2013 Workshop: Small Scale Waves in the MLT

Long title
Observing and Modeling Small-Scale Wave Dynamics and Interactions in the MLT Region
Conveners
Jonathan Snively
Michael Taylor
Alan Liu
Description

This workshop will focus on small-scale (<100s km) and short-period (<1 hour) wave dynamics of the mesosphere and lower-thermosphere (MLT) at all latitudes, and their interactions with waves and dynamics at larger spatial and longer temporal scales. These include propagating, ducted, and evanescent gravity and acoustic waves, and associated instability features and turbulence. Small-scale waves have significant influence on the local structure and dynamics of the MLT. Resolving and quantifying the complex interactions of small-scale waves with the larger-scale wave background remains as an unsolved problem in MLT-region science.

Talks and discussion will pertain broadly to the small-scale wave dynamics of the MLT region, including observation, modeling, and theory. Specific topics may include wave propagation and processes in the MLT, from their excitation to dissipation, linear and nonlinear interactions with other MLT region waves and processes, interactions with (and perturbations to) photochemical and electrodynamic processes, and their roles in the transport and deposition of energy and momentum. Studies directly-observing, theoretically-modeling, or numerically-simulating small-scale waves and processes, and their interactions with other MLT region waves or phenomena, are of particular interest.

The workshop will be organized as a series of very short talks, including ~10 minute / ~5 slide contributed short presentations. Talks must present new research, while remaining accessible for a general CEDAR audience. Student contributions are welcome and encouraged. Time will be allotted for questions and group discussion - Indeed, every talk must include a final conclusions and "questions for the audience" slide, to motivate our discussion. For example, modelers and theorists may wish to

query the experimentalists, and vice-versa.

Interested speakers should contact Jonathan Snively by email (snivelyj@erau.edu) with requests as soon as convenient.

Justification

The "CEDAR: The New Dimension" Strategic Vision report appreciates that "the circulation and variability of the upper atmosphere are dramatically impacted by waves carrying energy and momentum upward". Furthermore, "the frontier in our understanding of waves and tides in the upper atmosphere lies not in the linear theory of these waves, but in the quantification of wave amplitudes and variability produced by nonlinear interactions between individual wave modes or between waves and the mean state." In summary, our qualitative understanding of individual gravity wave processes within the MLT region continues to improve rapidly. However, an important challenge remains for the next decade to better-understand and quantify the interactions and effects of waves of disparate scales, with the goal of realistically modeling and eventually predicting MLTI dynamics and variability. This workshop aims to bring together theorists, modelers, and observationalists to discuss the crucial and interactive role of small-scale waves in the MLTI.

View PDF