

Investigating Mesospheric Gravity Wave Dynamics and Temperature Variability at Polar Latitudes

M.J. Taylor¹, P.-D. Pautet¹, Y. Zhao¹, W.R. Pendleton Jr¹, D. Fritts², B.P. Williams², K. Bossert², G. Stober³ and P. Hoffmann³

¹*Center for Atmospheric and Space Science (CASS), Utah State University, Logan, Utah, USA*

²*GATS, Inc., Boulder, Colorado, USA*

³*Leibniz-Institute of Atmospheric Physics (IAP), Kühlungsborn, Germany*

This presentation highlights new research capabilities and results focusing on polar latitudes that are being conducted using two Advanced Mesospheric Temperature Mappers (AMTM) currently operating at the ALOMAR Arctic Observatory (69°N), Norway and at the Amundsen-Scott Base, South Pole Antarctica. The AMTM is a high-performance infrared (IR) imaging system that measures selected emission lines in the mesospheric OH (3,1) band (at ~1.5μm) to determine band intensity and rotational temperature and their variability at the ~87 km level. Large-field (120°) intensity and temperature maps with a high spatial (~0.5 km) and temporal resolution are obtained every 30s enabling an exceptional study of a broad spectrum of mesospheric gravity waves (with periods ranging from several minutes to many hours). At ALOMAR the measurements are complemented by Na wind-temperature lidar measurements of the mesospheric wind and temperature fields, as well as Meteor, MF and other radar wind measurements. Here we present comparative measurements of gravity waves and temperature variability at these two polar latitude sites and investigate the dominant wave properties at polar latitudes.