



## **Climate and sea ice variability in the SW Labrador Sea during the late Holocene**

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The recent rapid decline in Arctic sea ice cover has increased the need to improve the accuracy of the sea ice components in climate models and to provide detailed long-term sea ice records based on proxy data. Recently, the highly branched isoprenoid IP25 has emerged as a potential sea ice specific proxy for past sea ice cover, found in marine sediments underlying seasonal sea ice. We tested the reliability of this biomarker against observational sea ice data off Newfoundland (SW Labrador Sea), where box cores covering the last ca. 100-150 years were collected. Based on the results, IP25 proved to be a robust and reliable proxy for reconstructing variability in past sea ice concentrations in the area. After having successfully validated the proxy in the SW Labrador Sea, we further analysed IP25 from a sediment core NE of Newfoundland covering the last ca. 5000 years, providing the southernmost multi-millennial record of this proxy to date. Based on this record and on diatom and dinoflagellate cyst data and alkenone-based sea surface temperatures (SSTs) from the same core, we reconstructed climatic conditions in and Arctic sea ice export to the SW Labrador Sea area: Alkenone-based SSTs show a clear albeit variable decline after the Holocene Climate Optimum, while at the same time diatom and dinoflagellate cyst data suggest decreased melt water export from the Arctic. The IP25 record reveals increased sea ice export from the Baffin and Hudson Bays starting ca 1500 yr cal. BP, accelerating ca. 800 yr cal. BP and culminating at the height of the Little Ice Age. Sea ice export during the last century is comparable to the export during the Medieval Climate Anomaly.