
Center for Environmental
& Applied Fluid Mechanics

Weekly Seminar: Spring 2011

Date: **Tuesday, April 12, 2011** (SPECIAL DATE)
Time: **11:00 AM**
Location: **Gilman Hall 50 (Marjorie M. Fisher Hall)**
Speaker: **Professor Hezi Gildor (The Hebrew University, Israel)**
Title: ***"Submesoscale mixing observations and modeling: from vertical density currents to horizontal barriers to mixing."***

Abstract

Ocean submesoscale (~2-20 km) processes play a major role in ocean dynamics, in physical-biological interactions, and in the dispersion of larvae and pollutants. We study submesoscale processes using a combination of observations and high-resolution numerical models. In this talk I will present two studies:

In the first study we use a data set of surface ocean currents measured by high-frequency radar to identify the existence of temporary barriers to mixing. The existence of these barriers is also simultaneously verified by aerial-photographs. The existence of such barriers requires a new approach to the way mixing is parametrized in ocean and climate models.

The second study deals with the dynamics of density currents. Density currents are an important component of the oceanic meridional overturning circulation, since they affect ocean climate and maintain a stable stratified world ocean. Because the Gulf of Eilat is separated from the Indian Ocean by two relatively shallow sills, deep and cold water from the world ocean cannot enter the gulf. Therefore, during the winter, dense currents evolve over the shallow shelves at the northern tip of the Gulf in response to buoyancy loss. Our observations and high-resolution 3D model results show pulses of density currents that form over night (when the buoyancy loss flux is at its maximum) during the winter months. The numerical simulations also demonstrate that it is necessary to include the diurnal cycle of air-sea fluxes in climate models in order to correctly simulate these currents in climate models.