Marine environmental changes in front of the Scandinavian Ice Sheet during the last deglaciation

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The Kattegat-Baltic Sea region shows evidence of strong coupling with North Atlantic climate over recent glacial-interglacial cycles, but insufficient long, continuous, high-resolution Baltic area climate records have often limited evaluating such links. New ultra-high-resolution sediment cores collected during IODP Expedition 347 allow such records to be generated, including foraminiferal geochemistry records reflecting seawater environmental changes directly adjacent to the Scandinavian Ice Sheet (SIS) during the most recent deglaciation.

We present benthic foraminiferal stable isotope ($\delta^{18}O$ and $\delta^{13}C$) and trace element (Ba/Ca, Mn/Ca and Mg/Ca) records from IODP Site M0060 (located between Sweden and Denmark in the southern Kattegat) to constrain bottom water salinity, temperature and oxygenation changes from ~18-13ka (chronology is based on ^{14}C dating). Because of the large salinity changes (fresh to near-marine) during the past 20ka in this region, we interpret $\delta^{18}O$ as reflecting salinity changes more than temperature here, while $\delta^{13}C$ reflects ventilation, productivity, and salinity. Ba/Ca, Mn/Ca, and Mg/Ca indicate salinity, oxygenation, and temperature variations, although Mg/Ca may be partly affected by salinity.

Stable isotope results suggest fjord-like, poorly ventilated conditions during early Deglaciation, with three clear phases: 1) an initial rapid, large freshening event; 2) subsequent slower, step-wise freshening (likely linked to the decay of the SIS); 3) more marine, ventilated, saline conditions after ~15.7ka. These events may be linked to regional and global climate changes during this period of global climate changes, and may help us evaluate the interplay between the SIS and climate in the North Atlantic and beyond.