Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Internal wave bolus transport dependence on pycnocline thickness GUILHERME SALVADOR-VIEIRA, MICHAEL ALLSHOUSE, Northeastern University, HARRY SWINNEY, University of Texas at Austin — Internal waves propagate hundreds to thousands of kilometers, ultimately reaching the continental slope and breaking. These shoaling waves can form boluses, vortices that trap and transport bio-matter, sediments and nutrient-rich water shoreward. Most previous work on boluses model stratifications composed of two layers of uniform density. Whereas in the oceans density varies continuously with depth, and the thickness of the pycnocline, the layer of rapid density change, varies with location and season. We study the impact of the pycnocline thickness on the dynamics of boluses generated by internal waves breaking on a constant slope topography. Direct numerical simulations provide the complex velocity field, and Lagrangian coherent structure methods are applied to objectively identify fluid trapped and transported with the bolus. Bolus properties are measured as a function of the pycnocline thickness, incoming wave energy, and topographic slope angle. The available potential energy is calculated to give an upper bound for the amount of mixing by the bolus. We find that the bolus dynamics depend significantly on the pycnocline thickness.

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Date submitted: 01 Aug 2017 Electronic form version 1.4