

Weekly CEA FM Seminar: Spring 2015



JOHNS HOPKINS

Center for Environmental
& Applied Fluid Mechanics

Date: **Friday, March 6, 2015**
Time: 11:00 AM
Location: Gilman Hall # 132
Speaker: **Dr. Sonya A. Legg** (Princeton & NOAA)
Title: ***"Ocean Mixing by Breaking Internal Tides"***

Abstract

Diapycnal mixing plays an important role in the large-scale ocean overturning circulation, and much of the energy for this mixing derives from the tides. When the barotropic tides flow over topography, energy is transferred to internal waves at the tidal frequency, known as internal tides. These internal tides can lead to mixing only if they break, which occurs when the waves are nonlinear and often of sufficiently small vertical length-scales to permit shear instability. I will describe numerical simulations which examine some of the processes leading to nonlinear internal tides and wave breaking. At tall steep topography, waves may break near the internal tide generation site through the formation of internal hydraulic jumps. Constructive interference may enhance nonlinearity at double ridge topography. Wave-wave interactions transfer energy to waves of smaller vertical length-scales. A significant fraction of the internal tide energy can propagate away from the generation site in the form of low-modes, which can ultimately break on reflection from large amplitude topography such as continental slopes and ocean ridges. Finally, I will summarize recent attempts to parameterize the mixing which results from these different wave breaking processes and their impact on ocean climate simulations.