

Tidal motion influences Antarctic ice sheet

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New research into the way the Antarctic ice sheet adds ice to the ocean reveals that tidal motion influences the flow of the one of the biggest ice streams draining the West Antarctic Ice Sheet.

This unexpected result shows that the Rutford Ice stream (larger than Holland) varies its speed by as much as 20% every two weeks. Ice streams – and the speed at which they flow – influence global sea level. Understanding their behaviour has been a priority for some time. On average the Rutford Ice Stream moves forward by one metre every day.

Reporting this week in the journal *Nature*, British Antarctic Survey (BAS) glaciologist Hilmar Gudmundsson says,

‘We've never seen anything like this before. The discovery that the

spring-neap tidal cycle exerts such a strong influence on an ice stream tens of kilometres away is a total surprise. For such a large mass of ice to respond to ocean tides like this illustrates how sensitively the Antarctic Ice Sheet reacts to environmental changes. Glaciologists need now to rethink how the Antarctic Ice Sheets reacts to external forces. '

The variations in flow of the Rutford Ice Stream are related to the vertical motion of the ocean caused by the gravitational effects of the sun and moon. Every two weeks sees large tides, the so-called spring tides which are followed by small tides, the neap tides. Scientists expect movement of the floating ice shelves, but the Rutford Ice Stream is grounded in the shallow waters of the Antarctic continental shelf.

So far, Rutford Ice Stream is the only ice stream where this type of temporal variation has been observed, but it is likely that the phenomenon is widespread, and so important to incorporate in computer models predicting the future contribution of the ice sheets to sea level rise.

Source: British Antarctic Survey

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