

New structure found deep within West Antarctic Ice Sheet

September 23 2004

Ice sheet more susceptible to change than previously thought

Scientists have found a remarkable **new structure deep within the West Antarctic Ice Sheet** which suggests that the whole ice sheet is more susceptible to future change than previously thought. The discovery, by scientists from Bristol University and the British Antarctic Survey in collaboration with US colleagues, is reported this week (September 24) in the international journal *Science*.

The stability of the West Antarctic Ice Sheet has been hotly debated since the 1960s because of its potential to raise global sea level by around 5 m over several centuries. The potential impacts of a major change in the West Antarctic ice sheet are severe – sea level rise will be fantastically expensive for developed nations with coastal cities and dire for poor populations in low-lying coastal areas.

Lead author Prof Martin Siegert of Bristol University said, 'There is a great deal of speculation that global warming may cause sea levels to rise due to the melting of ice sheets. Until now, scientific observations suggested that change to the West Antarctic Ice Sheet would be restricted to the edges implying that large-scale instability of the ice sheet is unlikely. This new discovery deep within the ice means that we need to re-think our current assessment of the risk of collapse of this ice sheet.'

The structure - a distinctive fold in the ice, 800m deep by 50 km long -

was detected using ice-penetrating radar. Ice sheets normally consist of flat layers of ice, so finding this huge fold was a complete surprise. Its presence suggests that a few thousand years ago surface ice at the centre of the ice sheet was moving rapidly and being 'drawn down' towards the bottom of the ice sheet.

More recently the rate of the ice flow has changed from fast to slow. The direction of flow has also changed. The most likely explanation for these changes is the 'switching-off' of a large ice stream at the margin of the ice sheet several centuries ago. These changes imply that the centre of the ice sheet is more mobile than scientists previously realised, requiring them to rethink existing models.

Ice sheet

The Antarctic ice sheet is the layer of ice up to 5000 m thick covering the Antarctic continent. It is formed from snow falling in the interior of the Antarctic which compacts into ice. The ice sheet slowly moves towards the coast, eventually breaking away as icebergs which gradually melt into the sea.

The ice sheet covering East Antarctica is very stable, because it lies on rock that is above sea level and is thought unlikely to collapse. The West Antarctic is less stable, because it sits on rock below sea level.

If the ice sheet does collapse, it is more likely to be part of a natural collapse cycle, or as a response to climatic change that occurred many thousands of years ago, rather than a response to current climatic change.

Source: University of Bristol & British Antarctic Survey

Citation: New structure found deep within West Antarctic Ice Sheet (2004, September 23)
retrieved 17 April 2024 from <https://phys.org/news/2004-09-deep-west-antarctic-ice-sheet.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.