

Weekly Seminar: Spring 2010

Date: Friday March 12

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Shane Keating (New York University)

Title: *"Diagnosing lateral mixing in the upper ocean with satellite altimetry"*

Abstract

Quantifying the mixing properties of the upper ocean is crucial for developing more skillful eddy parameterization schemes for numerical climate models as well as for improving understanding of the transport of ocean-borne material such as heat, chlorophyll, plankton, and pollutants.

Satellite-mounted altimeters now routinely provide continuous, global monitoring of the upper ocean eddy field and have become an important tool for oceanographers and modelers seeking to better understand mixing processes in the ocean. However, observational noise from tracking errors, cloud cover, sea ice, and so on reduce the effective resolution of altimetry-derived velocity fields to about the Rossby deformation radius. This limited resolution leads to model error in the inferred mixing diagnostics, arising from the fact that the unresolved scales are represented by an imperfect model --- if indeed one is used at all.

In this work, we examine a range of Eulerian and Lagrangian mixing diagnostics in simulations of idealized oceanic turbulence incorporating interior and surface-dominated quasi-geostrophic flow, mesoscale and sub-mesoscale mixing, and local and non-local spectral dynamics. We directly probe the dependence of these diagnostics on spatial and temporal sampling resolution with the aim of quantifying model error in measures of mixing inferred from satellite altimetry and elucidating the limitations of altimetry-derived velocity fields.