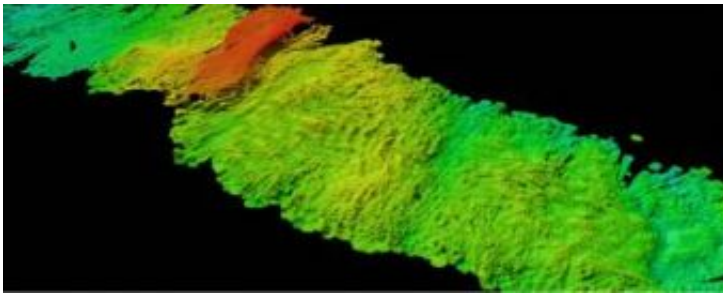


Arctic expeditions find giant mud waves, glacier tracks

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Sonar image of the Arctic Ocean Floor, showing a wavy surface caused by water currents. Credit: Image Courtesy of Ohio State University

Scientists gathering evidence of ancient ice sheets uncovered a new mystery about what's happening on the Arctic sea floor today.

Sonar images revealed that, in some places, ocean currents have driven the mud along the Arctic Ocean bottom into piles, with some “mud waves” nearly 100 feet across.

Around the world, strong currents often create a wavy surface on the ocean bottom. But scientists previously thought the Arctic Ocean was too calm to do so.

Leonid Polyak, a research scientist at Byrd Polar Research Center at Ohio State University, said that it's too early to know how the waves

formed.

“The mud waves could be caused by tidal fluctuations,” he said. “But that's really just speculation at this point.”

Polyak was one of the leaders of an international scientific expedition that crossed the Arctic Ocean in 2005, and he was part of a recent icebreaker expedition in 2007. Both missions took images of the ocean bottom with sonar and drew sediment cores from the ocean bottom.

Now that the sediment cores -- more than 1,000 feet in total -- are stored in a refrigerated facility of the Byrd Polar Research Center on the Ohio State campus, Polyak and his colleagues have begun their analysis.

Martin Jakobsson of Stockholm University in Sweden -- a team member and leader of the geology party in the 2007 expedition -- summarized the early findings of both sonar surveys Thursday, December 13, 2007, at the American Geophysical Union meeting in San Francisco . The presentation was part of a session on Arctic Ocean environmental history, and a related poster session was scheduled for Friday morning.

The 2005 Healy-Oden Trans-Arctic Expedition (HOTRAX) -- a cooperative effort between the United States Coast Guard Cutter Healy and the Swedish icebreaker Oden -- was the first scientific expedition to transit the entire Arctic Ocean in the direction from Alaska to Scandinavia . The scientists took sediment cores from 29 sites along the way.

For the 2007 Lomonosov Ridge off Greenland (LOMROG) expedition, the Oden joined with a Russian nuclear icebreaker called 50 let Pobedy (“50 Years of Victory”) to explore a smaller, difficult to access region of the Arctic Ocean near Greenland.

Both expeditions took images of the ocean bottom with a sonar system that also allowed them to view layers of sediment up to 1000 feet below ground.

The purpose of HOTRAX and LOMROG was to gather a sediment record of how the Arctic has changed over time, and also to find evidence of the ancient ice sheets that helped shape the Arctic Ocean seafloor. Scientists hope to use what they learned to better understand how water is exchanged between the basins, and how the Arctic affects (and is affected by) global climate systems.

This is a critical time for the Arctic, Polyak said. In the summer of 2007, much less ice covered the region than during any other time in the last century.

“Even a couple of years ago, we wouldn't have predicted that so little ice would cover the Arctic Ocean ,” he said. “It really looks like we may be living in a completely different world 20 to 30 years from now, with no ice in the Arctic in summer at all.”

The expeditions proved that giant ice masses once covered the arctic -- ice flows massive enough to scrape the ocean bottom half a mile deep. Sonar clearly showed the parallel grooves that ice flows carved in the sea floor, and boulders and other debris that the ice left behind.

As the scientists study the sediments and images in detail, they will focus on more recent Earth history -- specifically the last 150,000 years -- to find out how conditions during warm periods in the recent past resemble what we will likely have in the near future.

The mud waves that they spied on the ocean floor are another mystery, one that the scientists haven't begun to probe.

“Frankly, we have so much material to go through, and we've only just started,” Polyak said. “The goal is to establish a climate record in the sediments. To figure it out, we'll go through the cores centimeter by centimeter.”

Source: Ohio State University

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