



NOAA Teacher at Sea
Brett Hoyt
Onboard NOAA Ship RONALD H. BROWN
October 8 – October 28, 2006

NOAA Teacher at Sea: Brett Hoyt

NOAA Ship RONALD H. BROWN

Mission: Recovery of Stratus 6 mooring and deployment of Stratus 7 mooring
Recovery of SHOA tsunami warning buoy and deploy a fresh replacement buoy

Day: Thursday, October 12, 2006

Weather Data from Bridge

Visibility: 12nm(nautical miles)

Wind direction: 185° True

Wind speed: 9 knots

Sea wave height: 2-3ft

Swell wave height: 3-4 ft

Sea level pressure: 1011.9 millibars

Sea temperature: 23.9°C or 75.0°F

Air temperature: 21.0°C or 69.8°F

Cloud type: cumulus, stratocumulus

The Scientists

As I mentioned yesterday, today I will begin to introduce the scientists, their equipment, and their experiment/s.

Today I would like to introduce to you Dr. Byron Blomquist (lead scientist) and graduate student Mingxi (pronounced ming-she) Yang, both from the University of Hawaii. They plan to study the exchange of gases between the ocean and the atmosphere.

Dr. Blomquist is a quiet, soft spoken, and self-professed tinkerer. He began his love of science at an early age with a fascination for all things living. He took a great interest in bugs, snakes, birds, and other animals and insects. He stated that Biology was his favorite subject. Dr. Blomquist has a few



Dr. Byron Blomquist (seated) and graduate student Mingxi Yang (standing) beside the Atmospheric Pressure Ionization Mass Spectrometer or APIMS.

interesting facts about himself he is willing to share with us; one is that he works in Hawaii however he lives in Colorado and the other is that he finished high school in only three years!

The other scientist is graduate student Mingxi Yang, we just call him Ming for now but someday we will have to address him as Dr. Yang as he plans on earning his doctorate degree. Ming is a very intelligent and self-confident graduate student from the University of Hawaii. Ming originally was born in Beijing China, when at the age of 14 his family moved to Massachusetts. He originally was going to get a degree in chemistry when in his junior year in college he accepted a summer internship with the Woods Hole Oceanographic Institution. It was during these 12 weeks that Ming decided that he could

impact the world in a more positive way by switching majors and getting a degree in Oceanography.



Mr. Hoyt standing in front of Dr. Blomquist's portable lab. Please note the wires leaving the lab to the left of the photo.

The Machine

The Atmospheric Pressure Ionization Mass Spectrometer or APIMS for short is one of only three that exist worldwide. Dr. Blomquist built this machine from scratch. Many of the components and circuit boards were custom designed and built specifically for this machine. If cool and shiny is your thing and you have \$300,000 in your piggy bank then you might be able

to get Dr. Blomquist to build you one. What cool scientific discovery you make with it is up to you. Many students envision that science takes place only in large land based laboratories, but they would be wrong. Below is the portable (you might need a big truck or ship) laboratory that Dr. Blomquist and Ming brought with them. It's sort of like a camper without the wheels.

The Experiment

We have read about man-made global warming and generally believe that this is not good for the earth and its climate. Scientists also believe that the main source of global warming is the buildup of excess carbon dioxide in the atmosphere. Since it would be impossible to measure everywhere on the earth at the same time scientists use powerful computers to create



Here is a view of the mast at the front of the ship where Dr. Blomquist's instruments are located. Because his instruments are so sensitive, no smoking will be allowed on the bow (front) of the ship during the experiment. The mast is over 20m high that is over 60ft!

models (computer programs) to predict what is happening over the entire earth. The Atmospheric Pressure Ionization Mass Spectrometer or APIMS measures a gas, which in computer models is similar to carbon dioxide. What Dr. Blomquist and Ming are doing is collecting data to compare with model predictions to improve current computer models of the climate. What they are looking for is the interaction between the atmosphere and the ocean. Liquids can and do absorb gasses. To illustrate this open up a can of soda pop. The bubbles you see are the gas carbon dioxide leaving the liquid. The ocean both absorbs and releases carbon dioxide, and therefore plays an important role in climate regulation.

The Teacher

I spent my day interviewing scientist and preparing for upcoming interviews with other



Mr. Hoyt “driving” the ship. The two controls I am holding are how the ship is steered. The ship has no rudder and the pilot need only to rotate these controls to turn the propellers in a different direction. Much like turning the motor on a small boat.

scientist. Tomorrow we enter international waters and the experiments can begin. I will also begin drifter watch. My watch time will be from 8am to 12 noon and 8pm to 12 midnight. I will provide more details tomorrow and discuss drifters and how they are used.

Classroom Activities

Elementary K-6:

Because of the complexity of this experiment we will have no classroom activity but perhaps you could enjoy a bubbly beverage of your choice.

Middle school:

How many liquids could you list

that have dissolved gases in them that are commonly found in the home. What gases do you think they are? Are they harmful to the planet?

High School:

How many liquids could you list that have dissolved gases in them that are commonly found in the home. What gases do you think they are? Are they harmful to the planet?

We will continue to visit with some of the scientists and find out more on what experiments are being conducted on this Stratus 7 cruise and why.