



Testing hypotheses of the Last Glacial Maximum ice cap over South Georgia using glacio-isostatic adjustment modelling of raised marine features.

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There are at least two alternate hypotheses as to the size of the ice cap over South Georgia during the Last Glacial Maximum. The first of these suggests that the ice cap was extensive, with ice grounded well out on the continental shelf around South Georgia including in various cross-shelf troughs. This view of ice cap extent has been developed largely from marine geological and geophysical data. A second, contrasting hypothesis, is that the ice cap was much more restricted and that the ice margin remained in the inner fjords along the north coast of the island. The restricted hypothesis is based largely on terrestrial evidence of geomorphology supported by cosmogenic surface exposure dating and radiocarbon dating of lake sediments.

Here we use glacio-isostatic adjustment (GIA) modelling constrained by raised marine features (beaches, rock platforms etc) to test between these two widely contrasting hypotheses. Because raised marine features record the GIA following deglaciation they can be sensitive to former ice sheet extent and thickness, and thus have the potential to distinguish between the extensive and restricted ice cap hypotheses. We report new data on raised marine features from a range of sites along the north coast of South Georgia, and integrate these with previously published reports of raised marine features to develop a relative sea-level database. We have used a GIA model to explore several ice cap extent scenarios where each scenario provides predicted relative sea level histories that can be tested against the database. We discuss the utility of such modelling for distinguishing between the two ice cap hypotheses.