2022 Workshop: Themospheric Neutral winds: Dynamics and Chemistry

Long title
Current Status and Needs For 21st Century Thermospheric Dynamics and Chemistry Measurements: The 2019-2022 Thermospheric Winds SWOT Analysis
Conveners
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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), and the Space Weather Science and Observations Gap Analysis for NASA (April 2021) there are an enormous number of compelling geospace phenomena that impact our current technological developments that 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 high-resolution measurements of the thermospheric wind, over full diurnal and solar cycles, in order to be resolved.

The purpose of this workshop series, which started at 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 and their effects on the underlying thermospheric chemistry. 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 ten years. The workshops will be organized to produce a

community-accessible traceability matrix associated with this SWOT analysis.

Agenda

Title: Status & Needs For Modern Thermospheric Dynamics & Chemistry Measurements

Monday, June 20th ; 1:30 - 3:30 (Austin; Central Daylight Time); Room: Topaz 2

Format: 6 discussions over 2 hours; Each (talk + Q&A) will last 20 minutes, max.

1:30 - 1:50 - 1 - Jens Oberheide (Clemson U), **'Vertical Coupling by Solar Semidiurnal Tides in the Thermosphere From ICON/MIGHTI Measurements'**

1:50 - 2:10 - 2 - Wenbin Wang (UCAR), **'The Effects of IMF By on the Middle Thermosphere During a Geomagnetically "Quiet" Period at Solar Minimum'**

2:10 - 2:30 - 3 - Cosme Alexandre Figueiredo (INPE), 'Asymmetric Development of Equatorial Plasma Bubbles Observed at Geomagnetically Conjugate Points Over the Brazilian Sector'

2:30 - 2:50 - 4 - Andrew Pepper (Clemson U), 'Mesoscale Spatial Variability of Lower Thermospheric Winds During the Anomalous Transport Rocket Experiment'

2:50 - 3:10 - 5 - Joe Huba (Syntek), 'Generalized Rayleigh-Taylor Instability: Ion Inertia, Acceleration Forces, and E Region Drivers'

3:10 - 3:30 - 6 - Jonathan Makela (U of Illinois), Asti Bhatt (SRI), Brian Harding (Berkeley/SSL), 'Early results from a distributed array of small instruments (DASI): Winds and Waves in the Mesosphere'

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

Summary

Current Status and Needs For 21st Century Thermospheric Dynamics and Chemistry Measurements

Date: Monday, June 20, 2022, 20 minutes talks

Local Time: 1:30 - 3:30 (Austin; Central Daylight Time)

Format: 6 discussions over 2 hours; Each (talk + Q&A) will last 20 minutes, max.

The LINE Hotel - Room: Topaz 2

111 East Cesar Chavez, Austin, TX 78701

Related to CEDAR Science Thrusts:
Explore processes related to geospace evolution
Develop observational and instrumentation strategies for geospace system studies
Workshop format
Short Presentations
Keywords
THERMOSPHERE, WINDS, IONOSPHERE, DYNAMICS
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