

Warming ocean melts Greenland glaciers

September 23 2009, By KARL RITTER , Associated Press Writer



TO GO WITH CLIMA 09 GROENLANDIA-GLACIARES - This Aug. 23, 2009 file photo shows University of Maine glaciologist Gordon Hamilton, left, and graduate student Kristin Schild waiting for a helicopter after placing GPS receivers on Helheim Glacier in southeast Greenland. Like Greenland's other major glaciers, it accelerated earlier this decade, contributing to the melt of the ice sheet and sea level rise. (AP Photo/Karl Ritter, File)

(AP) -- With whale fins splashing in the distance, Ruth Curry hauls up her catch from the blustery deck of an icebreaker.

An orange tube fixed to a metal frame breaks the surface as the motorized winch stops groaning. Inside: data on the [water temperature](#) deep down in this glacial fjord off southeast [Greenland](#).

"If you were to dip your hand in it, it doesn't seem that warm," says Curry, an American climate scientist. "But it is. It's warm enough to melt ice. And that's the important thing here."

Curry and her colleagues from the Woods Hole Oceanographic Institution in Massachusetts zigzagged between majestic icebergs in the Sermilik fjord last month in search of proof that waters from warmer latitudes, or subtropical waters, are flushing through this remote and frigid region.

They found it - all the way up to the base of the outlet [glaciers](#) that spill into the ocean like tongues of ice from Greenland's massive ice sheet.

Coupled with similar findings off western Greenland, the discovery could help to explain why the glaciers have started flowing quicker in the past decade, a phenomenon that raised alarm because it contributes to rising sea levels.

"The measurements alone are not enough to conclude that the glacial melt is to a high degree driven by subtropical water. But I think the story is (starting) to come together," says research leader Fiamma Straneo.

The team found subtropical water with a temperature of about 39 Fahrenheit (4 degrees Celsius) deep inside the Sermilik fjord.

The findings confirm the outcome of an undersea battle below the dark surface of the North Atlantic: Arctic waters that usually dominate this region have yielded to an influx of subtropical water carried north by westward branches of the current commonly called the Gulf Stream.

Scientists say it's a natural process - in one period the cold waters will have the upper hand, and in the next it's the other way round. But the rapidly increasing temperatures of the subtropical oceans suggest that the balance could be tilted beyond natural variability, Curry says.

"We've actually measured the waters at their source and have seen their temperature going up, up, up in a way that can't be explained without

taking into account human influences," she says.

The research underscores the complex interaction between the world's oceans and a warming atmosphere.

Oceans help to contain global warming by absorbing about half of the carbon dioxide released by humans into the atmosphere, but the water also expands as it warms, raising sea levels.

It could also have a big impact on climate through feedback mechanisms, such as the melting of seaside glaciers and changes to ocean currents that warm or cool different parts of the globe.

In the June-August period, the world's ocean surface temperature was the warmest on record since 1880, according to the U.S. National Oceanic and Atmospheric Administration. The surface temperature was 62.5 F (17 Celsius), 1 degree F (0.6 degrees C) above the 20th century average. Meteorologists say the reason was El Nino weather patterns combined with manmade global warming.

The North Atlantic has seen especially large changes in recent years.

The temperature of the water that flows into the Arctic has increased by as much as 3.5 degrees F (2 degrees C) since the 1990s, says Helge Drange, professor of oceanography at Norway's University of Bergen. "This can only be understood as a combined effect of natural variability and manmade warming," he says.

That has had a big impact on marine ecosystems, with fish traveling north into waters that were previously too cold for them. For example, more than 20 new species of fish have been found off Iceland, including blue sharks and flounders.

Meanwhile, cod has followed the warm water as it flows around Greenland's southern tip and up the giant island's west coast. "If you talk to local people they say it's fantastic because the Atlantic cod is coming," Drange says.

To many scientists, however, the shifts in ocean currents are no cause for celebration. Even if there's natural variability, there's concern that global warming may make the fluctuations more extreme.

And while some species thrive in warmer water, others that live on the edge of the [Arctic](#), such as polar bears and seals, find their habitat melting away.

"We're heading off to a climate extreme and this is just going to snowball," says Curry, reflecting on the state of the global climate on the Greenpeace icebreaker hosting the Woods Hole research team.

"I think that we've done it, really kicked Earth's climate system. And that says a lot," she says. "It's a beast. It's huge. And to have moved it in as short a period of time as a 100 years, basically, to have done that is enormous."

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Citation: Warming ocean melts Greenland glaciers (2009, September 23) retrieved 16 June 2024 from <https://phys.org/news/2009-09-ocean-greenland-glaciers.html>

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