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Clue to break-up of ice shelves



Iceberg (AAAS)

The factors behind the calving process were not well understood

US researchers have come up with a way to predict the rate at which ice shelves break apart into icebergs.

These sometimes spectacular occurrences, called calving events, are a key step in the process by which climate change drives sea level rise.

Computer models that simulate how ice sheets might behave in a warmer world do not describe the calving process in much detail, Science journal reports.

Until now, the factors controlling this process have not been well understood.

Ice sheets, such as those in Antarctica and Greenland, spread under their own weight and flow off land over the ocean water.

Ice shelves are the thick, floating lips of ice sheets or glaciers that extend out past the coastline.

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Timelapse footage of an iceberg breaking away from a glacier in July 2008. The event took approximately 15 minutes (Video: Fahnstock/UNH)

The Ross Ice Shelf in Antarctica floats for as much as 800km (500 miles) over the ocean before the edges begin to break and create icebergs. But other ice shelves may only edge over the water for a few kilometres.

A team led by Richard Alley at Pennsylvania State University, US, analysed factors such as thickness, calving rate and strain rate for 20 different ice shelves.

"The problem of when things break is a really hard problem because there is so much variability," said Professor Alley.

"Anyone who has dropped a coffee cup knows this. Sometimes the coffee cup breaks and sometimes it bounces."

The team's results show that the calving rate of an ice shelf is primarily determined by the rate at which the ice shelf is spreading away from the continent.

The researchers were also able to show that narrower shelves should calve more slowly than wider ones.

Ice cracking off into the ocean from Antarctica and Greenland could be the main contributor to global sea level rise in the future.

If all the ice in Greenland and Antarctica melted, seas would rise by more than 60m (200ft).

The UN Intergovernmental Panel on Climate Change in its 2007 assessment forecast that seas could rise by 18 to 59 cm (7-23ins) this century. However, in giving those figures, it conceded that ice behaviour was poorly understood.