

# **A MODEL SIMULATION OF MOUNTAIN WAVES IN THE MIDDLE ATMOSPHERE AND ITS COMPARISON WITH MICROWAVE LIMB SOUNDER OBSERVATIONS**

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Topography-related wintertime stratospheric gravity waves in both Northern and Southern Hemisphere are simulated using the Naval Research Laboratory Mountain Wave Forecast Model (MWFM). The results agree well with the observations from Upper Atmospheric Research Satellite Microwave Limb Sounder (MLS). Both the MWFM simulation and MLS observations found strong wave activities over the high-latitude mountain ridges of Scandinavia, Central Eurasia, Alaska, southern Greenland in Northern Hemisphere, and Andes, New Zealand, Antarctic rim in Southern Hemisphere. These mountain waves are dominated by wave modes with downward phase progression and horizontal phase velocities opposite to the stratospheric jet-stream. Agreements of minor wave activities are also found at low- to mid-latitudes over Zagros Mountains of Middle East, Colorado Rocky Mountains, Appalachians, and Sierra Madres of Central America. Some differences between the MWFM results and MLS data are explained by different horizontal resolution between the model and observation, and the fact that MLS may also see the non-orographic wave sources, such as mesoscale storms and jet-stream instabilities. The findings from this model-measurement comparison study demonstrate that satellite instruments such as MLS can provide global data needed to characterize mountain wave sources, their inter-annual variations, and to improve gravity wave parameterizations in global climate and forecast models.