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The response of the southeast Greenland ice sheet to Holocene oceanographic variability

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Recent widespread changes around the marine-terminating margins of the Greenland Ice Sheet (GrIS) have prompted concerns about the future stability of the ice sheet in a changing climate. The southeast sector of the GrIS is highly dynamic and predominantly marine terminating making it vulnerable to changes in oceanic circulation, yet the role of the oceans in driving ice sheet evolution is not completely understood. The influx of warm, saline subtropical waters have been demonstrated to 'prime' glaciers for retreat but the influence of the oceans on the GrIS is poorly constrained, especially over timescales longer than $\sim$150 years. Long-term records of ice sheet behaviour provide a baseline against which to assess the magnitude of current changes and can provide insight into the mechanisms pacing glacial change.

We present a suite of proxy data from a 175 cm long gravity core collected from the main trough of Køge Bugt, southeast Greenland at a depth of 595 m. Køge Bugt is the drainage portal for several large, fast-flowing GrIS outlet glaciers. The sediment core tracks changes in both outlet glacier behaviour and oceanographic conditions. An age model is constructed using ^{210}Pb and ^{14}C age determinations from marine bivalves and planktonic foraminifera; the core provides a record of environmental change in Koge Bugt over the last $\sim$6 ka; a period of significant climate variability. IRD counts, grain size and XRF data are used to reconstruct glacial activity throughout the time period. Planktonic foraminifera assemblage data provide a proxy for surface water conditions. We will also attempt to reconstruct the flow strength and temperature variability of deep currents from the mean sortable silt size and from benthic foraminifera assemblage data respectively.

We present a record of surface and deep water change through the last 6 ka in southeast Greenland. We examine how these influence the behaviour of the GrIS margin to assess the mechanisms driving ice sheet change and to understand the magnitude of oceanic forcing.