

Arctic sea ice may have passed crucial tipping point

- 13:34 27 March 2012 by [Fred Pearce](#)
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The disappearance of Arctic sea ice has crossed a "tipping point" that could soon make ice-free summers a regular feature across most of the Arctic Ocean, says a British climate scientist who is setting up an early warning system for dangerous climate tipping points.



The sea ice has not recovered since this low in summer 2007. The Northwest Passage opened for the first time, between the Atlantic Ocean (top) to the Pacific Ocean (bottom right) (*Image: NASA/GSFC/Scientific Visualization Studio/Science Photo Library*)

[Tim Lenton at the University of Exeter](#) has carried out a day-by-day assessment of Arctic ice-cover data collected since satellite observation began in 1979. He presented his [hotly anticipated findings](#) for the first time at the [Planet Under Pressure conference in London](#) on Monday.

Up until 2007, sea ice systematically fluctuated between extensive cover in winter and lower cover in summer. But since then, says Lenton, the difference between winter and summer ice cover has been a million square kilometres greater than it was before, as a result of unprecedented summer melting. These observations are in contrast to what models predict should have happened.

Permanent alteration

Despite fears of runaway sea-ice loss after summer cover hit an all-time low in 2007 – [opening the Northwest Passage for the first time in living memory](#) – modelling studies based on our best understanding of ice dynamics indicated the ice cover should fully recover each winter. "They suggest that even if the ice declined a large amount in one year, it should bounce back," says Walt Meier of the US National Snow and Ice Data Center in Boulder, Colorado.

Instead, Lenton's research shows a permanent alteration. According to data from the past five years, the Arctic sea ice has not recovered from the 2007 extreme low. "The system has passed a tipping point," he says.

What caused the change is still unclear. Lenton speculates that the exceptional low in 2007 (pictured, above right) might have allowed the ocean to absorb so much heat that a lot of the thicker multiyear ice, which used to persist through the summer, was melted. Alternatively, the loss of ice may have changed air circulation patterns above the Arctic in ways that have similarly "locked in" the change.

Tsunami risk

Other glaciologists would not comment before seeing the details of the analysis, which have yet to be published in a journal. But if the findings are confirmed, they say, the existing models will have to be rewritten.

Elsewhere at the conference, Euan Nisbet of Royal Holloway, University of London, offered one particularly scary consequence of Arctic warming. He warned on Tuesday that warming ocean currents east of Greenland were [melting ice in the seabed](#).

This could trigger landslides on steep submarine slopes in the area, unleashing tsunamis capable of hitting the UK, and releasing buried methane that could amplify global warming. Something similar happened off Norway 8000 years ago in a similar geological setting, Nisbet told *New Scientist*.