Commonwealth Center for Coastal Physical Oceanography
Old Dominion University
Fall 2012 Seminar Series

"TEMPORAL AND SPATIAL VARIABILITY IN HYDROGRAPHIC CONDITIONS AND TRANSPORT OF EUPHAUSIID LARVAE IN THE ROSS SEA"

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Monday, October 15, 2012
3:30 PM
Room 3200, Innovation Research Park Building I

Abstract

The continental shelf waters of the Ross Sea are modified by air-sea interaction, the formation and melting of sea ice, and the Ross Ice Shelf. Characterization of the temporal variability of the upper ocean waters in the Ross Sea is primarily based on summer measurements made during ice-free conditions. In this study, vertical profiles of temperature and salinity collected from sensors deployed on Weddell seals *(Leptonychotes weddellii)* between February to November 2010 and January to May 2011 were used to describe the thermohaline properties of the upper water column for fall and winter. Depth-averaged time series of temperature and salinity were constructed for regions where seals remained for extended periods of time. The seal-derived data showed three dominant water masses on the shelf, Modified Circumpolar Deep Water, Antarctic Surface Water and Modified Shelf Water. Depth-time distributions of temperature showed the summer to fall/winter transition of the upper water column in both years. The upper 200 m of the water column was warmer in 2010 relative to 2011. Calculation of the total heat content of the upper 200 m gave a value for 2010 that was 8% higher than that obtained for 2011. Interannual differences were also observed in the rate of erosion of the summer stratification, with a faster rate for 2011 ($0.8^{o}C$ $month^{-1}$) than in 2010 ($0.5^{o}C$ $month^{-1}$).

In a related study, a coupled sea ice-ice shelf-ocean circulation model was used to simulate the circulation and the hydrographic conditions on the continental shelf of the Ross Sea. Lagrangian particle simulations using neutrally buoyant floats were used to simulate the transport of larvae of Antarctic krill (*Euphausia superba*) and crystal krill (*Euphausia crystallorophias*), which are important components of the Ross Sea food web. The adults of both species occupy different parts of the shelf and have different reproductive strategies. The hypothesis tested with the particle tracking simulations is that the adult distributions are the result of oceanic circulation and the location of Circumpolar Deep Water, which influences the early life stages of Antarctic krill.

Biography

Andrea Piñones received a B.S. degree in Oceanography from the Catholic University of Valparaiso in Chile, where she studied intraseasonal oscillations in the ocean and its effects on atmospheric conditions off northern Chile. After graduating, she worked as research assistant at Estacion Costera de Investigaciones Marinas (ECIM), where she studied the dynamics of the coastal ocean. In fall 2004, she moved to the U.S. to begin her graduate studies and received a M.S. degree in 2006 from ODU's Department of Ocean, Earth and Atmospheric Sciences (OEAS) with a thesis that focused on tidal variability at the entrance of Chesapeake Bay. In fall 2011, she received her Ph.D. from OEAS. Her dissertation research was part of the synthesis and integration phase of the U.S. Southern Ocean GLOBEC program and was focused on the circulation on the western Antarctic Peninsula and implications for biological production. Early in 2012, Andrea started as a post-doctoral research associate at CCPO under the direction of Dr. Eileen Hofmann. At the end of 2012, she will leave the CCPO family to take a post-doctoral appointment in the Yale Climate Energy Institute (YCEI) at Yale University.

Reception before seminar at 3:00 PM