Lasers from space show thinning of Greenland and Antarctic ice sheets

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The most comprehensive picture of the rapidly thinning glaciers along the coastline of both the Antarctic and Greenland ice sheets has been created using satellite lasers. The findings are an important step forward in the quest to make more accurate predictions for future sea level rise.

Reporting this week in the journal *Nature* researchers from British Antarctic Survey and the University of Bristol describe how analysis of millions of NASA satellite measurements* from both of these vast ice sheets shows that the most profound ice loss is a result of glaciers speeding up where they flow into the sea.

The authors conclude that this 'dynamic thinning' of glaciers now reaches all latitudes in Greenland, has intensified on key Antarctic coastlines, is penetrating far into the ice sheets' interior and is spreading as ice shelves thin by ocean-driven melt. Ice shelf collapse has triggered particularly strong thinning that has endured for decades.

Lead author Dr Hamish Pritchard from British Antarctic Survey (BAS) says, "We were surprised to see such a strong pattern of thinning glaciers across such large areas of coastline - it's widespread and in some cases thinning extends hundreds of kilometres inland. We think that warm ocean currents reaching the coast and melting the glacier front is the most likely cause of faster glacier flow. This kind of ice loss is so poorly understood that it remains the most unpredictable part of future sea level rise."

The scientists compared the rates of change in elevation of both fast-flowing and slow-flowing ice. In Greenland for example they studied 111 fast-moving glaciers and found 81 thinning at rates twice that of slow-flowing ice at the same altitude.They found that ice loss from many glaciers in both Antarctica and Greenland is greater than the rate of snowfall further inland.

In Antarctica some of the fastest thinning glaciers are in West Antarctica (Amundsen Sea Embayment) where Pine Island Glacier and neighbouring Smith and Thwaites Glacier are thinning by up to 9 metres per year.

More information: Extensive dynamic thinning on the margins of the Greenland and Antarctic ice sheets by Hamish D. Pritchard, Robert J. Arthern, David G. Vaughan & Laura A. Edwards is published online this week in the journal *Nature* (Advanced Online Publication).

Source: British Antarctic Survey (news : web)