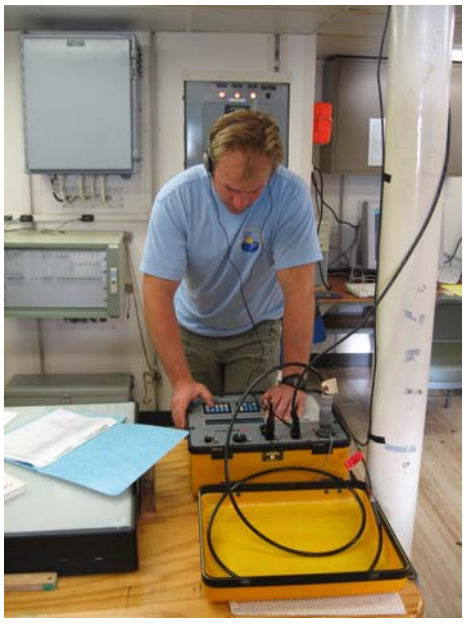
NOAA Teacher at Sea
Diana L. Griffiths
Onboard UNOLS Ship ROGER REVELLE
June 22 – 30, 2005

NOAA Teacher at Sea: Diana L. Griffiths
UNOLS Ship ROGER REVELLE
Mission: Recovery of WHOTS-2 mooring and deployment of WHOTS-3 mooring
Day 3: Friday, June 24, 2006
Time: 1800

Weather Data from Bridge
Visibility: 10 miles to less than 25 miles
Wind direction: 065°
Wind speed: 06 knots
Sea wave height: small
Swell wave height: 4-6 feet
Sea level pressure: 1014.5 millibars
Cloud cover: 3, type: stratocumulus and cumulus

Science and Technology Log
Today was very busy because it was the day that WHOTS-2 mooring, which has been sitting out in the ocean for almost a year, was recovered. At around 6:30 a.m., Sean Whelan, the buoy technician, tried to contact the Acoustic Release. (The Acoustic Release is the device that attaches the mooring to the anchor. When it receives the appropriate signal, it disengages from the anchor, freeing the mooring for recovery. There are actually two releases on WHOTS-2.) He does this by sending a sound wave at 12 KHz down through the ocean via a transmitter, and when the release "hears" the signal, it returns a frequency at 11 KHz. The attempt failed, so the ship moved closer to the anchor site and the test was repeated. This time it was successful. Based on the amount of time it takes the acoustic signal to return, the transmitter calculates a "slant range" which is the distance from the ship to the anchor. Because the ship is not directly over the anchor, this slant range creates the hypotenuse of a right triangle. Another side of the triangle is the depth of the ocean directly below the ship. Once these two distances are known, the horizontal position of the ship from the anchor can easily be calculated using the Pythagorean theorem.

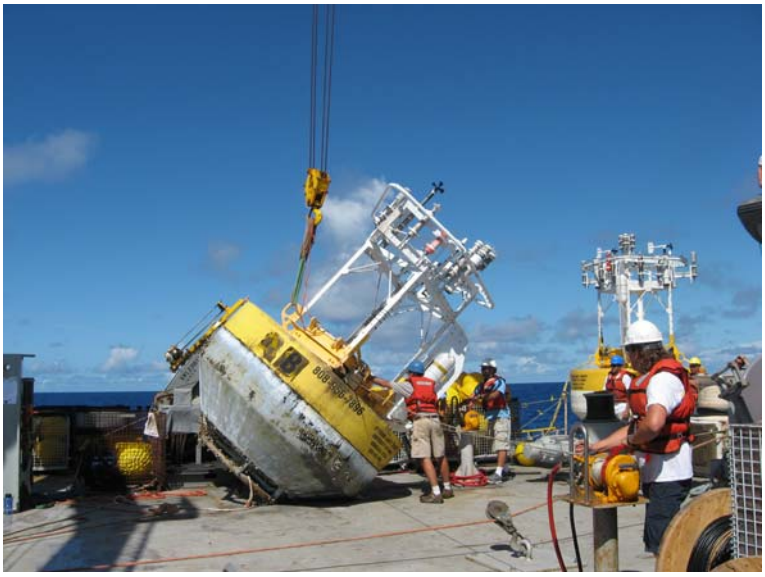


Buoy Technician, Sean Whelan, contacting the Acoustic Releases on WHOTS-2.

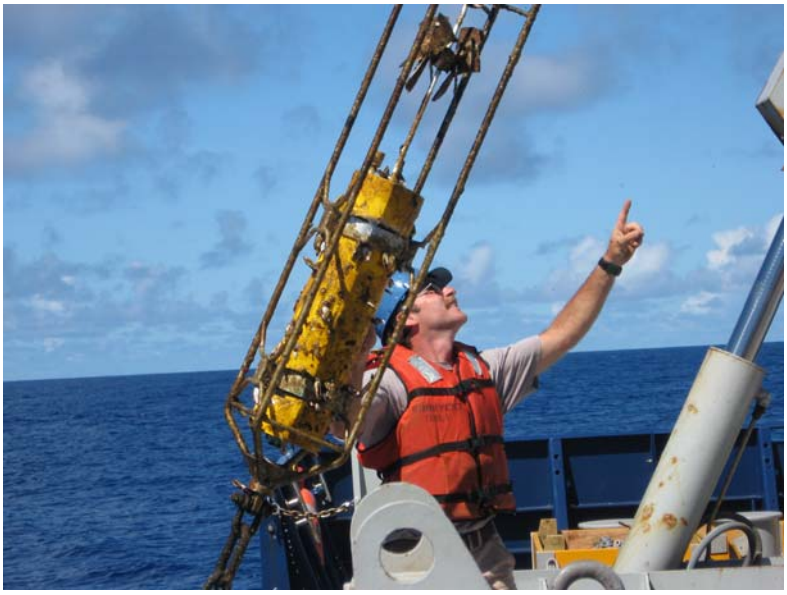
After breakfast, the buoy recovery began. A small boat was lowered from the ship and driven over to the buoy, as the ship was steamed right near the buoy. A signal was sent down to activate

the Acoustic Releases. Ropes were attached from the buoy through a pulley across the A-frame, located on the stern of the ship, to a large winch. With Jeff Lord leading the maneuvering of the 3750-pound buoy, it was disengaged from the mooring and placed safely on deck. This was a bit of a tense moment, but Jeff did a wonderful job of remaining calm and directing each person involved to maneuver their equipment to effectively place the buoy.

Once the buoy was recovered and moved to the side of the deck, each instrument on the mooring was recovered. The first to appear was a VMCM, (Vector Measuring Current Meter) located just 10 meters below the buoy. Then two microCATs were pulled up, located 15 and 25 meters below the buoy, followed by a second VMCM. This was followed by a series of eleven microCATs located five or ten meters apart, an RDI ADCP (Acoustic Doppler Current Profiler), and two more microCATs. As each instrument was recovered, the time it was removed from the water was recorded and its serial number was checked against the mooring deployment log. Each instrument was photographed, cleaned off and sent to Jeff Snyder, an electronic technician, for data upload. Each of these instruments has been collecting and storing data at the rate of approximately a reading per minute for a year (this value varies depending on the instrument) and this data now needs to be collected. Jeff placed the instruments in a saltwater bath to simulate the ocean environment and connected each instrument to a computer by way of a USB serial adaptor port. The data from each instrument took approximately three hours to upload. Tomorrow, these instruments will be returned to the ocean alongside a CTD



Recovery of WHOTS-2 buoy aboard the R/V REVELLE.



Jeff Lord, engineering technician, directing the recovery of a Vector Measuring Current Meter (VMCM).

in order to compare their current data collection with that of a calibrated instrument.

Once all of the instruments were recovered, over 4000 feet of wire, nylon rope, and polypropylene rope were drawn up using a winch and a capstan. Polypropylene rope is used near the end of the mooring because it floats to the surface. The last portion of the mooring recovered was the floatation. This consisted of eighty glass balls chained together and individually encased in plastic. The glass balls, filled with air, float the end of the mooring to the surface when the Acoustic Releases disengage from the anchor. It takes them about 40 minutes to reach the surface. Recovering the glass balls was tricky because they are heavy and entangled in one another. Once on deck they were separated and placed in large metal bins.

After dinner, a power washer was used to clean the buoy (it is a favorite resting place for seagulls and barnacles) and the cages encasing some of the instruments. The deck was cleaned and organized to prepare for tomorrow.

Recovery of mooring floatation on WHOTS-2, consisting of 80 glass balls encased in plastic.

Personal Log

The theme that keeps going through my mind during this trip and today especially, is how much of a cooperative effort this research requires. It begins with the coordination between Dr. Weller and Dr. Lukas to simultaneously collect atmospheric data using the buoy and subsurface data with the mooring instruments. In addition, Dr. Frank Bradley, an Honorary Fellow at the CSIRO Land and Water in Australia, is on the cruise working to create a manual set of data points for relative humidity using an Assman psychrometer to further check the relative humidity data produced on the buoy. Within the science teams, coordination has to occur at all stages, from the collection of data to its analysis. This was very evident in physical form today with numerous people on deck throughout the day working to retrieve the mooring, fix machinery as it broke down (the winch stopped twice), and clean the instruments. In the labs, others were working to upload data and configure computer programs to coordinate all of the data. In addition to all of this is the quiet presence of the ship's crew who are going about their duties to be sure that the ship is running smoothly. Several of the crew did take a break today just after the instruments were collected in order to put out fishing lines! They caught numerous tuna and beautiful Mahi Mahi that the cook deliciously prepared for dinner.