



**NOAA Teacher at Sea
Rebecca Bell
Onboard NOAA Ship DELAWARE II
August 13 – 28, 2008**

NOAA Teacher at Sea: Rebecca Bell]
NOAA Ship DELAWARE II
Mission: Ecosystems Monitoring Survey
Geographical area of cruise: North Atlantic
Date: August 22, 2008

Weather Data from the Bridge

Time: 1919(GMT)
Latitude: 4219.5N
Longitude: 6812.5 W
Air Temp °C: 20.7
Sea Water Temp °C: 19.6

Science and Technology Log

The Shrinky Cup Caper

A trip to sea is not complete without the classic experiment on ocean depth and pressure— Styrofoam cup shrinking. Styrofoam cups are decorated with markers, and then lowered in a bag attached to the cable during a vertical cast.

In our experiments, pressure is measured in decibars (dbar). This means that 1 dbar equals about 1 meter of depth. So 100 dbars = 100 meters; 1000 dbars = 1000 meters.

For every 10m (33ft) of water depth, the pressure increases by about 15 pounds per square inch (psi). At depth, pressure from the overlying ocean water becomes very high, but water is only slightly compressible. At a depth of 4,000 meters, water decreases in volume only by 1.8 percent. Although the high pressure at depth has only a slight effect on the water, it has a much greater effect on easily compressible materials such as Styrofoam.

Styrofoam has air in it. As the cups go down, pressure forces out the air. See the results of the experiment for yourself. The depth of the cast was

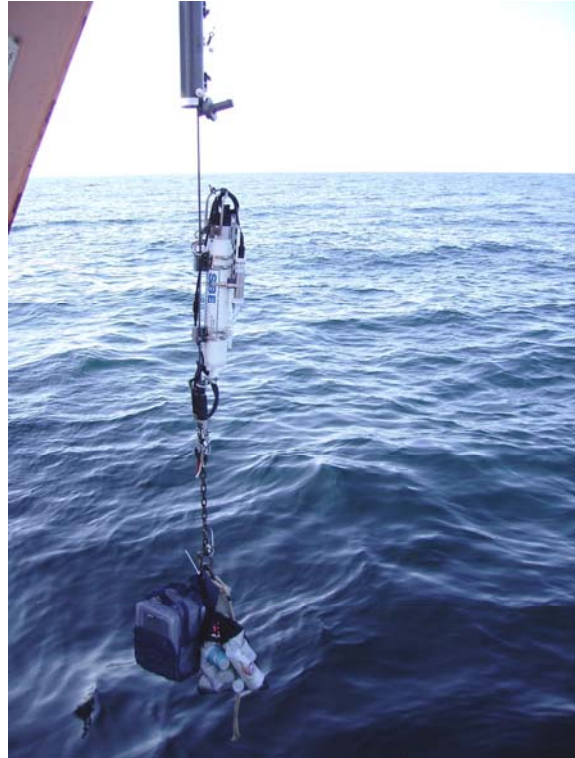


Alison, Shrinky Cup Project Director, with the cups before being sent beneath the water.

200 meters or about 600 feet. (You can now calculate the total lbs of pressure on the cups).



Attaching the bag of cups to cable



Over they go!

Addendum: August 23 note—Alison discovered that putting one of the shrunken cups down a second time resulted in an even smaller cup. The cups were sent to 200 meters again. Below right is a photo of the result of reshinking the cup. Apparently, time has something to do with the final size as well.



The results of what happened to the cups at a depth of 200 meters. The white cups are the original size.



Left, a cup shrunken 2 times; center 1 time; and right, the original size

Resources:

NOAA Ocean Explorer Web site – Explorations; Submarine Ring of Fire

<http://oceanexplorer.noaa.gov/explorations/03fire/logs/feb26/feb26.html>

AMNH Explore the Deep Oceans Lessons

http://www.amnh.org/education/resources/card_frame.php?rid=802&rurlid=700

Personal Log

There is a noticeable difference in the amount of plankton we pull in at different depths and temperatures. I can fairly well predict what we will net based on the depth and temperature at a sample site. I've also noticed that the presence of sea birds means to start looking for whales and dolphins. I assume that where there is a lot of plankton (food) there are more fish and other lunch menu items for birds and dolphins. A high population of plankton means we are more likely to see more kinds of larger animals.

Animals Seen Today

- Salps
- Krill
- Amphipods
- Copepods
- Ctenophores
- Chaetognaths (arrow worms)
- Fish larvae
- Atlantic White-sided Dolphins
- Terns
- Minke whales
- Pilot whales
- Mola mola (4)