Deglacial and Holocene climate change records from subantarctic fjords

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A series of sediment cores were collected in February 2015 and 2016 from Norman Inlet, Auckland Islands, and are being used to reconstruct a high-resolution record of climate change following the Last Glacial Maximum (LGM). Sediment has been preserved in Norman Inlet due to a sill, of probable glacial origin, creating a depositional basin that was protected from the influence of sea-level rise until the early Holocene. Physical property data, ITRAX XRF and visual core descriptions indicate the cores capture several phases of sedimentation. We identify four primary sedimentary facies: 1) a deglacial facies exhibiting mm-scale laminae defined by magnetic susceptibility and density contrasts and high counts of elements associated with terrigenous deposition; 2) a lacustrine facies defined by very low density, high organic carbon concentrations and low counts of terrigenous elements; 3) a marine transgression facies with moderate density, moderate bioturbation and alternating marine and lacustrine sedimentary components; 4) a marine facies that contains biogenic carbonate. Radiocarbon dates indicate deglacial sedimentation was underway in the basin by approximately 19,000 cal yr BP. Lacustrine deposition in an ice free watershed began around 15,600 cal yr BP and continued until the marine transgression at 9,500 cal yr BP. A low resolution *n*-alkane biomarker stratigraphy shows that marine and lacustrine facies are dominated by long chain odd number *n*-alkanes (C_{27}, C_{29}, C_{31}) and the most elevated dD values occur in the early Holocene. Bulk organic $\delta^{13}C$ values decrease down core from -24‰ to -29‰ and there are stepped changes in $\delta^{13}C$ values that suggest changes in primary productivity during the marine phase. We will place these results in a broader context by comparing the timing of reconstructed change in the Auckland Islands with established Southern Hemisphere records.