



The excitation of secondary gravity waves from body forces created by wave dissipation, and application to the Antarctic winter

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In this paper, we examine the spectrum of secondary gravity waves (GWs) excited by localized and intermittent horizontal body forces in the middle atmosphere. Such a body force is created, for example, when primary GWs in a wave packet dissipate and deposit their momentum into the fluid. We find that the excited secondary GW spectrum is reasonably broad, which causes the vertical wind and temperature perturbations to emphasize different wave scales at higher altitudes. We then apply this theory to the results from the KMCM and WACCM GW-resolving models in the wintertime Antarctica. We examine the GWs propagating through the middle to upper mesosphere and relate some of them to the secondary GWs created at lower altitudes via ray tracing.