

Greenland's glaciers disappearing from the bottom up

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Water warmed by climate change is taking giant bites out of the underbellies of [Greenland's glaciers](#). As much as 75 per cent of the ice lost by the glaciers is melted by ocean warmth.



"There's an entrenched view in the public community that glaciers only lose ice when icebergs calve off," says Eric Rignot at the University of California, Irvine. "Our study shows that what's happening beneath the water is just as important."

In the summer of 2008, Rignot's team measured salinity, temperature and current speeds near four calving fronts in three fjords in western Greenland. They calculated melting rates from this data.

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The underwater faces of the different glaciers retreated by between 0.7 and 3.9 metres each day, representing 20 times more ice than melts off the top of the glacier. This creates ice overhangs that crumble into the sea, says Paul Holland at the British Antarctic Society.

Warming water may also be [unlocking ice](#) from the seabed, removing the buttresses that stop inland ice sliding out to sea, says Rignot. This is one way that warming oceans could be helping to shift Greenland's ice off the land and out to sea.

Glaciologist Eric Steig at the University of Washington in Seattle says the importance of bottom-melting by warm ocean water was well-known in Antarctic glaciers. "But this is the first study to strongly indicate that it is occurring in Greenland too," he says.

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