

SESSION: Antarctic and sub-Antarctic earth science

MARS Themes:

Earth Systems Observations

Title:

The deglaciation of sub-Antarctic Marion Island

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Abstract:

It is increasingly apparent that local and regional geographic factors strongly influence the timing and extent of glaciation across the Southern Hemisphere. Glacial chronologies of sub-Antarctic Islands can provide valuable insights into the nature of regional climatic variability and the localised response(s) of glacial systems during periods of climatic change. In this talk I will provide an overview of the approaches used to reconstruct Marion Island's past glaciations starting with a (re-)assessment of geological history and geomorphological evolution and then the application of cosmogenic ³⁶Cl exposure age dating. Exposure ages of glacial depositional and erosional features confirm a local Last Glacial Maximum was reached prior to ~40 ka. Ice retreated throughout MIS 2 with minor standstill events between ~33-26 and ~20-17 ka, with limited evidence of ice re-advances during the Antarctic Cold Reversal or Holocene cooling periods. A spatio-temporal reconstruction shows that deglaciation of individual glacier lobes was a-synchronous due to local physiography and topographical factors controlling the island's micro-climate. We compare Marion Island's glacial chronology to other sub-Antarctic islands (e.g. the Kerguelen archipelago, Auckland and Campbell islands, and South Georgia) and continental mountain glaciers (e.g. Patagonia and New Zealand) and a review of evidence for a Southern Hemisphere glacial maximum in late MIS 3. Sea surface temperatures and the position of the Southern Westerly Wind belt are recognized as key controls for ice accumulation / starvation throughout the Quaternary due to their influence on air-temperature and precipitation regimes.

Format:

Oral presentation

Keywords: (add ; between keywords)

Sub-Antarctic, cosmogenic dating, glaciations, ³⁶Cl, MIS2, MIS3