

Thinning glaciers driving polar ice loss, satellite survey finds

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Satellite survey of Greenland and Antarctic ice sheets reveals extensive network of rapidly thinning glaciers that is driving ice loss in the regions.

A comprehensive satellite survey of the Greenland and Antarctic ice sheets has revealed an extensive network of rapidly thinning glaciers that is driving ice loss in the regions.

The most profound loss of ice was seen along the continental coastlines, where glaciers speed up as they slip into the sea. In some regions, glaciers flowing into surrounding waters were thinning by nearly 10m a year.

Scientists used data from Nasa's ICESat (Ice, Cloud and and land Elevation Satellite) to piece together a picture of the changing fortunes of glaciers on the ice sheets. The satellite bounces laser light off the ground, allowing researchers to measure the terrain with extraordinary precision.

The survey, compiled from 50m satellite measurements taken between February 2003 and November 2007, shows glaciers thinning at all latitudes in Greenland and along key Antarctic coastlines. Thinning penetrated deep into the interior of the ice sheets and continues to spread as ice shelves melt into the sea.

"We were surprised to see such a strong pattern of thinning glaciers across such large areas of coastline. It's widespread and in some cases, thinning extends hundreds of kilometres inland," said Hamish Pritchard who led the study at the British Antarctic Survey.

In Greenland, glaciers in the south-east were found to be flowing at speeds of more than 100m per year, during which they thinned by 84cm. More slow-going glaciers lost around 12cm a year.

In a vast region of western Antarctica that drains into the Amundsen Sea, the Pine Island glacier and neighbouring Smith and Thwaites glaciers are thinning by 9m a year, the satellite measurements show. The study is published in the journal Nature.

Previous satellite surveys of polar regions have relied upon radar measurements that cannot map the Earth's surface with the same precision as the ICESat laser rangefinder. The satellite allows scientists to take 65m-wide snapshots of the ground, giving an unprecedented view of glaciers on the steep terrain where ice meets ocean.

This satellite survey helps scientists explore how different aspects of climate change are driving ice loss in polar regions. Higher air temperatures can increase surface melting, but

warm ocean currents accelerate ice loss more when glaciers flow into the sea.

“The majority of the thinning we see is not due to increased melting from higher atmospheric temperatures, but because the glaciers are flowing faster thanks to their interaction with the oceans,” said Prof David Vaughan, a co-author on the study.

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