



NOAA Teacher at Sea
Eric Heltzel
Onboard NOAA Ship RONALD H. BROWN
September 26 – October 22, 2005

Log 11

NOAA Teacher at Sea: Eric Heltzel
NOAA Ship RONALD H. BROWN
Mission: Stratus 6
Saturday, October 8, 2005

Weather Data from Bridge, 07:00

Temperature: 17 degrees C
Sea level Atmospheric pressure: 1016 mb
Relative Humidity: 70%
Clouds cover: 8/8, stratocumulus, cumulus, cirrus
Visibility: 12 nm
Wind direction: 120 degrees
Wind speed: 16kts.
Wave height: 6 – 8'
Swell wave height: 8 – 10'
Seawater Temperature: 18.2 degrees C
Salinity: 35.3 parts per thousand
Ocean depth: 4890 meters

Science and Technology Log

I've been working with the meteorological team from NOAA in Boulder, Colorado. I've been teamed with Dr. Jessica Lundquist to manage the 13:00 balloon launch. Balloons are launched four times a day at intervals of six hours. A balloon carries an instrument called a radiosonde to a height often exceeding 20 kilometers. Eventually the balloon ruptures and the instrument and spent balloon fall to earth.

When preparing a radiosonde we take the battery pack and add water to activate it. As the battery is soaking, the sonde is attached to the computer interface/radio receiver, and it is activated and calibrated. It is necessary to have real-time weather measurements to input into the sonde so it has a comparison to ensure accuracy. A radio transmitting frequency is selected then the sonde is detached from the interface and attached to the battery. While it is still in the lab, we make sure that data is being transmitted. If all of this goes correctly the radiosonde is set to launch.

We take the activated radiosonde out to the staging bay, which looks a bit like a garage. There are two overhead doors, a workbench, and bottles of helium. We inflate the balloon with helium to a diameter of about five feet. When it is inflated we close the balloon with a zip-tie, then attach the radiosonde by its hook, and close it with another zip-tie. We call the Bridge and let them know we are about to launch a balloon.

Now comes the tricky part, walking out on the fantail of the rolling ship carrying a large balloon in one hand and the radiosonde in the other. Today there 16-knot winds coming from the SE and a wind generated by the ship's speed of an additional 10 knots from due south. To complicate matters further, the superstructure of the ship blocks the wind and creates erratic eddies. We check the wind direction and decide on which corner of the fantail will give us the cleanest launch. Walking aft, the balloon is buffeted by the wind. It pulls and pushes you in various directions while you try to maintain balance on the heaving deck. When you reach the railing, you hold your hands out and release the balloon and radiosonde. If it clears the A frame and the other equipment you stand and watch your balloon ascend until it enters the cloud layer and disappears. We call the Bridge and let them know the balloon is away.

Now we return to the Lab to check that our sonde is sending out data. Measurements of temperature, relative humidity, and atmospheric pressure are taken and sent back every two seconds. The GPS tracking device allows us to know wind speed, wind direction, altitude, and location of the radiosonde. The measurements of temperature and relative humidity allow the computer to calculate the dew point. Data streams in until the balloon reaches an elevation where the atmospheric pressure of about 30, the balloon fails and the radiosonde falls to earth.

Tomorrow: More about radiosonde information.

Questions to Consider

- What is an eddy?
- What will happen to the volume of the balloon as it rises in the atmosphere?
- Why does atmospheric pressure decrease as elevation increases?
- What is the relative humidity when dew point and air temperature are the same?
- What is the adiabatic rate?
- What is a temperature inversion?

Personal log:

I am a Pollywog. Yes, that's right. I'm one of those slimy little creatures with a spherical body and a tail. At least that's what the Shellbacks tell us. A pollywog is a person who has never sailed across the equator and gone through the ceremony and initiation to move onward. Shellbacks are people who have been through these rites. I made the mistake of admitting that I don't know what a Shellback is. I fear that admission will come back to haunt me. Initiation is approaching. I don't know what I'll have to do. I'll keep you posted.