

Coral links ice to ancient 'mega flood'

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Scientists drilled down to the sea floor to collect coral samples. Photo: IODP

(PhysOrg.com) -- Coral off Tahiti has linked the collapse of massive ice sheets 14,600 years ago to a dramatic and rapid rise in global sea-levels of around 14 metres.

Previous research could not accurately date the [sea-level rise](#) but now an Aix-Marseille University-led team, including Oxford University scientists Alex Thomas and Gideon Henderson, has confirmed that the event occurred 14,650-14,310 years ago at the same time as a period of [rapid climate change](#) known as the Bølling warming.

The finding will help scientists currently modelling future climate change scenarios to factor in the dynamic behaviour of major ice sheets.

A report of the research is published in this week's *Nature*.

"It is vital that we look into Earth's geological past to understand rare but high impact events, such as the collapse of giant ice sheets that occurred 14,600 years ago," said Dr Alex Thomas of Oxford University's Department of Earth Sciences, an author of the paper. "Our work gives a window onto an extreme event in which deglaciation coincided with a dramatic and rapid rise in [global sea levels](#) – an ancient 'mega flood'. Sea level rose more than ten times more quickly than it is rising now! This is an excellent test bed for climate models: if they can reproduce this extraordinary event, it will improve confidence that they can also predict future change accurately."

During the Bølling warming high latitudes of the Northern hemisphere warmed as much as 15 degrees Celsius in a few tens of decades. The team has used dating evidence from Tahitian corals to constrain the sea level rise to within a period of 350 years, although the actual rise may well have occurred much more quickly and would have been distributed unevenly around the world's shorelines.

Dr Thomas said: "The Tahitian coral is important because samples, thousands of years old, can be dated to within plus or minus 30 years. Because Tahiti is an ocean island, far away from major ice sheets, sea-level evidence from its coral reefs gives us close to the 'magic' average of sea levels across the globe, it is also subsiding into the ocean at a steady pace that we can easily adjust for."

The research is part of a large international consortium, the Integrated Ocean Drilling Program (IODP), and the [coral](#) samples were obtained by drilling down to the sea floor from a ship positioned off the coast of Tahiti.

What exactly caused the Bølling warming is a matter of intense debate: a leading theory is that the ocean's circulation changed so that more heat was transported into Northern latitudes.

The new sea-level evidence suggests that a considerable portion of the water causing the sea-level rise at this time must have come from melting of the ice sheets in Antarctica, which sent a 'pulse' of freshwater around the globe. However, whether the freshwater pulse helped to warm the climate or was a result of an already warming world remains unclear.

The UK's contribution to this research, and involvement in the IODP programme, was funded through the Natural and Environmental Research Council (NERC), and was supported by the Oxford Martin School.

A report of the research, '[Ice-sheet](#) collapse and sea-level rise at the Bølling warming 14,600 years ago', is published in the journal *Nature*.

The team comprised researchers from Aix-Marseille University (France), Oxford University's Department of Earth Sciences (UK), University of Tokyo (Japan), National Institute of Polar Research, Tokyo (Japan) and Institute of Biogeosciences, JAMSTEC, Yokosuka (Japan).

More information: *Nature* paper - www.nature.com/nature/journal/full/nature10902.html

Provided by Oxford University

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