

# New research sheds light on Antarctica's melting Pine Island Glacier

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New results from an investigation into Antarctica's potential contribution to sea level rise are reported this week (Sunday 20 June) by scientists from the British Antarctic Survey (BAS), Lamont-Doherty Earth Observatory (LDEO) and the National Oceanography Centre in the journal *Nature Geoscience*.

Thinning ice in West Antarctica is currently contributing nearly 10 per cent of global [sea level rise](#) and scientists have identified Pine Island Glacier (PIG) as a major source. As part of a series of investigations to better understand the impact of melting ice on sea level an exciting new discovery has been made. Using Autosub (an autonomous underwater vehicle) to dive deep and travel far beneath the pine Island Glacier's floating [ice shelf](#), scientists captured ocean and [sea-floor](#) measurements,

which revealed a 300m high ridge (mountain) on the sea floor.

Pine Island Glacier was once grounded on (sitting on top of) this underwater ridge, which slowed its flow into the sea. However, in recent decades it has thinned and disconnected from the ridge, allowing the glacier to move ice more rapidly from the land into the sea. This also permitted deep warm ocean water to flow over the ridge and into a widening cavity that now extends to an area of 1000 km<sup>2</sup> under the ice shelf. The warm water, trapped under the ice, is causing the bottom of the ice shelf to melt, resulting in continuous thinning and acceleration of the glacier.

Lead author Dr Adrian Jenkins of [British Antarctic Survey](#) said, "The discovery of the ridge has raised new questions about whether the current loss of ice from Pine Island Glacier is caused by recent [climate change](#) or is a continuation of a longer-term process that began when the glacier disconnected from the ridge.

"We do not know what kick-started the initial retreat from the ridge, but we do know that it started some time prior to 1970. Since detailed observations of Pine Island Glacier only began in the 1990s, we now need to use other techniques such as ice core analysis and computer modelling to look much further into the glacier's history in order to understand if what we see now is part of a long term trend of ice sheet contraction. This work is vital for evaluating the risk of potential wide-spread collapse of West Antarctic glaciers."

Co-author Stan Jacobs adds: "Since our first measurements in the Amundsen Sea, estimates of Antarctica's recent contributions to sea level rise have changed from near-zero to significant and increasing. Now finding that the PIG's grounding line has recently retreated more than 30 km from a shallow ridge into deeper water, where it is pursued by a warming ocean, only adds to our concern that this region is indeed the

'weak underbelly' of the West Antarctic Ice Sheet. Increased melting of continental ice also appears to be the primary cause of persistent ocean freshening and other impacts, both locally and downstream in the Ross Sea."

**More information:** Nature Geoscience paper: Observations beneath Pine Island Glacier West Antarctica and implications for its retreat

Provided by British Antarctic Survey

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