Utilization of airglow imaging to investigate gravity wave instability dynamics in the MLT region: Overview and new results

M. J. Taylor (1), P.D. Pautet (1), Y. Zhao (1), M. Ejiri (1), A. Liu (2), and D.C. Fritts (3)

1. Center for Atmospheric and Space Sciences, Utah State University, Utah, USA, (mtaylor@cc.usu.edu/Fax: 01 435-7977992)
2. Department of Electric and Computer Engineering, University of Illinois at Urbana-Champaign, USA
3. Colorado Research Associates, Colorado, USA

Short-period ($<$1-hr) gravity waves exhibiting small horizontal scales and large amplitudes are expected to provide the majority of the mean forcing of the mesosphere and lower thermosphere ($\sim$80-100 km) region via momentum deposition. However, our understanding of this forcing, which varies significantly with latitude and season is still in its infancy. To quantify the intrinsic properties of these waves and their role in instability processes it is essential to measure simultaneously the background MLT wind and temperature field in which they propagate and break. High-resolution airglow imaging and temperature mapping of mesospheric gravity waves together with high-quality wind and temperature measurements using powerful Na lidar systems arguably provide the best method for quantifying gravity wave dynamics. In this overview I will summarize current knowledge of gravity wave instability signatures in the MLT and will then focus on recent measurements of wave breaking and associated effects (where known) on MLT dynamics.