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# Deglacial deep water circulation and Nd isotope changes in the Nordic Seas and subpolar North Atlantic

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Neodymium (Nd) isotopes have become a valuable proxy for the reconstruction of past water mass provenance and mixing. However, the local water mass Nd isotope signature is a function of water mass advection and Nd fluxes from weathering and diagenesis. Consequently, Nd isotope signatures of water mass end members may vary under changing weathering regimes such as glacial-interglacial cycles. For the accurate interpretation of Nd isotopes in terms of changing ocean circulation requires a precise knowledge of end-member isotopic compositions through time. North Atlantic Deep Water (NADW) presents a major link between the atmosphere and the deep ocean, but, whether or not its Nd isotope composition remained constant through time or to which degree it varied over glacial cycles is debated. The northern North Atlantic is the source region of NADW and connects the Nordic Seas and the central Atlantic. Weathering fluxes and sources in the North Atlantic varied significantly through the last glacial cycle, potentially affecting local deep water Nd isotope compositions.
Aiming to provide improved (de-)glacial end member compositions, we reconstructed the deep water Nd isotope signatures from several sites across the deep Nordic Seas and the subpolar North Atlantic from the last glacial to the Holocene. Our results show that the Nordic Seas were characterised by at least 3 epsilon units less radiogenic Nd isotope signatures during the Last Glacial than today. Furthermore, water mass exchange between the deep eastern and western subpolar North Atlantic basins was limited during the Last Glacial Maximum, probably due to the weakened admixture of overflow waters from the Nordic Seas. During the deglaciation, a strong overflow from the Nordic Seas into the North Atlantic was established, leading to the homogenisation of Nd signatures along the flow paths of the western boundary currents. The changes to weathering in a warmer climate during the early Holocene further led to a transient change in the Nd isotope signatures of the Nordic Seas and consequently of the overflow waters exported to the Atlantic Ocean. These changes in end member water mass Nd isotope signatures are crucial for more accurate interpretations of Nd isotope records throughout the Atlantic Ocean.