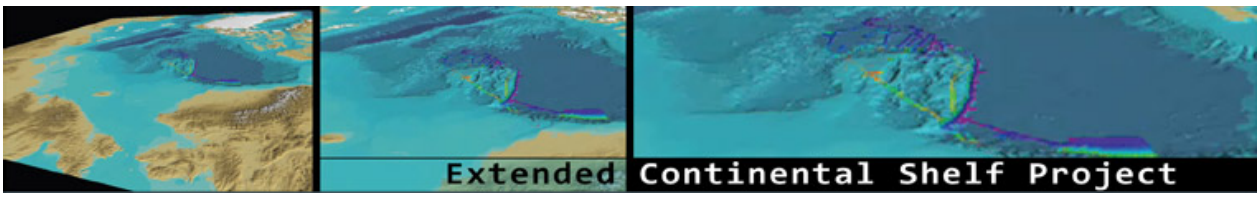
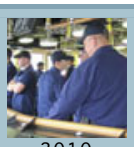
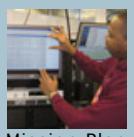
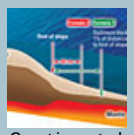


Arctic Seafloor Mapping Project Web Site - arcticseafloormapping.gov


2010 Mission


Mission Plan


Law of the Sea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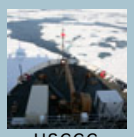
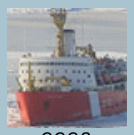

USCGC *Healy*


CCGS *Louis S. St-Laurent*


Healy's Science Team


Teachers

The Mission Begins—From Wind and Waves into Tough Ice

August 8, 2010

Date: August 8, 2010
Time: 0928 hours Alaska Daylight Time
Latitude: 71°55.80'N
Longitude: 138°46.00'W
Air temperature: -0.87°C (30.43°F)
Sea temperature: -1.2°C (29.84°F)
Wind speed and direction: 20.2 knots from the northeast
Ship's speed over the ground: 5.2 knots
Water depth: 2,629 m

Shortly after 1800 hours (Alaska Daylight Time) last evening, August 7, the ship made a wide turn, sailed over our first "waypoint" (name given to points at either end of tracklines), and began mapping the first official line of our expedition, moving north from the edge of the Beaufort Shelf into the deeper water of Canada Basin.

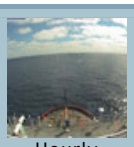
As we began the line, we were in open water, with higher winds and waves than we had yet encountered on the trip: 3-foot wind waves over swells of up to 8 feet. For the first time since we embarked, it was difficult to walk in a straight line. Dinnertime in the crowded mess was touch and go. How embarrassing would it be to careen into someone, especially in front of all the Coasties? I made it from my table to the dessert bar and back by following the all-purpose advice of Football Hall of Fame Coach John Madden: "Keep your head up and your knees bent."

The seas calmed as we sailed north along our mapping line and approached the ice pack. Shortly after midnight, *Healy* was pushing through closely packed ice, with about 9 tenths of the sea surface covered with ice floes. At times it looked as though we were moving through a small continent, with turquoise blue lakes and rivers among low hills of white snow and ice.

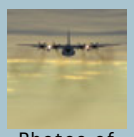
The ship's motion in the ice is quite different from the ponderous

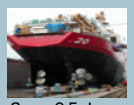
We've been running our mapping systems since we left Dutch Harbor, but at about 1800 hrs (Alaska Daylight Time) on August 7, we began our "official" mapping, in the Beaufort Sea off the northwest corner of Canada. Click image for larger view. Credit: Graphic by Helen Gibbons, USGS/ECS Project; modified from map by Natural Resources Canada, 2008, North Circumpolar Region, in Atlas of Canada.


Spray from a wave breaking against *Healy's* bow. Credit: Helen Gibbons, USGS/ECS Project.


Hourly Photos from *Healy's* Aloft Conn


USCG Logs


Photos of the Day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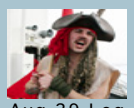
Aug 29 Log


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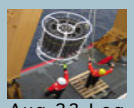
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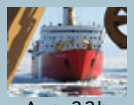
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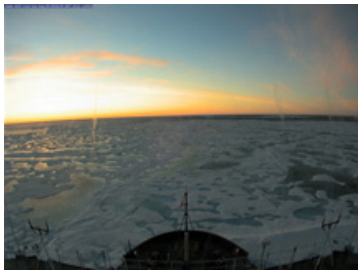


View from *Healy's* Aloft Conn (a high bridge used for steering during icebreaking) as she pushes into a high concentration of ice at 0007 hrs Alaska Daylight Time on August 8. **Credit:** Photo taken by *Healy's* Aloft Conn camera (hourly shots posted on the Web).

pitching and heaving we experienced in the open water. In the ice, the ship stays for the most part level, but lurches and shudders as it hits pieces of ice. Noisy rumbles and the sound of ice scraping against the metal hull mark our passage through the more resistant floes. Many times last night the ship had to resort to "backing and ramming": backing away from the ice and then accelerating to hit it again, sometimes along a slightly different route.

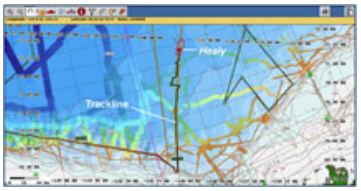
Shot taken by the Aloft Conn cam at 0010 hr shows a patch of dark water and ice fragments in front of *Healy's* bow as she backs up along the track she has just broken to try pushing through on a slightly different route. **Credit:** Photo taken by *Healy's* Aloft Conn camera (hourly shots posted on the Web).

Healy breaks ice with the help of an "ice knife" that projects downward from the hull about 55 ft behind her bow. (Photograph of a model of *Healy* displayed near the bridge.) **Credit**: Helen Gibbons, USGS/ECS Project.

Healy generally breaks ice with the help of an "ice knife" projecting downward from her hull, which both cuts ice that reaches that low and prevents the ship from riding too far onto an ice floe and becoming stuck.

Occasionally the bow slides 10s of feet up onto the ice, and then the weight of the ship causes it to sink down and crush the ice—except when it doesn't. According to USGS geologist Andy Stevenson, at one point last night *Healy* rode partway up onto some tough multiyear ice and then stopped. The ship was successfully maneuvered off the ice, but making forward progress was becoming increasingly difficult. MST1 Josh Miller, a National Ice Center (NIC) ice analyst, came to the rescue around 0130 hrs with the latest satellite data on ice-floe locations. Using this information, the group on the bridge found a way out of the area of tough ice, and the ship resumed mapping the "line."

The ice is beautiful, and plowing through it is exciting, but icebreaking takes it toll on our scientific records. For example, the jolts and sudden lurches of the ship cause gaps in the mapping data collected by our multibeam echosounder. Ice underneath the hull interferes with the multibeam signals, resulting in the gaps.

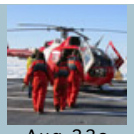


The ship's track along the first "line" of our mapping mission. Guess where the ship encountered closely packed ice! **Credit**: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.

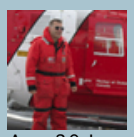
Icebreaking is hard on the multibeam bathymetric data. This image shows a section of bathymetric data collected along our first trackline before we hit the concentrated ice. **Credit**: *Healy* Map Server/Steve

Even the fragmented data that the multibeam system manages to record in heavy ice are valuable in these areas that have not been mapped before.

This image shows a section of


Aug 22a Log


Aug 21 Log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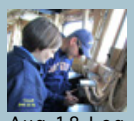
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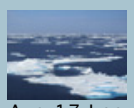
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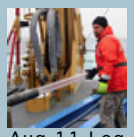
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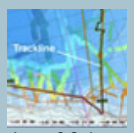
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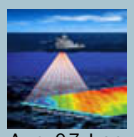
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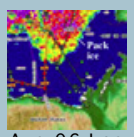
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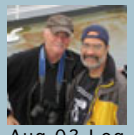
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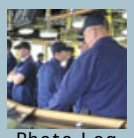
Photo Log

Roberts, National Center for Atmospheric Research.

bathymetric data collected along the same trackline after we ran into the ice. Note the gaps in the data collected in heavy ice. Credit: *Healy* Map Server/Steve Roberts, National Center for Atmospheric Research.