

Study: Ocean tides once spread massive icebergs

December 8 2004

Connection between changes in ocean circulation and future climate remains a matter of great interest

Labrador Sea ocean tides dislodged huge Arctic icebergs thousands of years ago, carrying gigantic ice-rafted debris across the ocean and contributing to the ice age's deep freeze, say an international team of university researchers.

The study, published in the November issue of *Nature*, is the first to suggest that ocean tides contributed to enigmatic Heinrich events, a phenomenon where colossal discharges of icebergs periodically flowed into the North Atlantic from about 60,000 to 10,000 years ago.

The events occurred during the deep throes of the ice age and the new study shows that tides added to the chill by breaking gigantic icebergs from the ice sheet covering northern Canada. “These findings provide a link between ocean tides, ice sheets and ocean circulation and a measure of the sensitivity of climate during the last ice age,” says University of Toronto physics professor Jerry Mitrovica, a co-author of the study. “This sensitivity is important to understand, because the connection between changes in ocean circulation and future climate remains a matter of great interest.”

To track ancient tides, Mitrovica, lead author Professor Brian Arbic of Princeton University and a team of researchers used a state-of-the-art computer model that captured current open-ocean tidal variances with an unprecedented 92 per cent accuracy. They then inputted ice-age

simulations of sea-level changes over time. “The results showed that the tides were highest in the Labrador Sea at the same time the Heinrich events occurred,” says Mitrovica. “We can safely assume that the tides played a key role in breaking the ice and launching the icebergs into the ocean.”

Mitrovica is careful to note that ocean circulation is just one piece of the present-day climatic change puzzle. “As an example, the Antarctic ice sheet weakens due to warming and huge blocks have broken off where tides are highest. Future climatic changes involve many different factors, but it's important to note that in our ice-age past tides defined the weak spot and acted as a catalyst for large climate events.”

The study was funded by National Sciences Foundation and the Canadian Institute for Advanced Research. Other authors include Professor Douglas MacAyeal of the University of Chicago and Glenn Milne of the University of Durham, United Kingdom.

Source: University of Toronto

Citation: Study: Ocean tides once spread massive icebergs (2004, December 8) retrieved 18 April 2024 from <https://phys.org/news/2004-12-ocean-tides-massive-icebergs.html>

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