



Towards a climate history of the Weddell Sea region from Berkner Island, Antarctica

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During the 2004/05 austral field season we succeeded in drilling an ice core to the bedrock on Berkner Island, Antarctica. Drilling began in 2002/03 with the establishment of the drilling infrastructure, and a cased pilot hole to 88 m, continued in 2003/04 reaching 526 m, and again in 2004/05. In January 2005, at a depth of 948.5 m from the surface, the drill brought up sediment, a pure quartz sand, from beneath the ice sheet, making this only the fifth Antarctic ice core project ever to reach the very base of the ice sheet. Initial analysis of the stable isotopes and methane shows that the Berkner ice core contains a record of climate change spanning at least 60 kyrs. The transition from the LGM to the Holocene is at a depth of 300 to 350 m above the bed, in line with modelling predictions. We present the initial data, including stable isotopes, gases, and soluble chemistry, and discuss the potential to determine the climate history of the Weddell Sea region (a source of cold bottom water to the Atlantic). Early results suggest that Berkner Island may not have been over-ridden by ice from the AIS as in some ice sheet models, and was likely to have been an independent ice rise throughout the glacial cycle. The presence of a clear, and vertical, Raymond bump supports this hypothesis. However, preliminary total air content results, supported by a large glacial to interglacial shift in stable isotope data, suggest that the Berkner ice sheet was considerably thicker at the LGM.