

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Doppler Spreading of Internal Gravity Waves in the Ocean¹

JULIE VANDERHOFF, JAMES ROTTMAN, KEIKO NOMURA, Mechanical & Aerospace Engineering Dept., University of California, San Diego — The breaking of oceanic internal waves is an essential part of the deep-ocean mixing processes that contribute to the general circulation of the ocean, the exchange of heat and gases with the atmosphere, the distribution of nutrients and the dispersal of pollutants. The aim of this study is to improve our understanding of how these waves evolve toward dissipation and the resultant mixing of momentum, heat, and materials in a realistic ocean environment. Specifically ray and numerical simulations are used to examine the refraction of a short internal-wave packet by an inertia-wave packet to test the validity and explore the limitations of currently used models of short internal waves in the deep ocean. These so-called Doppler-spreading models for the high wavenumber end of oceanic internal wave spectra though successful are far from well understood and ignore a number of significant physical processes, especially time-dependent effects in their parameterization of dissipation. The results of our simulations are enough to show that these ignored physical effects and in particular the time dependence in the long-wave shear can make a significant difference to short-wave behavior and should be taken into account in the models.

¹Supported by National Science Foundation Grant number OCE-0117869

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Date submitted: 01 Sep 2005

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