategic Thrust #2: Explore Exchange Processes at Interfaces and Boundaries • Strategic Thrust #4: Develop Observational and Instrumentation Strategies for Geospace System Studies • Strategic Thrust #5: Fuse the Knowledge Base across Disciplines • Strategic Thrust #6:Manage, Mine, and Manipulate Geoscience Data and Models

Furthermore, the timing of this workshop is well suited for ongoing spacecraft operations and measurements of the thermospheric system, namely from the NASA GOLD and (upcoming) ICON missions.

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