



## **Glacial history of sub-Antarctic South Georgia based on the submarine geomorphology of its fjords**

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We present multibeam swath bathymetric surveys of the major fjords surrounding the sub-Antarctic island of South Georgia to characterise the glacial geomorphology and to identify the relative timings and extent of past glacial advance and retreat. Bathymetry data revealed a range of glacial features including terminal, retreat and truncated moraines, deep (distal) outer and shallow (proximal) inner basins and cross shelf troughs. These provide evidence of glacial advance and retreat through several glacial cycles. A near consistent pattern of large scale submarine geomorphological features was observed in the different fjords suggesting a similar response of margins of the island ice cap to past climate forcing. A relative chronology based on the relationships between the submarine features with their radiocarbon and cosmogenic isotope dated terrestrial counterparts suggests that widely observed inner basin moraines date from the last major glacial advance or Last Glacial Maximum, while deep basin moraines may date from an earlier (pre-LGM) more extensive glaciation, which we speculate corresponds to MIS6. On the sides of the deep basins a series of truncated moraines show ice advance positions from preceding glacial periods. The cross shelf troughs, and mid-trough moraines are interpreted as the product of much more extensive glaciations that predate the fjord geomorphology mapped here, thus possibly older than MIS6. This hypothesis would suggest that South Georgia followed a glacial history similar to that of central Patagonia (46deg S) where a series of Pleistocene glaciations (of MIS 20 and younger) extended beyond LGM limits, with the most extensive glacial advance occurring at c. 1.1 Ma.