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SCIENCE & ENVIRONMENT EDITORS

Warm Ocean Explains Antarctic Ice Shelf Collapse

A giant ice shelf the size of Scotland is melting rapidly in warm Antarctic waters, a report in SCIENCE will reveal today. Thinning of the Larsen Ice Shelf - vast sections of which collapsed catastrophically during the past decade – was discovered by scientists at the University of Cambridge, University College London, University of Bristol and the Instituto Antártico Argentino. The findings suggest that Antarctica may be more sensitive to the effects of global warming than was previously thought.

The floating Larsen Ice Shelf fringes the east coast of the Antarctic Peninsula at the northernmost reaches of the continent, and for several decades its gradually warming climate and episodes of wholesale ice shelf disintegration have been the subject of much scientific debate. Until now, neither the method of ice shelf collapse nor the source of the climate warming has been clarified. This study reveals that the Larsen Ice Shelf has thinned by as much as 18 metres over the past decade due to enhanced ocean melting - the first evidence of a widespread mass imbalance that has likely rendered the ice shelf susceptible to crevasse fracture.

Using radar measurements from European Space Agency satellites – accurate to within 20 centimetres – the team have been mapping the height of the Larsen Ice Shelf surface since 1992. After accounting for the movement of ocean tides, the data revealed a clear pattern of surface lowering across the majority of the Larsen Ice Shelf. After eliminating other potential causes of lowering – such as increased summer melt water production – the team were able to attribute the signal to enhanced melting at the Larsen Ice Shelf base.

The Larsen Ice Shelf melting is releasing vast quantities of ice-cold water into the world's oceans - equivalent to a staggering eight times the River Thames' yearly outflow – creating a disturbance that may have wider implications for patterns of global ocean circulation. At these rates, in less than a hundred years the remaining Larsen Ice Shelf will become as thin as the now-disintegrated sections at the time of their collapse. If ocean temperatures continue to rise, disaster may strike even sooner.

Dr Andrew Shepherd at the University of Cambridge said:

"We have shown that the Larsen Ice Shelf has progressively thinned due to the combined effects of surface and basal ice melting. This previously undetected imbalance may provide a simple link between the regional climate warming and the successive disintegration of Larsen Ice Shelf sections, and suggests that fluctuations in the surrounding ocean should be considered in any future assessment of the regions climate change."

Notes to Editors:

1. Larsen Ice Shelf has Progressively Thinned by Andrew Shepherd, Duncan Wingham, Tony Payne and Pedro Skvarca will appear in the October 31st 2003 edition of SCIENCE. Copies of the article are available from the AAAS Office of Public Programs at 202-326-6440 or scipak@aaas.org
2. The University of Cambridge, University College London and University of Bristol groups form the Centre for Polar Observation and Modelling (CPOM), funded through a £2 million grant from the UK Natural Environment Research Council in an effort to improve forecasts of environmental change. CPOM's use of satellites to measure changes in polar ice - which could disturb sea levels and ocean circulation - has already begun to yield important results. Future effort will concentrate on developing a better understanding of how the Antarctic oceans and ice may respond to the changes in the Larsen Ice Shelf.
3. Photos and movies of the Larsen Ice Shelf are available at:
<http://www.spri.cam.ac.uk/~aps46/lis>
username: larsen
password: marambio

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