

Small-scale Stratospheric Gravity Waves over Poker Flat Alaska

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An important property of Atmospheric gravity waves (AGWs) is their ability to transport energy through the atmosphere. While the effects of AGWs have been studied for a number of years, current weather and climate models are still not capable of resolving the majority of small scale waves and their individual energy contributions. Hence, understanding how AGWs propagate from their tropospheric sources and across atmospheric regions is considered one of the most pressing scientific questions in the atmospheric and space sciences. This study investigates the propagation of gravity waves across the stratosphere over the altitude range of 40-80 km utilizing data collected from a Rayleigh lidar system located in interior Alaska. Various methods of extracting gravity waves from lidar systems are discussed. Three years of temperature data have been analyzed to reveal the wave characteristics, wave variability, and estimations of the energy carried by the individual waves.

Keywords: Gravity waves, Lidar observations, Polar stratosphere