2014 Workshop: Thermosphere Ionosphere Climate

Long title
Thermosphere-Ionosphere Climate
Conveners
John Emmert
Liying Qian
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Description

Climate may be defined as the mean response of an environmental system to external and internal forcing; in contrast, weather refers to the system's behavior during a specific time period. Characterization of climate provides insight into the physical mechanisms underlying the system's response and serves as a stringent benchmark for validating physics-based models. This workshop will provide a forum for presenting and discussing issues relevant to thermosphere-ionosphere (T-I) climate and long-term changes of this climate. Presentations and discussion of the following topics are solicited: regional and global T-I climatology; climate science methodology; coupling of T-I climate with the climate of the underlying atmospheric layers; new results of T-I long-term change; and new data sources applicable to upper atmospheric climate studies. Both observational and modeling results are welcome.

Agenda

Welcome - J. Emmert, L. Qian, D. Drob, S.-R. Zhang

Climate science theory and issues for the upper atmosphere - J. Emmert

The climatology of high-latitude electric fields: a SuperDARN-based empirical model (invited) - E. Cousins

Improvements to mesospheric and thermospheric climatology in the NRLMSIS empirical model - D. Drob

HWM14 Model comparisons with 5 years of equatorial wind and temperature measurements - J. Meriwether

Tide-mean state interactions in the ionospherethermosphere (invited) - M. Jones

Long Term Neutral Upper Atmosphere Variations From the Initial 50+ Year Run of CESM/WACCM-X - J. McInerney

Secular changes in the thermosphere and ionosphere between two quiet Sun periods - L. Qian

An investigation of the ionospheric response to interminima changes between Solar Cycle 22/23 and 23/24 S. McDonald 1125 North American TEC Climatology - S.-R. Zhang

Discussion

Justification

Thermosphere-Ionosphere climate is critical to space-based technologies such as GPS, radio communications, and satellite operations. However, our understanding of thermosphere-ionosphere climate is immature, particularly with respect to long-term changes and physical mechanisms. This is due in part to the limited availability of well-calibrated data and current inconsistencies among some observations and between modeling and observations. As defined in the workshop description, climate science inherently adopts a systems perspective to the environment, and is therefore aligned with Strategic Thrust #1 in the CEDAR Strategic Plan. The workshop also directly addresses Strategic Thrust #3 (Geospace Evolution), and the Strategic Thrust #6 task of fusing observations into sophisticated inference. The workshop also addresses Science Challenge 3 of the Decadal Survey for Solar and Space Physics: â€œUnderstanding the space environments of Earth and other solar system bodies and their dynamical response to external and internal influences.

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