



NOAA Teacher at Sea
Barney Peterson
Onboard NOAA Ship RAINIER
August 12 – September 1, 2006

NOAA Teacher At Sea: Barney Peterson
NOAA Ship RAINIER
Mission: Hydrographic Survey
Day 5: Friday, August 18, 2006

Weather Data from Bridge

Visibility: 10 nm
Wind direction: 220°
Wind speed: light 0 – 2 knots
Sea wave height: 0 – 1'
Seawater temperature: 9.4 °C
Sea level pressure: 1017 mb
Cloud cover: cloudy (8/8)

Science and Technology Log

Wednesday I spent time on the bridge, observing what happens when the ship is traveling at sea. My classes at James Monroe Elementary have participated in the GLOBE program, acquiring and sending weather data daily to be used to form a picture of conditions around the world. It was particularly interesting to me to learn that the crew of NOAA ships take much the same readings hourly and report them every 4 – 6 hours to the National Weather Service to help develop the predictions that help us all guide our day to day lives. I was especially impressed that the readings I saw were made using traditional instruments, not an automated electronic weather device.

One of the people in the pilot house logs weather every hour on the hour. There is a **wet and dry bulb thermometer** outside on the starboard wall of the pilot house. (See inset at



Wet and dry bulb thermometers



An anemometer measures wind speed.

the right.) This gives a temperature reading and allows them to calculate relative humidity. That is the difference between how much moisture is in the air, and how much total moisture the air is capable of holding. It is may be expressed as a percentage, or

decimal number. For hourly reporting, the relative humidity is not recorded and it is calculated automatically by when the “Big Weather” is submitted to National Weather Service. Both temperature of the air and sea water are read in °Fahrenheit and converted to °Celsius for reporting.

Wind speed is read from an anemometer mounted on the ship’s mast. This reading is a bit trickier if we are under way. When the ship is moving, the ship’s speed is subtracted from the anemometer reading to give a corrected wind speed. (Otherwise, the reading is like what you would get running while holding a pinwheel in front of you...much faster air movement than what is actually happening.) There is a wind vane mounted on the front of the ship and also an electronic gauge for reading wind direction.



A barometer reads air pressure.

The **barometer** (at left) is used for reading air pressure. It is located on the back wall of the pilot house and always gets a gentle tap before a reading is taken. This measurement is important because trends up or down in air pressure give clues to developing weather systems. The pressure is recorded in millibars. The ship’s barometer is shown at left.

Some measurements involve using experience and personal judgment as well as instruments. These are the ones for wave height, swell height, cloud cover amount, cloud height, and visibility. The accuracy of these readings depends upon the experience and care of the

person making them. The sea wave and swell can be estimated by careful observation, which seems to become second nature to the crew because they are exposed to them all the time. They are recorded in feet. The direction of the swell is always shown as the direction in which the swell is going. It can be measured using a device mounted on the deck outside the pilot house.

Cloud cover is measured in eighths. The observer divides the sky, calculates by observation how many eighths of the sky are covered by clouds, and reports that fraction. Likewise, a person must be a careful observer to note the kind of clouds they are seeing and where they mostly appear in the sky. There is a cloud chart available that shows pictures of cloud types and tells the altitudes at which they are commonly formed. This is a great help.

(The **cloud chart** is shown at the right.) When there low clouds, and is land nearby, the observer



A cloud chart on the NOAA’s National Weather Service Web site.

can check the elevation of a point of land and judge the elevation of the lowest clouds as they appear against that point. Another measurement that may sometimes have to be an experienced estimate is visibility. Again, if land is visible, the observer tells how far away she/he can clearly see according to landmarks and the distances on charts or the ship's radar screens. It is a lot harder to make this judgment when the ship is at sea, with no landmarks to help. That is when experience is especially important. One aid in this case is that the known distance to the horizon, due to the curvature of the earth, is eight nautical miles. That means that if the observer can see clear to the horizon, visibility is at least 8nm.

This day I watched Able Bodied Seaman (AB) Jodi Edmond take weather readings and report "Big Weather" to the National Weather Service using the internet.

Personal Log

I am running about a day behind writing and submitting my logs. There is so much to do and see that I forget to spend enough time writing. I am using the personal journals that my students gave me at the end of the school year to record my impressions and thoughts every evening. Those act as memory-joggers when I sit down at the computer to do my formal writing.

Everyone aboard the RAINIER is very friendly and helpful. I am still making a few wrongs turns or selecting the wrong stairs to get to where I need to go. The officers and crew are great about pointing me in the right direction and giving me clues to help me remember how to find where I need to be when.

Every afternoon the orders for the next day are posted in several spots throughout the ship. These list the survey boats that will be going out, and their crews and assignments. The list also tells about responsibilities on board ship...both for the officers and the crew. These are called the Plan of the Day (POD) and are important for everyone to read when they are posted.

Question of the Day

How is wind direction normally reported: do we tell the direction from which the wind comes, or the direction toward which it is blowing?

Send your answer to the question of the day to barney.peterson@noaa.gov I'll look forward to your emails.

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