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RECONSTRUCTION OF PAST ICE CONFIGURATION IN SOUTHERN MCMURDO SOUND – GLACIAL AND GEOLOGICAL EVIDENCE FROM BLACK ISLAND, ANTARCTICA

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Conflicting reconstructions exist for Last Glacial Maximum (LGM) ice configurations in McMurdo Sound, yet climatic modelling studies such as the landmark CLIMAP investigation, are critically reliant on ice sheet reconstructions in this region. In more recent reconstructions there is disagreement over grounding line position, ice flow directions, ice surface contours and chronology of ice sheet retreat. The most significant divergence occurs in the region surrounding southern Black Island, which in turn hosts a significant glacial and geological cover that has been little studied.

Fifteen days were spent mapping striated basement, geomorphic features, sediment/erratic distribution and collecting samples on four drift-covered, trachytic to basaltic bedrock promontories at the southern end of Black Island.

An Ar^{40}/Ar^{39} age of 1.7 Ma was obtained from the two largest bedrock promontories, providing a maximum age constraint for deposition of glacial material. Granite erratics, used as a proxy for ice elevation, mark the minimum height (513 m a.s.l) of the ice body that deposited the erratics. Well-developed “knock and lochan” topography indicates the promontories have been areally scoured; a process attributed to overriding by an ice sheet. Orientations of 140 glacial striations/grooves show a consistent south/north flow trend, which is markedly different flow direction indicated by previous reconstructions. Glacial benches on the promontories are indicative of fluctuating levels of ice.

The present day ice shelf system cannot explain the complexity of the deposits located on southern Black Island. Future work will focus on developing a hypothesis that can account for the physical expression of the drift cover and geomorphic features, as the ice configuration adopted by CLIMAP does not explain it.