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Polar Mesospheric and Thermospheric Gravity Wave Measurements Using Optical and Radar Techniques MICHAEL NEGALE, Utah State University, KIM NIELSEN, Utah Valley University, MICHAEL TAYLOR, DOMINIQUE PAUTET, Utah State University, MICHAEL NICOLLS, SRI International — Atmospheric gravity waves (AGW) play an important role in atmospheric circulation via momentum deposition in the mesosphere and lower thermosphere (MLT) region ($\sim$ 80–110 km). Modeling and observational studies have shown that AGW can penetrate to high altitudes and play similar roles in the thermospheric region ($\sim$ 110–400 km). All-sky airglow imagers provide one technique to remotely sense airglow emissions in the MLT, and extract AGW parameters. An imager installed at Poker Flat Research Range (PFRR), Alaska (65 N) was operated during the winter months (August–April) from January 2011–April 2014 to investigate small-scale (wavelengths <100 km) AGW in the high Arctic. These data have recently been compared with new imaging results (October 2011 March 2012) using an Advanced Mesospheric Temperature Mapper (AMTM) operated at ALOMAR Observatory, Norway (69 N) to study longitudinal differences in wave propagation. In contrast several case studies have revealed the presence of much larger scale AGW in the thermosphere, but the distributions and variability of the AGW are currently unknown. Using recently developed methods, we present new high-latitude thermospheric AGW characteristic distributions obtained using the PFRR Incoherent Scatter Radar during a one year period (August 2010–July 2011). Their winter season distributions are compared to the smaller-scale AGW results from the PFRR imager and ALOMAR AMTM.

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