Scientists embark on two-week ocean study

Marine researchers to monitor water flow where the Hudson River plume meets the Atlantic Ocean as a continuation of a five-year study

By Grace Sica
Staff Writer

At its source in the Adirondack Mountains, the Hudson River is used for fishing, swimming and recreation.

It then flows through New York, and becomes a depository for waste, chemicals and bacteria.

As the fresh water rounds Manhattan, gliding under the Verrazano Bridge, it seems impossible to differentiate its waters from the Atlantic Ocean.

Marine scientists from the University will board the R.V. Cape Hatteras and the Oceanus Friday for a two-week trip. Researchers will dye the river red and monitor the results when the Hudson River freshwater meets the Atlantic Ocean.

Courtesy of The Institute of Marine Coastal Sciences

To track the water, the researchers from the Coastal Ocean Observation Labs will combine three different technologies — satellites, codar and robot gliders — to capture the ocean weather and terrain in real time.

The information will then be transmitted to the observatory room in New Brunswick and the marine science Web site.

The research is called the Lagrangrian Transport and Transformation Experiment, or LaTTE. It's named after French mathematician Joseph-Louis Lagrange, who created formulas for studying fluids.

Oscar Schofield — one of the project leaders who will sail on the Oceanus — said the research asks which factors effect how the material flowing in from the Hudson is processed as it meets the ocean.

"What makes it difficult is that forests in the ocean are constantly being transported," Schofield said. "How do you follow the same parcel of water when it is flowing around and changing with the way the wind blows?"

Josh Kohurt is one of the marine scientists who will stay on land in the RU COOL observatory to monitor the data as it streams in from the boats. According to Kohurt, the combination of technologies is one of the things that separates the University from others.

"Every observatory has different technology," he said. "We are the only group integrating all three technologies and monitoring them 24 hours a day."

According to Kohurt, the two satellites on top of the Institute of Marine and Costal Science building receive information that is used to map the temperature of the sea surface. The satellites also show the presence and absence of chlorophyll, which shows where the oceans flora is located.

Coastal radar — also known as Codar — uses radio waves to measure currents and tides. Antennas located on the beach send radio waves out to sea.

Then, using the Doppler theory that sound is perceived differently coming towards us than going away from us, it's possible to measure the rate and direction of currents and tides.

The third aspect of the technologies uses gliders. These miniature submarines pump seawater in and out to make themselves heavier or lighter so that it will rise and sink according to the programmed directions.

When it surfaces, it inflates its bladder and uses its satellite modem antenna and radio modem antenna to communicate with the computers located in New Brunswick.


Courtesy of The Institute of Marine Coastal Sciences

These technologies will allow real-time information to be transmitted to the Institute of Marine and Coastal Sciences Web site. The boats can communicate with the New Brunswick COOL Room through high-speed wireless connection.

The researchers communicate primarily through Instant Messenger.

"It used to be when you would get on a boat, you would be separate from the world," Kohurt said. "Now there is more information to make decisions."

The idea for the five-year project and a $4.2 million grant came from the National Science Foundation. Five other research institutions are involved in the project, run from the Coastal Ocean Observation Laboratory on Dudley Road in New Brunswick.

This research benefits pure science research in numerous disciplines, Kohurt said. In physics, it can benefit research on fluid movement; in biology, the effect of plumes on animals; and in chemistry, how chemicals are disseminated in water.

Schofield agreed that the robot gliders and other advances have changed the way the ocean is researched and will maximize scientific impact.

"As a grad student, I would tend to fly blind. I would book one or two months on the boat," Schofield said. "Now, with the new robots, I pretty much know where everything is before I even get on the boat."

The technology increases allow researchers to be at sea every day of the year but have created a new problem: a lack of trained people to operate them.

"Currently, the big lacking resource is people — oceanographers are not trained to run satellites, codar and robots," he said.

To address this, the University will be creating a master's program in operational oceanography.