Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Energetics of nonlinear harmonic generation during the incidence of an internal wave beam on a model oceanic pycnocline ANIL AKSU, DIAMESSIS PETER, Cornell University, SCOTT WUNSCH, Johns Hopkins University, Applied Physics Laboratory — An energetic analysis of the interaction of a numerically simulated IWB with a model ocean pycnocline is presented. The focus is on the nonlinear generation of harmonics. The analysis consists of a) monitoring the transfer of the primary beam's energy into higher harmonics along the beam path and b) evaluating how any energy trapped inside the pycnocline is distributed across different wave frequencies propagating within it. The majority of the analysis is performed on a dataset spanning a wide range of pycnocline strengths and thicknesses restricted to an IWB propagating at 45° from the horizontal. For such an angle, internal wave refraction is the primary driver of nonlinear harmonic generation. Moreover, all resulting harmonics remain trapped within the pycnocline. Preliminary results from additional simulations with shallower angles of IWB incidence are also analyzed. When the incidence angle is less than 30 degrees, IWB reflection is an additional important mechanism of harmonic generation and lower harmonics are able to radiate back out of the pycnocline.

Peter Diamessis
Cornell University

Date submitted: 25 Jul 2014 Electronic form version 1.4