

The Geomorphology of Antarctic submarine slopes

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1. Research Findings

Erosional gullies are found on many parts of the upper continental slope around Antarctica. The processes that formed these gullies however remain poorly constrained. Several possible processes have been suggested in the literature, including mass flows such as debris flows, turbidity currents and sediment slumps, subglacial meltwater discharge, re-suspension by shelf and slope currents, high salinity shelf water, bottom water currents, tidal pumping and ice scour.

The part of the Antarctic continental margin where there is the greatest flux of cold, dense water across the shelf edge is the mouth of the Filchner Trough in the southern Weddell Sea. This is a major source of Antarctic Bottom Water, which floods large areas of the deep ocean floor. At the mouth of the Filchner Trough, pulses of Ice Shelf Water, which is a precursor of Antarctic Bottom Water, cascade across the shelf edge with an average flux of 1.6 Sverdrups.

Detailed bathymetric mapping of this area should reveal the geomorphological expression of cold, dense water overflow, and provide insight into the potential for this process to have eroded gullies on other parts of the margin in the past. We collected multibeam echo sounding and acoustic sub-bottom profiler data over the shelf edge and upper slope at the mouth of the Filchner Trough in February 2011 during a cruise on RRS *James Clark Ross*. These data will allow us to test the hypothesis that cold, dense water overflow eroded gullies on other parts of the upper slope around Antarctica. This work will be presented in July at the International Symposium of Antarctic Earth Sciences, Edinburgh.



Gravity Coring in the southern Weddell Sea, Antarctica on board the RRS *James Clark Ross*



Surveying the seabed of the southern Weddell Sea, Antarctica on board the RRS *James Clark Ross*

Collecting samples from the gravity corer in the southern Weddell Sea, Antarctica on board the RRS *James Clark Ross*



Relief work on James Ross Island, Antarctica