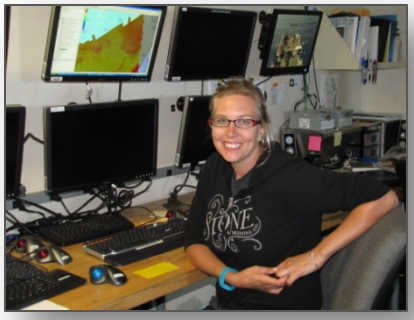
NOAA CORAL REEF CONSERVATION PROGRAM

Sea Floor Characterization of the U.S. Caribbean
2011 Field Season
Day 17: April 13, 2011

Cell Phone Towers are Good for More Than Just Phone Calls

Good Day! This is Vanessa Wright preparing the blog today about oceanic properties. I am the Oceanographic Technician at the University of the Virgin Islands and have been lucky to come aboard the NOAA ship Nancy Foster to help out with the sea-floor mapping and benthic habitat characterization. We can understand even more about the Caribbean environment that we are mapping by taking a look at the oceanographic properties. A variety of measurements can provide information about the water column and help us address questions such as, why a certain species of coral or a disease thrives in one area but not another. Some of these ocean metrics include temperature, salinity, pH, dissolved oxygen, nutrients, ocean currents, trace metals, and concentrations of dissolved solids and chlorophyll.



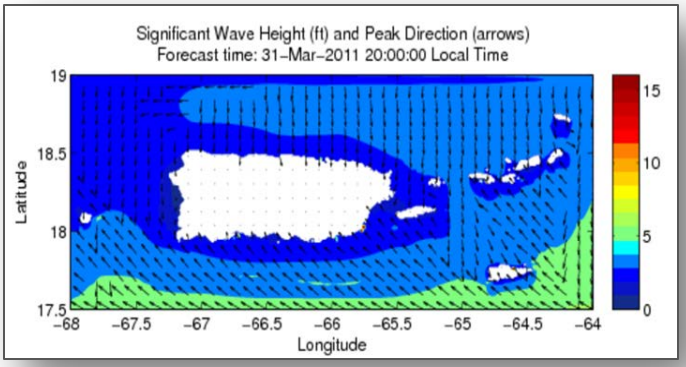
Vanessa getting ready for some fun processing backscatter data .

Figure 1. Real time data buoy off San Juan, PR. The U.S.V.I. buoy will look exactly the same!

One of the best ways to make meteorological and oceanographic measurements is through the use of a real time buoy (Figure 1) equipped with instruments that can measure above water properties such as air temperature, wind speed, wind direction, sea surface wave height, and under water properties such as water temperature, salinity, ocean currents, and chlorophyll concentration from fluorescence. The real time data buoy does just what it's named to do: it transmits the collected data in real time through cell phone towers. The data will then be made available to the general public, scientists, and managers to help make important decisions.

Puerto Rico currently has two data buoys located off the coast in open water with one more to be launched this week! The U.S. Virgin Islands are getting their first real time data buoy this month, with the Launch Ceremony occurring this Thursday in St. Thomas. The launch of the real time buoy in the Caribbean waters south of St. John is a great achievement! The data measured with the buoy is important for transportation, both seafaring and aeronautical, emergency management, as well as search and rescue efforts. The data will also be useful for the development of ocean general circulation models in the Caribbean Sea (see Figure 2).

Figure 2: Wave Height and Direction as determined from a model developed from real time data collected from the data buoys.

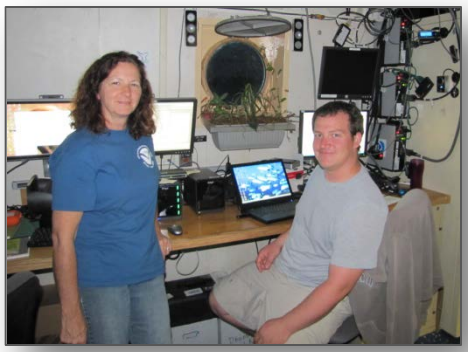


We know that the predominant surface ocean current in the Caribbean Sea south of the U.S. Virgin Islands moves East to West. This is a dominant feature in the Caribbean Sea and has been well documented and measured. But what we don't know about the area are the variations in the currents on a daily or monthly scale. Eddies are features common in the ocean and are water currents that move contrary to the direction of the main current in a circular pattern, like a whirlpool. Sometimes they last for only a few minutes to hours, but other times they can be prolonged events that have an effect on the properties of the water column. Some scientists believe they can entrain fish larvae and keep them near the reefs where they were spawned, thereby increasing the chances that they find suitable habitat. Since these features, as well as deviations in wind driven currents are variable and can only be detected if well measured, the new real time data buoy off St John will help us to start characterizing the ocean currents in this area.

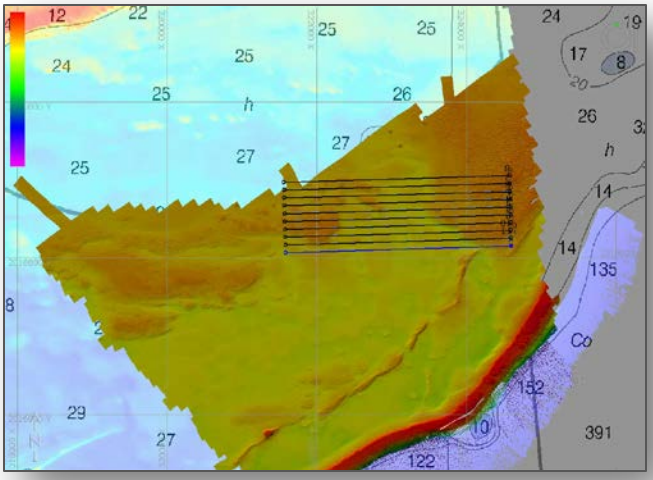
With the information this data buoy collects and hopefully more to come in the future, we can start to improve our answers to questions like: how do temperature fluctuations affect coral disease or spawning fish aggregations, how do fish populations change when water current patterns change on a seasonal scale, and how do coral reef environments respond to natural disasters like hurricanes?

Tracking Fish Around the Clock

I am Erik Ebert, and accompanied by Laura Kracker, we are the Fisheries Acoustics team aboard the R/V *Nancy Foster*. We have been working to collect hydroacoustic data for fish off the southern shores of St. Thomas, U.S. Virgin Islands. The data we collect is applied to habitat maps to assess fish density, but more on this and the team during Friday's log (4/15). This evening we will be starting two consecutive days of around the clock fish acoustics to look at the movement patterns of fish from one habitat to another. We have identified a very interesting site for the first 24-hour survey ,with a large variety of habitats that includes sandy bottom, patch reef, and a large coral cap. The area is about 4,000 square meters and we will be able to cover it 7 times in 24 hours. We utilize a suite of scientific echosounders and the ships navigation system to give us the exact location, time, and size each fish we passed over. We will be conducting ROV dives throughout the day to identify the specific species of fishes that we see in this area. With this data we will gain greater knowledge about the fish behavior and movement patterns in this area.



Laura Kracker and Erik Ebert, Team Fish Acoustics



Map of St. John shelf sea floor with fishery acoustic transects (black lines). The dark orange area on the right side of the transects represents the large coral cap. The lighter area in the middle is sandy bottom and the darker area on the left is a patch reef.