2013 Workshop: Planetary Waves and Tides

Long title
Planetary waves and Tides in the Middle Atmosphere and Ionosphere: Observations, Modeling and Data Assimilation
Conveners
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Description

This workshop will focus on observations as well as modeling, assimilation and theoretical studies that deal with excitation, propagation and interactions of planetary waves and tides and their effects on both the neutral atmosphere and the ionosphere. As highlighted in CEDAR thrusts, traditional data comparisons with models are inefficient in determining what mechanisms and forcing's can drive the model state towards observations. The aim of this workshop is to understand mechanisms of wave generation, wave-wave and wave-mean flow interactions, ionospheric dynamo coupling processes, year-to-year, annual and day-to-day variability in wave dynamics, and their impacts on neutral / ion composition. We welcome studies highlighting the seasonality of different planetary-scale waves and tides in the middle atmosphere and ionosphere from both observations and models. During this workshop we will assess capability of models to predict variability of tides and PWs and discuss data analysis/assimilation techniques needed for effective fusion of current and planned observations into the first-principle physics-chemistry based models to improve predictions of global waves. An additional objective is to facilitate dialogue between the middle atmosphere and ionospheric community on planetary wave and tidal processes of interest, and how efforts between the two communities can be coordinated.

Agenda

Session 1 (pdfs)

- "Tides and Planetary Waves at High Latitudes Measured by Meteor Radars" by David Fritts et al.
- "Global Responses of Gravity Waves to Planetary Wave Anomalies" by Chihoko Yamashita, Scott England, Thomas Immel
- "Seasonality of instability driven Planetary Waves in the MLT" by Amal Chandran et al
- "Coordinated Ground- and Space-Based Observations of Atmosphere-Ionosphere Coupling" by Scott England et al.
- "Transmission of planetary wave effects to the upper atmosphere by modulation of turbulent mixing" by Vu Nguyen and Scott Palo
- "Nonmigrating tidal impacts on the nitric oxide 5.3 um infrared cooling of the low-latitude thermosphere" by Jens Oberheide et al.
- "Polarization relations of tidal waves" by C.Y. She et al.

Session 2 (pdfs)

- "Constraining Upper Atmosphere Dynamics of WACCM(X) by met-analyses and MARS Data" by Valery B Yudin, H-L Liu, BV Khattatov
- "Longitudinal and day-to-day variability in the ionosphere from lower atmosphere tidal forcing" by T.W. Fang et al
- "Seasonal and Local Time Variation of Ionospheric Migrating Tides in 2007-2011 FORMOSAT-3/COSMIC and TIE-GCM Total Electron Content" by Loren Chang et al.
- "Attribution of Ionosphere (ExB)z Perturbations to Large-Scale Waves and the Dependence on Solar Activity" by Hanli Liu and Art Richmond
- "Changes of the ionosphere and thermosphere during a strong quasi-two-day planetary wave event: a numerical modeling study" by Jia Yue, Wenbin Wang, Alan Burns
- "Atmospheric diurnal tides from the nudged extended Canadian Middle Atmosphere Model - CMAM20" by Jian Du, William Ward, Stephen Beagley
- "Matching C/NOFS and CHAMP Climatology at Low Latitudes with Different Tidal Models in the TIEGCM" by BA Emery et al.

Justification

Observation and modeling studies of planetary-scale waves and tides in the middle atmosphere-ionosphere system and their vertical / global coupling effects on both the neutral atmosphere and the ionosphere is directly related to CEDAR strategic thrusts # 1 and # 2. This workshop will also asses the whole atmosphere model

developments and their capability to recreate observed variability of tides and planetary waves as well as enhancing the predictive skills of models in realistic recreation of wave dynamics by constraining their initial states, boundary forcing’s /conditions and physics by data. The workshop thus addresses CEDAR strategic thrust # 5 and # 6 by promoting interdisciplinary participation and collaboration of researchers who are involved in observations, model development, data analysis and assimilation.

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