

Transmission and Reflection of Three-Dimensional Internal Gravity Wave Packets in Nonuniform Retrograde Shear Flow

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Abstract

A stably stratified fluid is one in which the mass density decreases with height. Internal gravity waves (IGWs) propagate horizontally and vertically within stably stratified fluids, such as the oceans and atmosphere.

I will introduce IGWs, wave packets, the wave-induced mean flow, and pseudomomentum. I will define the ‘reflection level’ at which an initially upward-propagating, small amplitude, incident wave packet is predicted to reflect and propagate downward. I will discuss the linear and nonlinear theory that predicts the reflection and partial transmission of moderately large amplitude three-dimensional (3-D) IGW packets incident upon a reflection level. I will briefly describe the fully nonlinear numerical code and present the results of simulated 3-D IGW packet evolution in a nonuniform retrograde shear flow.

This is joint work with Drs. Gordon Swaters and Bruce Sutherland.