



**NOAA Teacher at Sea
Patricia Donahue
Onboard NOAA Ship *Rainier*
August 18 – 23, 2008**

NOAA Teacher at Sea: Patricia Donahue

NOAA Ship *Rainier*

Mission: Hydrographic Survey of Halibut Cove

Geographical Area: Kachemak Bay, Alaska, 59.43.7 N, 151.02.9 W

Date: August 21, 2008

Weather Data from the Bridge at 1000 hours

Broken clouds (7/8)

Visibility 11 to 27 nautical miles

Winds calm

Seas 0-1 ft (light breeze) at 9.4°C

Air pressure 1001.5 millibars and rising slightly

Dry Bulb 12.2°C, Wet Bulb 11.1°C

Cumulus clouds between 3000 and 5000 feet

Science and Technology Log

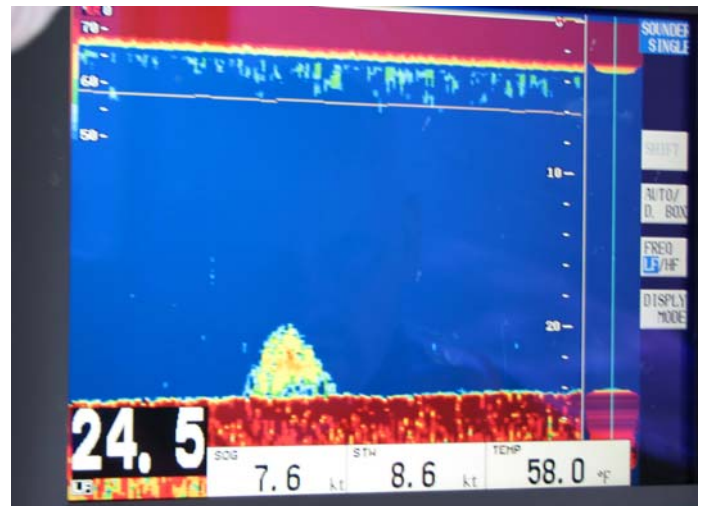
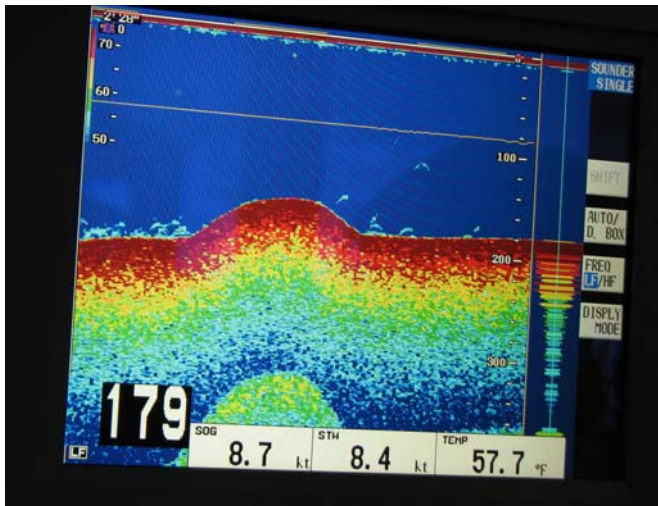
We are anchored in Halibut Cove near a large lagoon too shallow even for the small boats to enter. The nearby mountains have attracted my attention. According to the chart for this area, the two seen off the bow are both 3600 feet high. They have some patches of snow on them. A taller mountain, 4200 feet high, is barely visible in the distance. Nearer the shore some cliffs show evidence of an interesting geological history. Once upon a time, marine sediments collected at the bottom of the sea. The layers built steadily one atop the other, creating organic and clastic sedimentary rocks. The rocks were uplifted to nearly vertical and have eroded. The lighter colored section appears to be limestone but it's difficult to tell from afar. Due to intense tectonic activity in the area, some of the rock was heated and crushed, causing metamorphism. The section next to what I think is limestone looks to be either a metamorphosed limestone or a batholith. I'm hopeful that someone on board knows more geology than I do!

Today I went out on one of the small vessels conducting single beam sonar scanning to determine the depth and shape of the bay bottom. The boat moves across the surface of the sea in straight, parallel lines much like the ones made when cutting the grass with a lawn mower. The



The lines circled in red are the track that the boat follows back and forth in order scan the bottom of the sea. It's a lot like mowing a lawn!

lines in the first picture are the rows that the boat “mows.” The sonar pings go down from the bottom of the boat at a rate of 100 per second! The equipment on board measures how much time passes until the ping returns from the bottom. The longer it takes for the sound signal to bounce back, the deeper the water is in that location. The boat also has another scanner similar to what fishermen use to find schools of fish. Look at these two photographs from the scanner. Which is a school of fish and which is a 27 foot high mound on the ocean floor? The depth of the water is in large numbers in the lower left. The numbers farthest to the right are the ocean temperatures. Why is the water colder where the bottom is deeper?



One of these scans shows a school of fish and the other shows a mound on the sea floor. Can you guess which is which? (Answer: the scan on the left is a mound on the sea floor and the scan on the right is a school of fish.)

Personal Log

The screen above with the “mowing the lawn” lines on it clearly shows an airplane making its way back and forth.



This is a sea otter feasting on a clam! The tiny white spec on its belly is the clam (as marked by the red arrow)

Of course I had to ask, “Why an airplane icon”? I thought they’d tell me that it was for laughs but no, there is a good reason. The airplane icon’s nose keeps in sync with the GPS and the lines better than the ship icon! The surveyors find it easier to know their position.

Animals Seen Today

- Many sea otters – Look closely at the picture to the left. The otter in the picture is eating clam. A shell is balanced on its belly!
- Schools of fish under the boat “seen” by the radar (the third picture above)

- Several types of birds too far away to identify

Vocabulary of the Day

While inputting the weather this morning, I noticed several screens that we did not add data to and rather than skip them, I decided to see what they were about. They were about ice conditions that a ship might encounter and include in a weather report. Here are two new words I didn't have for ice. A ***bergy bit*** is a large piece of floating glacier ice between 100 and 300 square meters in area and showing less than 5 meters but more than 1 meter above sea level. A ***growler*** is smaller than a *bergy bit*. It is larger than 20 square meters in area but less than 1 meter is above the sea surface. Growlers can be transparent, green, or even black in appearance. Since its summer in Alaska, I won't be seeing any *bergy bits* or *growlers*! I also learned that the term *iceberg* has a precise definition. An *iceberg* is a piece of ice afloat or aground that shows more than 5 meters above the sea surface. They are described more specifically by their shape.

Challenge Yourself

Kachemak Bay receives a lot of glacial melt water. Surveyors have a difficult time with the radar equipment when they encounter freshwater because the sound waves travel at a different speed through fresh water than they do through salt water. In which type of water, salt or fresh, does sound travel faster? Why?