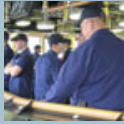




Arctic Seafloor Mapping Project Web Site - arcticseafloormapping.gov



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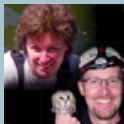
[USCGC Healy](#)



[CCGS Louis S. St-Laurent](#)



[Healy's Science Team](#)



[Teachers](#)

Deep CTD Cast, Part 1: Styrofoam Cups to 3,750 Meters—

The Pressure's On!

August 21, 2010

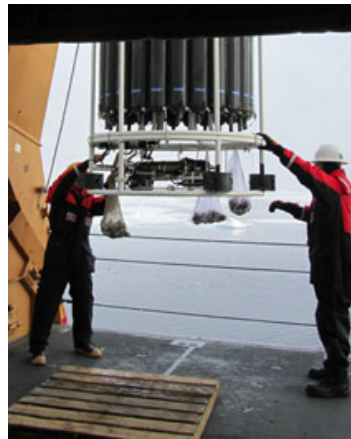
By Helen Gibbons, Web Coordinator, ECS Project

Date: August 21, 2010
 Time: 1354 hours Pacific Daylight Time
 Latitude: 76°46.45'N
 Longitude: 147°17.15'W
 Air temperature: -1.17°C (29.89°F)
 Sea temperature: -1.0°C (30.2°F)
 Wind speed and direction: 7.0 knots from the north
 Ship's speed over the ground: 9.2 knots
 Water depth: 3,816 m

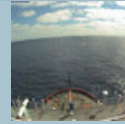
Earlier today, we lowered a CTD rosette to 3,750 m below the sea surface, nearly to the bottom of the 3,800-m-deep seafloor. (The CTD rosette is a frame containing a circle of water-collecting bottles—the “rosette”—with CTD sensors mounted to the bottom for measuring Conductivity, Temperature, and Depth. More about that in a future log...)

Attached to the frame were three mesh bags containing Styrofoam cups that members of the science crew and ship's crew had decorated over the previous couple of days. We were counting on the increase in water pressure as the rosette was lowered toward the seafloor (approximately 1 atmosphere per 10-m increase in depth) to push the air out of the Styrofoam cups and shrink them. Physics says that the water pressure is “hydrostatic,” or equal in all directions. So, we hoped that the shrinkage would be uniform and create “mini” Styrofoam cups.

It took nearly three hours for the CTD rosette and attached bags to make the trip down and back. Although it's fairly common on research cruises to shrink Styrofoam cups by attaching them to sampling gear, we couldn't help but wonder if our attempt would work. We watched eagerly as the rosette was winched back out of the water and the bags were detached from the frame, brought into the lab, and opened up. Soon we saw that our experiment was a success.



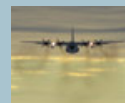
MST1 Lee Brittle (right) steadies the frame of the CTD rosette as MST3 Marshal Chaidez begins detaching the mesh bags containing Styrofoam cups. Once the bags are removed, the frame will be placed onto the pallet and brought into the bay from which this photo was taken. **Credit:** Helen Gibbons, USGS/ECS Project.



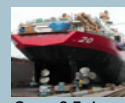
[Hourly Photos from Healy's Aloft Conn](#)



[USCG Logs](#)



[Photos of the Day](#)



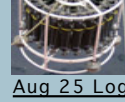
[Sep 05 Log](#)



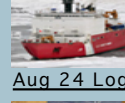
[Aug 29 Log](#)



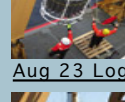
[Aug 28 Log](#)



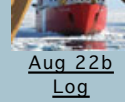
[Aug 25 Log](#)



[Aug 24 Log](#)



[Aug 23 Log](#)



[Aug 22b Log](#)



As good as Christmas: Marshal opens the first bag of cups in the Main Lab. Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project.



Chief scientist Brian Edwards (left) and University of South Florida (USF) research associate Sherwood Liu carefully remove the soggy paper towels from the shrunken cups. Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project.



A closeup view of Mark's cups, with full-size cup on the right for scale. Although the lefthand cup went nearly 4 times as deep as the cup in the center, it did not shrink 4 times as much. We speculate that at a certain depth, all the air has been pressed out of the Styrofoam and no further shrinking takes place as the cup keeps going down. Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project.



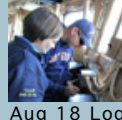
[Aug 22a Log](#)



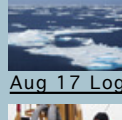
[Aug 21 Log](#)



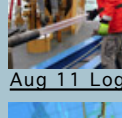
[Aug 20 Log](#)



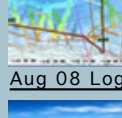
[Aug 18 Log](#)



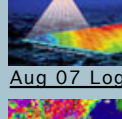
[Aug 17 Log](#)



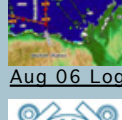
[Aug 11 Log](#)



[Aug 08 Log](#)



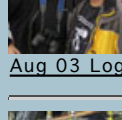
[Aug 07 Log](#)



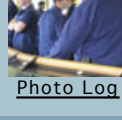
[Aug 06 Log](#)



[Aug 04 Log](#)



[Aug 03 Log](#)



[Photo Log](#)



It worked! Shrunken Styrofoam cups cover the lab table. Following the advice of cup-shrinking veteran Mary McGann (a paleontologist back home in the USGS office in Menlo Park, California), we had put a paper towel into each cup, to help the cups keep their shape and to prevent them from nesting inside one another. Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project



Soon the cups have been rinsed in fresh water and laid out to dry. (There are something like 85 cups here—I lost count.) Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project



LTJG Chris Skapin... Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project.



Before long, the cups were being claimed by their happy owners—such as CDR John Reeves... Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project



USF graduate student Mark Patsavas sent two cups of the same size (16-oz) to different depths, one on today's cast to 3,750 m (left) and one on an August 19 cast to 1,000 m (center). Full-size cup on the right. Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project.



...and chief scientist Brian Edwards. Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project



A closeup view of Mark's cups, with full-size cup on the right for scale. Although the lefthand cup went nearly 4 times as deep as the cup in the center, it did not shrink 4 times as much. We speculate that at a certain depth, all the air has been pressed out of the Styrofoam and no further shrinking takes place as the cup keeps going down. (We are too far north to access the Internet to check on this hypothesis!). Click image for larger view. **Credit:** Helen Gibbons, USGS/ECS Project.



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