

## "Fjord bathymetry controls on basal melt and glacier retreat in Greenland"

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Although many of the largest glaciers in Greenland are receding, there does not appear to be a coherent pattern of melt among various glaciers. Some glaciers are accelerating and thinning more than others, even as some others gain mass. We investigate whether the variability in recent changes among Greenland glaciers can be partially explained by differing fjord geometry. Increased ocean temperature may be responsible for glacial retreat due to basal melting beneath floating ice tongues and vertical ice faces of tidewater glaciers, but only if the warmer ocean water can reach the ice. Basal melting may contribute significantly to calving and thinning, and to an eventual speeding up of the glacier, resulting in thinning further inland.

New estimates of fjord bathymetries in Greenland, using airborne gravimetry measurements from Operation IceBridge flights, are compared to several important characteristics of their outlet glaciers and ocean waters. We investigate the correlation between fjord bathymetries and several glacier parameters, such as surface velocity and elevation changes. Does the geometry of glacial fjords play a large role in determining the stability of outlet glaciers? Sloping seafloors can feedback on a moving grounding line. Shallow sills and deep continental shelf troughs will allow greater interaction with the nearby warmer ocean water. Are faster flowing glaciers found in fjords with deep sills and a greater exchange with continental shelf water? These broad correlations are a starting point in an effort to investigate the role of bed geometry in the variability of observed recent changes in some of Greenland's largest outlet glaciers.