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Last Interglacial sea ice variability and paleoceanography of the Labrador Sea

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Sea ice provides strong feedback in the climate system, and it plays an important role in modulating the strength of the Thermohaline Circulation through glacials, and even interglacials. The warmer than present Last Interglacial (LIG, ~116-128 ka) is thought to have a less stable climate than the current interglacial. Proxies from the deep- and surface subpolar North Atlantic Ocean show prominent instabilities pointing toward coupled ocean-climate variability. Here we reconstruct sea surface and sea ice changes of the subpolar gyre through the penultimate deglaciation and LIG in order to evaluate sea ice's role as a driver and amplifier of these ocean circulation and climate changes. We reconstruct the sea ice and sea surface conditions using biomarkers (IP_{25}, sterols) and dinoflagellate cyst assemblages from the Eirik Drift. Low productivity combined with an absence of IP_{25} could indicate a potential full sea ice cover through MIS 6. The surface ocean experienced large variability through the first half of the LIG, including an early cooling with potential seasonal sea ice cover evident from the dinoflagellate cyst assemblage and IP_{25}. The peak warm period of the LIG is seen in the second half, followed by a brief cooling period towards the end. Following the LIG, MIS 5d is characterized by an IP_{25} signal and high relative abundances of round brown dinocysts indicating cooling with seasonal sea ice cover. Initial comparisons with deep ventilation proxies (benthic foraminiferal $\delta^{13}C$ data) indicate a potential close link between sea ice, surface hydrography and deep circulation. In future studies, we aim to compare the sea ice record to benthic foraminiferal $\delta^{13}C$ data from the same samples to better understand the connection between surface and deep-ocean variability.