Reconstructing the Holocene Variability of the Strength and Radiogenic Isotope Composition of Labrador Sea Water

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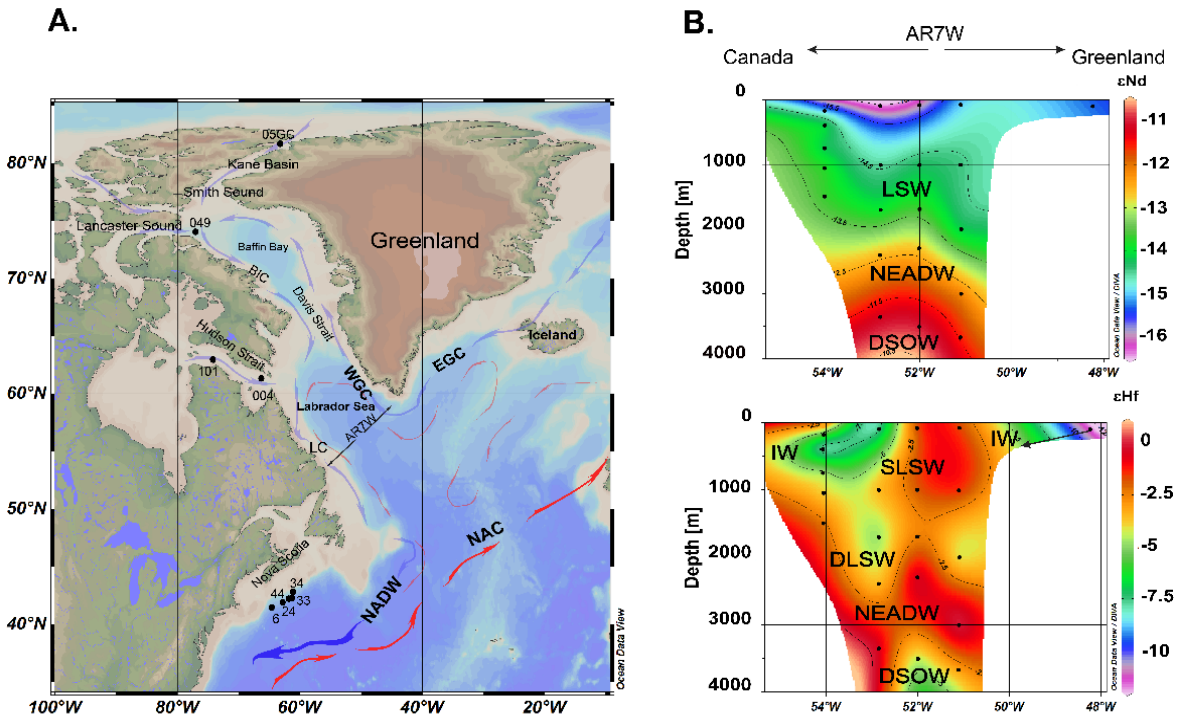
The Labrador Sea is one of the most important regions of deep water formation. Southward flowing Labrador Sea Water (LSW) contributes to the Atlantic Meridional Overturning Circulation.

There is no consensus on the rate of deep water production during the last glaciation and timing for the initiation of the modern circulation in the Labrador Sea. Partially this is due to the fact that the end-member radiogenic isotope compositions of the water masses in the Labrador Sea are still not well constrained.

Analysis of the Nd and Hf isotope composition using different marine archives can provide crucial information on changes in deep water circulation patterns and changes in the isotope compositions of the end-member water masses contributing to LSW during the termination of the last glacial period. This knowledge is essential for predictions of the ocean-climate system.

Analysis of sediment samples and uncleaned foraminifera from four key locations, reflecting main inflow paths of the Arctic waters into the Labrador Sea will help to constrain the stability of the water mass signatures in the Labrador Sea during the Holocene and the role of LSW in circulation changes in the open North Atlantic Ocean.



Schematic representation of the water mass circulation in the Labrador Sea. Blue arrows denote cold currents; red arrows denote warm currents modified from (Yashayaev and Clark, 2006). Black dots represent locations of cores used in this study. The black arrows indicate the position of the cross section in [B]. **B.** ε_{Nd} and ε_{Hf} signatures of present day seawater in the Labrador Sea modified from (Filippova et al., 2017); $\varepsilon_{Hf} = [(^{176}Hf/^{177}Hf_{sample} - ^{176}Hf/^{177}Hf_{CHUR})/ ^{176}Hf/^{177}Hf_{CHUR}] *10000$, where CHUR represents the present-day chondritic $^{176}Hf/^{177}Hf$ value of 0.282785 (Bouvier et al., 2008). Abbreviations stand for: North Atlantic Deep Water (NADW); North Atlantic Current (NAC); Eastern Greenland Current (EGC); West Greenland Current (WGC), Baffin Island Current (BIC); Labrador Current (LC). SLSW and DLSW stand for Deep and Shallow LSW.