

Search for ice sheet 'tipping point'

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Airborne view of the Pine Island glacier, Antarctica. Photo: NASA/Jane Peterson

(PhysOrg.com) -- A new study examines how ice sheets, such as the West Antarctic Ice Sheet, could become unstable as the world warms.

The team from Oxford University and Cambridge University developed a model to explore how changes in the 'grounding line' - where an ice sheet floats free from its base of rock or sediment - could lead to the disintegration of ice sheets and result in a significant rise in global [sea level](#).

A report of their research is published in [Proceedings of the Royal Society A](#).

'The volume of ice locked up in the West [Antarctic Ice Sheet](#) is equivalent to a [sea level rise](#) of around 3.3 metres,' said Dr Richard Katz of Oxford University's Department of Earth Sciences, an author of the

report. ‘Our model shows how instability in the grounding line, caused by gradual climatic changes, has the potential to reach a ‘tipping point’ where disintegration of the ice sheet could occur.’

At the moment the model - that uniquely takes into account the three dimensional shape of ice sheets - is still fairly simple, but the researchers hope to eventually include more detail on how ice sheets interact with their base slopes and show the behaviour of individual ice streams.

When the team applied their theoretical and [mathematical model](#) to the West Antarctic Ice Sheet they found that, contrary to earlier assessments, a scenario which would see instability grow as the grounding line recedes was likely. In the case of the Pine Island Glacier it may already be occurring.

‘Global climate models often assume that, as the world warms, ice sheets will melt at a steady rate, leading to gradual rises in sea level - but ice sheets are much more complex structures than this,’ said Dr Katz. ‘We need to do a lot more work to build better models of how ice sheets behave in the real world. Only then can we start to predict how this behaviour might change in the future as the climate changes.’

Provided by Oxford University

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