Center for Environmental & Applied Fluid Mechanics

Speaker: Dr. Inga Koszalka (JHU | Earth and Planetary Science)
Title: *"Investigating transport and mixing of Atlantic Water in the Nordic Seas with surface drifters*"

Date: **Friday, September 23, 2011**
Time: 11:00 a.m.
Location: Gilman Hall 50 (Marjorie M. Fisher Hall)

Lagrangian instruments yield a unique insight into structure of the oceanic circulation and its variability. In this talk I will present results from the POLEWARD project that employed surface floats, so-called drifters, to study transport and mixing processes in the Nordic Seas. In this area, between Greenland and Norway, warm and saline waters transit from the Atlantic to the Arctic Ocean, gradually cooling, submerging and finally returning southward as deep water masses which constitute a key component of the Meridional Overturning Circulation.

During the International Polar Year (2007-2009), 148 drifters were released under the POLEWARD project. It was the largest single deployment of floating instruments in the Nordic Seas to date, and proved to be a fruitful venture. Temporal averaging of the Lagrangian velocities in geographical bins allowed us to map the mean currents and eddy variances. We have also developed a method based on a clustering algorithm which enhance the significance and the resolution of the estimates, revealing several semi-permament mesoscale recirculations.

The lateral dispersion was studied by mapping the eddy diffusivities as well as by using multiple particle statistics. The results suggest that the dispersion processes in the Nordic Seas are similar to these of a two-dimensional, quasigeostrophic turbulence, but for a pronounced spatial variability. In particular, the Lofoten Basin stands out as a region of enhanced mesoscale mixing, prolonging the transit to the north and the exposure of Atlantic waters to atmospheric cooling.

Further, we augmented the drifter set with synthetic particles generated from a stochastic model and employed transit times statistics to interpret the temperature and salinity anomalies of the Atlantic Water observed in time series from hydrographic stations.

More information can be found on:
http://folk.uio.no/ingako/my_files/POLEWARD_WEBPAGE_MAIN.html

Bio

Dr. Koszalka received a M.Sc in Physical Oceanography from the University of Gdansk, Poland, in 2004 and a Ph.D degree in Fluid Dynamics from Politecnico di Torino, Italy, in 2008. Her graduate work focused on the dynamics of mesoscale ocean vortices. In the years 2008-2011, prior to her recent post at Earth and Planetary Sciences Department at JHU, she held a postdoctoral fellowship at the University of Oslo, Norway, where she studied circulation in the Nordic Seas by means of Lagrangian instruments and methods.