NOAA Teacher at Sea
Ginger Redlinger
Onboard NOAA Ship RAINIER
July 15 – August 1, 2007

NOAA Teacher at Sea: Ginger Redlinger
NOAA ship RAINIER
Mission: Hydrographic Survey –Baranof Island Project
Date: July 17, 2007
Peril Strait to Biorka Island

Weather Data from the Bridge
Temp: 56 degrees
Wave height: Negligible
Cloud: Cloudy and Fog
Visibility: ¼ mile or less

Mariner word of the day: Strait A strait is a body of water - straight straits are straight bodies of water, but there are no wiggly straits. (Commanding Officer Noll provided today's definition.)

Science and Technology Log:
I got up early (0600 hours) to be sure to watch the crew navigate the ship from Peril Strait through Neva Strait, and then Olga Strait. Can you imagine navigating a 231 foot ship though a channel that is a slightly wider than the ship and its wake, with only 14 feet of water below the keel? Did you see the visibility distance in the conditions report? Imagine how difficult it would be to see another ship approaching! Well, these people are professionals. The deck hands steered the ship and watched from the decks with binoculars to catch any movement or objects on the surface of the water. The officers monitored two radar screens and checked the bearings constantly as they approached navigation markers. They checked their route on the gyroscope compass to be sure they were not drifting. They constantly communicated with each other in their own terminology so everyone knew exactly who was doing what and where the ship was at all times.

Needless to say, the margin of error for passing through VERY narrow straits is small. The crew made a difficult navigation task looks easy. This crew, deck hands, engineering, electronics, stewards, survey crew, and officers are exemplary. I wish I could describe how well they work as a team – and I will try to help my students understand how important it is to work as a team –everyone has an important job to do.

When the fog cleared a bit I was able to see a variety of jellyfish in the water off the side of the ship. A junior officer told me that when we drop anchor I will see more jelly fish than I can imagine. I just hope my supply of camera batteries holds out!

We will be entering deeper water in a few hours were I will be able to test my sea legs. (Which means that I will find out whether or not I will be seasick, or if will I be ok.) When we enter the sea beyond the bays, harbors, and straits that are protected from the seas constant motion, the boat will begin to move up and down and side to side with the waves and swells. After reading about the experiences of other Teachers at Sea, I decided to go the safe route and begin taking seasickness medicine ahead of time. Does that make me Pollo Del Mar? (Chicken of the Sea – just a little chiste (joke) there!)

If you want to follow our journey on a map start at Juneau, go south to Gastineau Channel then head through Stephen's Passage, north to Peril Strait, then west through Neva and Olga Strait. Pass Stika then head towards Biorka Island. From this area we will head to our hydrography starting location and work as we travel.

A multibeam sonar transducer is installed on the bottom of the hull that will send signals to the ocean bottom and receives the data when it bounces back. How does it work? Commanding Officer Noll describes it best, "The multibeam sonar precisely measures the time and angle of transmission/reception of the sound signal. The Conductivity-Temperature-Depth (CTD) casts help us determine the speed of sound, which more or less allows us to apply Snell's Law layer-based corrections to the ray-tracing of the sound vector that results. The data is converted to a picture of the bottom of the ocean."
Here is a picture of the transducer on the hull of the ship. It is on the bottom of the ship's hull, between the two posts that are holding the ship off the ground.

You may be asking, “why take speed of sound readings in the water before you survey?” Well, the speed of sound changes with the depth of the water so readings that pass through different layers have different velocities. Accounting for those changes by correcting the data creates more accurate charts and maps.
For more information about Snell’s Law and the refraction of sound waves, visit here http://www.kettering.edu/~drussell/Demos/refract/refract.html

The ship runs a 24-hour hydrography work schedule. The boat and crew will continue to collect and process data all day and night. This means that everyone will be working hard the entire time. If you would like to see a short animation clip of this work - click on this link
http://www.oceanservice.noaa.gov/education_new/seafloor-mapping/movies.html

Questions of the Day
How much faster does sound travel in the water than in the air? Why is the velocity of sound faster in deeper waters than at the surface? When you are mapping a deep part of the ocean, what impact would the changing velocity of sound have on the time it takes to travel from the transducer to the bottom, and back to the top again?