



**NOAA Teacher at Sea
Justin Czarka
Onboard NOAA Ship *McArthur II*
August 10 – 19, 2009**

NOAA Teacher at Sea: Justin Czarka

NOAA Ship *McArthur II* (link: <http://www.moc.noaa.gov/mt/>)

Track the *McArthur II* online at <http://shiptracker.noaa.gov/default.aspx>.

Mission: Hydrographic and Plankton Survey

Geographical area of cruise: North Pacific Ocean from San Francisco, CA to Seattle, WA

Date: August 11, 2009

Weather data from the Bridge

Sunrise: 6:25 a.m. Sunset: 20:03 (8:03 p.m.)

Weather: partly cloudy

Sky: patchy fog

Wind direction and speed: Northwest 5-10 knots

Visibility: unrestricted to less than 1 nautical mile due to fog (nm)

Waves: 5-7 feet

Air Temperature: 15° Celsius / Water Temperature: 12.92 °Celsius

Science and Technology Log

The *McArthur II* took about six hours from leaving port in San Francisco to reach our first station at Bodega Bay. We arrived at Bodega Bay around midnight. Bodega Bay, along with the next three stations, Point Arenas, Vizcaino Canyon, and Trinidad Head, California, will be sampled at only one station location each as we move up the coast to reach our first transect line of nine stations off Crescent City, California (Latitude: 41 deg 54 min). Due to leaving port later than expected, the science team has dropped some of the sampling sites at the southern end of the cruise. Still we are sampling as we head north in order to get an enhanced survey picture along a north-south line. At the stations, we are dropping the CTD into the water column, using the vertical net, and the bongo net.

While I did not participate in the first sampling at Bodega Bay, my shift (read more about shifts below) began sampling at Point Arenas and then Vizcaino Canyon. Upon entering the



Jennifer Menkel and Lacey O'Neal observe the CTD deployment. The left screen display depth soundings on three different frequencies, the middle screen creates graphs based on the CTD sensors, and the right screen shows live video feed of the CTD deployment on the fantail (back deck) of the *McArthur II*.

dry lab, Jay Peterson and Jennifer Menkel, both of Oregon State University, Hatfield Marine Science Center (OSU/HMSC) in Newport, Oregon, were observing the data stream for the CTD on the computer monitors with *McArthur II* senior survey technician Lacey O'Neal. Communication is essential. The scientists are looking at the TV monitors for the CTD deployment outside, altimeter (measures the CTD's height above the seafloor), depth below the surface, and communicating with both the ship's officers on the bridge, who are navigating the boat, and crew who are working the winches. Everyone has to work together to ensure that the CTD is deployed and retrieved safely. Otherwise, it could potentially hit the ship, causing damage to the ship, crew, and/or CTD sensors. I am appreciating the emphasis on collaboration that occurs for the benefit and safety of the scientific research occurring on the ship.

I will discuss the sample collection technique for the chlorophyll. The main purpose for measuring the chlorophyll is to determine the chlorophyll composition and suitability for single celled algae to develop. These single celled organisms are the basis of the food chain. By determining the amount of chlorophyll, you can look at the probability of organisms to develop at that location, such as plankton. Plankton succeed where there is enough light to allow photosynthesis to occur. Deni Malouf, a marine science technician from the U.S. Coast Guard,



I am measuring a 100 mL water sample to collect chlorophyll on a filter inside the black cups in the wet lab. These containers have a filter that at the bottom. A vacuum draws the water through white tube, leaving the chlorophyll behind on the filter.

and I put on waders, boots, life jackets, gloves and hardhats. We headed out to the CTD to collect water samples from specific depths. After filling up brown bottles (which prevent exposure to sunlight) with water, we transferred the bottles to the wet lab to pour 100 mL through a filter that collects chlorophyll on top while allowing the water to flow through by utilizing a vacuum. This procedure is done while ensuring that the equipment, filters, and water samples avoid contact with your hands, thus

contaminating the sample. After the water has been filtered the filter is placed in a centrifuge tube (vial) with tweezers, covered to avoid exposure to light, and stored in the freezer for lab analysis at a later date. The sample is covered to prevent exposure to sunlight. If not, sunlight could cause more chlorophyll to develop, which would be an inaccurate reading for how much chlorophyll was actually collected at specific depths in the water column at a sampling station.

Personal Log

The work conducted aboard the *McArthur II*, as well as other ships in the NOAA fleet, revolves around a schedule of watches (a watch is a shift). Crewmembers work on the *McArthur II* in

four or eight hour watches. The time of day and length vary for different crewmembers. As for the science team, Bill Peterson, our chief scientist (cruise leader) from NOAA/ Northwest Fisheries Science Center (NWSC), Newport, Oregon, arranged us into 12-hour watches. There is a day watch and night watch. I am part of the day watch, which commences at 7:00 a.m. and ends at 7:00 p.m. You muster (show up) about a half hour before your watch begins so that the previous watch knows you are ready to begin work, and to assist as needed with the end of the previous watch. My watch is comprised of Jay Peterson, Jennifer Mendel, and myself. There is a lot of teamwork and cooperation within the watches. Even this morning, Deni Malouf, who had been working the night watch, stayed on for a portion of the day watch to assist me with the protocol for filling up the water samples from the CTD, for preparing chlorophyll samples, and for setting up the Niskin bottles on the CTD to be deployed at the next station.

Vocabulary



Dry lab- in the back of the O-1 deck (one of the floors on the ship above the waterline) where the computer equipment is situated. Used to monitor CTD deployment.



Wet lab- an indoor lab in the back of the O-1 deck connected where water samples are tested. Contains sinks, freezers, refrigerators, and science equipment.



Vertical net- a net deployed vertically through the water column at one specific location. Has a weight on the bottom of it to maintain its shape on the way through the water column.



Bongo net- a net for collecting organisms, that appears to look like a set of bongo drums. Attached to a cable and the J frame, deployed off the side of the boat, and collects samples as the boat trawls at a specific speed to maximize the collection