

Reverse Ray Tracing of Mesospheric Gravity Waves over the Antarctic Peninsula

*Brittany Williams¹, Eric Davis¹, Kim Nielsen¹, Michael Taylor²

1. Utah Valley University, 2. Utah State University

The majority of studies of atmospheric gravity waves are concerned with waves observed at equatorial and mid latitudes. In the early 2000' s Utah State University and British Antarctic Survey initiated a long term study of these waves over the Antarctica utilizing mesospheric airglow imagers, which has progressed into a comprehensive Antarctic observation network (ANGWIN). A recent long term analysis of gravity wave characteristics from two observation sites: Halley and Rothera, has revealed a distinct difference in predominate propagation directions between the two. Though Halley exhibited propagation directions changing with seasons, Rothera showed a remarkable fixed preference for westward propagating waves. While the waves observed over Rothera revealed freely propagating characteristics in the observed mesospheric region, their source location and origin remains unanswered. In this project we have focused on investigating the propagation of the waves from the observation point to their origin through a simple reverse ray tracing scheme. By analyzing ray tracing trends over two years of data we provide a preliminary overview of propagation characteristics and discuss the impact of orographic generated waves over the Antarctic peninsula.

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