

## **The seafloor geomorphic record of ice flow from the Antarctic Peninsula**

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### **Abstract**

Multibeam swath bathymetry has been used to map seafloor geomorphology from the continental shelf around both sides of the Antarctic Peninsula and document patterns of past ice flow and retreat. We present a reconstruction of the evolving ice-flow path on the eastern side of the Antarctic Peninsula, where mapping indicates shifting flow directions during retreat in several areas, indicating flow reorientation that reflects the changing ice sheet geometry as the ice retreated across the continental shelf. Evidence of possible previous ice-shelf collapse, recorded in subparallel iceberg furrow sets, is noted near the shelf break. Low relief, somewhat sinuous grounding line features are mapped across the shelf; correlations between the grounding line features and retreat ages show the large-scale pattern of retreat as ice pulled back from the Weddell Sea continental shelf. The seafloor geomorphic record in the Weddell Sea contrasts with that of the western side of the peninsula, where ice flow paths are more structurally controlled and thus do not change during retreat; while the flow directions in the fjords remain relatively unchanged, each fjord records different punctuations in retreat. Inside the fjords and bays of the western peninsula, features that are analogous to the geomorphic assemblages of those that are often documented on the outer shelf are found and can be used in a similar manner to interpret the glacial history in these smaller regions. A schematic model was developed showing the features found in the bays, from flutings and moraines in the inner bay, to grounding zone wedges and drumlins in the middle bay, and streamlined features and meltwater channels in the outer bays. In addition, analysis of local variables in the bays demonstrates that width and length of the bays or fjords play a greater role than fjord water depth in determining grounding line position.

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