



Press Release

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Fracture threat to Antarctic ice could trigger sea-level rise

A platform of ice surrounding Antarctica nearly four times the size of the UK is at risk of collapse as the effects of climate change threaten to destabilise it, a study suggests.

More than 350,000 square miles of floating ice shelves that extend from the world's largest ice sheet into the sea could split if fractures on their surface are submerged by meltwater produced as the climate warms, researchers say.

Sudden loss of these supportive structures could rapidly accelerate the flow of upstream ice into the ocean, raising sea levels around the world. Previous studies have suggested that sea levels could rise by as much as one metre by 2100.

A team involving geoscientists from the University of Edinburgh identified areas at risk from a process called hydrofracturing. Their model was validated using a fracture map created by using AI and machine learning to analyse satellite images of Antarctica.

The findings show that around 60 per cent of the ice-shelf area that buttresses the ice sheet is vulnerable. The weight of water from increased surface melting could enlarge fractures in these sections of ice, putting them at risk of collapse, the team says.

Surface melting in Antarctica is likely to increase significantly in the future unless major steps are taken to tackle climate change. The collapse of Antarctica's ice shelves could impact millions of people living in low-lying communities around the world, researchers say.

The study, published in the journal *Nature*, was led by researchers from Columbia University in the US. It also involved Utrecht University and Google. The work received supported from the National Science Foundation and the Dutch Research Council.

Dr Martin Wearing, of the University of Edinburgh's School of GeoSciences, who took part in the study, said: "We've seen in the past that the sudden collapse of ice shelves can trigger rapid acceleration of the glaciers that flow into them, and, in turn, sea-level rise. We have found that stresses within vast sections of Antarctica's ice shelves are sufficiently large that they could collapse if, as climate models predict, surface melting increases substantially in coming years.

"We hope our use of machine learning is a first step towards further applications of AI in the analysis of the ever-growing quantity of data from the Polar Regions."

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