



## **Shear and temperature layers: their sources and influences on gravity wave propagation**

Katrina Bossert (1), Dave Fritts (1), Tyler Mixa (1), Titus Yuan (2), Dominique Pautet (2), Mike Taylor (2), and Bifford Williams (1)

(1) GATS, inc., Boulder, United States (katrina.bossert@gmail.com), (2) Utah State University

Small-vertical-scale ( $< 5\text{km}$ ) temperature and wind perturbations in the mesosphere and lower thermosphere (MLT) may have multiple sources, including inertia-gravity waves or different environmental factors causing stratified layering. These layers have the potential to notably affect the propagation of other gravity waves in the MLT given their influences on the Richardson number due to shear, and sharp induced peaks in the buoyancy frequency due to temperature layering. These small-vertical-scale perturbations have been observed using both Advanced Mesospheric Temperature Mapper (AMTM) and sodium lidar measurements at multiple sites including Logan, UT, and the ALOMAR observatory in Norway. We investigate the nature of these layered structures in MLT and their potential sources by quantifying their intermittency, phase structure, and wave characteristics. We also discuss the implications that these structures can have on GW propagation in multi-scale environments.