



News : January 07, 2009 | Climate Change

Yellow Submarine to Probe Antarctica Glacier

A yellow robot submarine will dive under an ice shelf in Antarctica to seek clues to world ocean level rises in one of the most inaccessible places on earth.



Robot Sub

Adrian Jenkins of the British Antarctic Survey inspects the robot submarine that will dive under an ice shelf in Antarctica to seek clues to world ocean level rises (Photo: Reuters)

The 7-meter (22 ft) submarine, to be launched from a U.S. research vessel, will probe the underside of the ice at the end of the Pine Island glacier, which is moving faster than any other in Antarctica and already brings more water to the oceans than Europe's Rhine River.

Scientists have long observed vast icebergs breaking off Antarctica's ice shelves—extensions of glaciers floating on the sea—but have been unable to get beneath them to see how deep currents may be driving the melt from below.

They are now stepping up monitoring of Antarctica, aware that any slight quickening of a thaw could swamp low-lying Pacific islands or incur huge costs in building defenses for coastal cities from Beijing to New York. The rate of flow of the Pine Island glacier in west Antarctica has quickened to 3.7 km (2.3 miles) a year from 2.4 km in the mid-1990s.

"It's taken everyone by surprise," Adrian Jenkins, leader of the "Autosub" mission at the British Antarctic Survey, told Reuters just before leaving this week after preparations in Chile. The submarine cost several million dollars to develop. "If you just make measurements at the ice front all you have is a black box," Jenkins said. "What we are doing is observing what is going on within the box."

Antarctica holds more than 90 percent of the world's fresh water and would raise ocean levels by 57 meters (190 ft) if it were all to melt, which would take thousands of years.



Picture Gallery (click on the picture to start)

Princess Elisabeth Antarctica research station relies on renewable energy and sustainable waste treatment. See how it works (Photo: International Polar

Foundation)

The U.N. Climate Panel projected last year that world sea levels would rise between 18 and 59 cm (7-24 inches) by the year 2100, driven by global warming caused mainly by human emissions of greenhouse gases from burning fossil fuels.

"Pine Island glacier and the glacier alongside, the Thwaites, are moving faster than any other glaciers in Antarctica," said Stan Jacobs, the chief scientist on the icebreaker, of Columbia University in the United States. "They are also accelerating," he said aboard the U.S. Nathaniel B. Palmer vessel in Punta Arenas at the southern tip of Chile just before the 54-day voyage.

Pine Island, Thwaites and the nearby Crosson glacier add 0.25 mm a year to global sea levels—2.5 cm over a century even if unchanged.

The Autosub, driven by 5,000 batteries of the kind used to power torches, has a top speed of 3.4 knots, a range of 400 km (250 miles) and can dive to 1,600 meters. The Pine Island ice shelf is about 400 meters thick at its seaward edge on the Amundsen Sea. Other projects the research vessel will carry out include tethering devices to the seabed to monitor ocean temperature, salinity and currents for two years.

At Pine Island, the thinning of the shelf seems to be linked to a shift in deep ocean currents that are bringing warmer water from the depths and melting the ice. No one knows why. On the Antarctic peninsula further north, several ice shelves have disintegrated in recent years apparently because of a 3 degrees Celsius (5.4 Fahrenheit) warming of air temperatures in the past 50 years that may be linked to global warming. In much of Antarctica, temperatures are little changed.

Whatever the causes, glaciers may slide off the land more quickly if ice shelves vanish, adding water to the ocean and nudging up sea levels. "You have to start worrying whether the system is speeding up, moving ice more rapidly into the ocean than it was even 50 years ago," Jacobs said. Shifts in winds might be causing currents to suck warmer water from deeper parts of the ocean.

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The submarine, which takes sonar readings and measurements of the saltiness of the water under the ice—glacier ice is made of fresh water—is the successor to one lost near the start of a similar mission in 2005 beneath an ice shelf in east Antarctica.

"People are surprised to hear that it's powered by 5,000 'D' sized alkaline torch batteries," said Steve McPhail of the British National Oceanography Centre in Southampton who engineered the Autosub.

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"This is the most economical way of powering a submarine like this," he said. The submarine is due to make a half-dozen missions under the ice—its route has to be programmed in advance but it can maneuver around hazards. He said the submarine is yellow because it makes it easy to spot when it surfaces, and its color has "absolutely nothing" to do with the Beatles song "Yellow Submarine".

editor: Alister Doyle (Reuters)

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