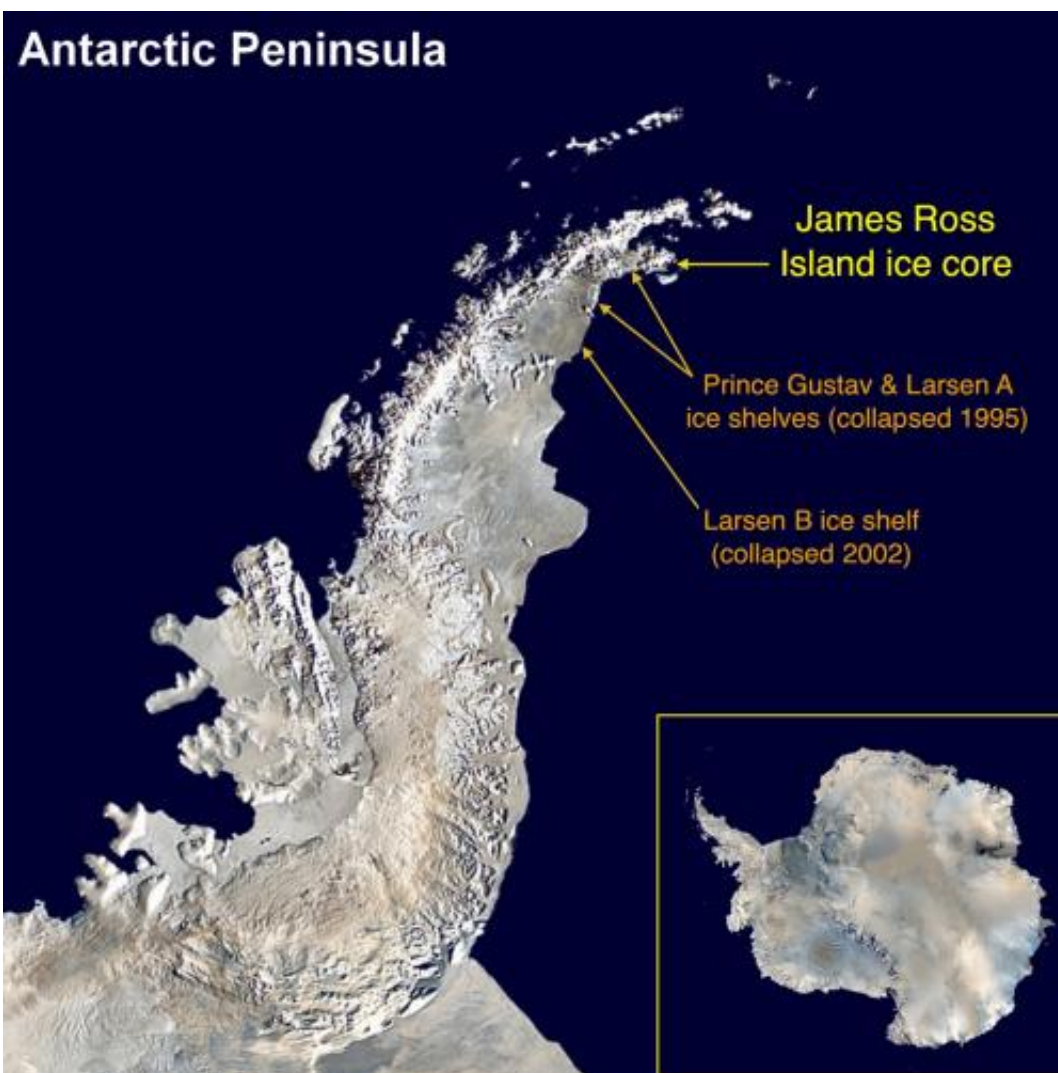


1000-year Antarctic Peninsula climate reconstruction provides new insight into accelerating ice melt

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Credit: British Antarctic Survey

A new 1000-year Antarctic Peninsula climate reconstruction shows that summer ice melting has intensified almost ten-fold, and mostly since the mid 20th Century. Summer ice melt affects the stability of Antarctic ice shelves and glaciers.

The research, published this week in the journal *Nature Geoscience*, adds new knowledge to the [international effort](#) that is required to understand the causes of [environmental change](#) in Antarctica and to make more accurate projections about the direct and indirect contribution of Antarctica's ice shelves and glaciers to [global sea level](#) rise.

In 2008 a UK-French science team drilled a 364-metre long ice core from James Ross Island, near the northern tip of the [Antarctic Peninsula](#), to measure past temperatures in the area. They discovered that this ice core could also give a unique and unexpected insight into ice melt in the region.

Visible layers in the ice core indicated periods when summer snow on the ice cap thawed and then refroze. By measuring the thickness of these melt layers the scientists were able to examine how the history of melting compared with changes in temperature at the ice core site over the last 1000-years.

Lead author Dr Nerilie Abram of The Australian National University and [British Antarctic Survey](#) (BAS) says,

"We found that the coolest conditions on the Antarctic Peninsula and the lowest amount of summer melt occurred around 600 years ago. At that time temperatures were around 1.6°C lower than those recorded in the late 20th Century and the amount of annual snowfall that melted and refroze was about 0.5%. Today, we see almost ten times as much (5%) of the annual snowfall melting each year.

"Summer melting at the ice core site today is now at a level that is higher than at any other time over the last 1000 years. And whilst temperatures at this site increased gradually in phases over many hundreds of years, most of the intensification of melting has happened since the mid-20th century."

This is the first time it has been demonstrated that levels of ice melt on the Antarctic Peninsula have been particularly sensitive to increasing temperature during the 20th Century.

Dr Abram explains, "What that means is that the Antarctic Peninsula has warmed to a level where even small increases in temperature can now lead to a big increase in summer ice melt."

Dr Robert Mulvaney from the British Antarctic Survey led the ice core drilling expedition and co-authored the paper. He says,

"Having a record of previous melt intensity for the Peninsula is particularly important because of the glacier retreat and ice shelf loss we are now seeing in the area. Summer ice melt is a key process that is thought to have weakened ice shelves along the Antarctic Peninsula leading to a succession of dramatic collapses, as well as speeding up glacier ice loss across the region over the last 50 years."

In other parts of Antarctica, such as the West Antarctic Ice Sheet, the picture is more complex and it is not yet clear that the levels of recent ice melt and glacier loss are exceptional or caused by human-driven climate changes.

Dr Abram concludes, "This new [ice core](#) record shows that even small changes in temperature can result in large increases in the amount of melting in places where summer temperatures are near to 0°C, such as along the Antarctic Peninsula, and this has important implications for [ice](#)

instability and [sea level rise](#) in a warming climate."

More information: Acceleration of snowmelt in an Antarctic Peninsula ice core during the twentieth century by Nerilie Abram, Robert Mulvaney, Eric Wolff, Jack Triest, Sepp Kipfstuhl, Luke Trusel, Françoise Vimeux, Louise Fleet and Carol Arrowsmith is published in *Nature Geosciences* 14 April 2013. [dx.doi.org/10.1038/ngeo1787](https://doi.org/10.1038/ngeo1787)

Provided by British Antarctic Survey

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