NRL Press Release
34-04r
8/3/2004

nrlpao@nrl.navy.mil
202-767-2541

NRL Conducts Ocean Research off Mississippi Coast

To understand the mechanisms that transfer properties such as heat, salt, energy, marine organisms, and materials across the shelf slope, the Naval Research Laboratory (NRL) has undertaken intensive measurements and modeling programs in the shelf and slope waters off Mississippi. The continental shelf waters off the Gulf Coast are a nearly perfect region to study coastal ocean processes as the shelf gently slopes down to depths of about 300 feet off of the coast. Near this depth, the continental shelf ends as depths rapidly increase to greater than a mile.

According to Mr. Bill Teague, an oceanographer at NRL Stennis Space Center (SSC), cross-shelf exchanges of continental-shelf waters with deep-ocean waters (and vice versa) are common and have a large impact on the environment in which we live. Ocean physics, optics, biology, and chemistry can be used to gain an understanding of these exchanges, which presently are not sufficiently understood.

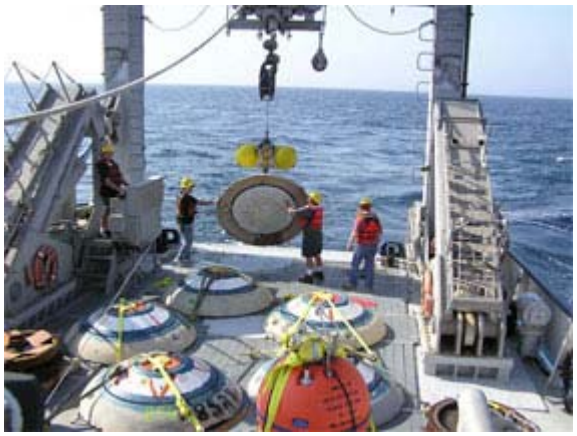
The entire region is being intensely simulated at high resolutions by NRL numerical models at SSC. Numerical models provide a means of picturing and predicting what is happening in the ocean by realistically simulating ocean currents and water properties. High spatial resolutions are required to visualize and to understand processes such as ocean eddies that may only be a few thousand feet in diameter. "This measurements program is one of the most intensive multi-discipline programs ever undertaken to achieve these goals," said chief scientist Teague, "and lessons learned regarding the cross-shelf exchanges, such as when, where, and why they occur, will be widely applicable in the Gulf of Mexico and in other coastal regions around the globe." Understanding of ocean processes in the Gulf of Mexico will also, in general, enable the Navy to better understand ocean conditions in areas that are poorly measured or not directly observable due to political boundaries and conflicts, such as, for example, the coastal seas off China. The Gulf of Mexico is effectively being used as a "natural laboratory" to observe, model, and to understand complex processes in the ocean. Ultimately this work is intended to provide the science required to expand future Naval capabilities for ocean monitoring and predictions systems.

In-water field measurements taken in May were focused at the shelf break region about 100 miles south of Gulfport, Mississippi. Concurrently, surface salinities were measured from an aircraft flying out of Stennis International Airport and sea surface temperature, height, and optical/biological parameters were measured from satellites.

A contract research vessel was chartered to conduct this elaborate field experiment. The first of three cruises was recently undertaken from Gulfport, and Mr. Teague considers the mooring deployments and related measurements made during the cruise a complete success. State-of-the-art current profilers were deployed on the continental shelf and down the shelf slope at depths ranging from several hundred feet to greater than 1500 feet.

These profilers will measure currents from the surface to the bottom for a year. During the first cruise, water properties such as temperature and salinity, and numerous biological and optical properties were measured. "Joint data analyses will help us better understand the processes occurring just off our coast that affect us all," remarked Mr. Teague.

The multi-disciplinary team consisted of scientists and researchers from NRL, the University of Southern Mississippi, San Diego State University, U. S. Geological Survey (Gainesville, Florida), and the U. S. Naval Reserve (Houston). The next part of the field program is scheduled to be conducted in December of 2004. During this phase, the current moorings will be recovered in order to service the moorings and to retrieve the current data. Then the moorings will be redeployed for another six months and be recovered in May 2005, providing a full year of current data.



A Barny is launched from the stern of a contract research vessel. A Barny is a trawl-resistant bottom mount that contains an acoustic Doppler current profiler, temperature sensor and pressure gauge.
Larger Image(900kb)

A Long Ranger ADCP housed in a 45 inch in diameter buoyant sphere is launched.
Larger Image(700kb)

-30-