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Northward advection of Atlantic Water in Fram strait during the late Holocene: a view from mixed layer proxies

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The North Atlantic Current (NAC) is the major carrier of oceanic heat to the Arctic Ocean. Recent studies suggest that enhanced oceanic heat transfer to the Arctic Ocean in the last century is linked to the polar amplification of global warming. Still, the intricate interaction between circulation changes and sea-ice dynamics, as well as contradictory information provided by a variety of paleoceanographical proxies, hamper our understanding of the timing, spatial significance and impact of recent oceanographical changes in the northern North Atlantic. Here, we focus on the main core of Atlantic water entering the Nordic Seas flowing along the northwestern coast of Norway and the western Spitsbergen, before penetrating into the Arctic Ocean. Our study is based on two short cores recovered off northwest Norway and from the West Spitsbergen Margin, which are under the influence of North Atlantic Current and West Spitsbergen Current respectively. The core sites are thus ideally located to investigate changes in the nature and intensity of the poleward Atlantic Water flow on a south to north transect within the last ca. 2000 years. Calcareous (coccoliths) and organic-walled (dinocysts) remains of phytoplankton are investigated in order to provide both qualitative and quantitative (modern analogue technique) reconstructions of the surface mixed layer. These proxy-records and other indicators of sea-surface conditions such as ice-rafted detritus, XRF and planktic foraminiferal assemblages, are critically discussed and compared with available marine and terrestrial records from the northern North Atlantic and adjacent surrounding lands. Preliminary results indicate centennial scale paleoclimatic changes in the surface and sub-surface heat advection to the Arctic Ocean during the Medieval Warm Period, Little Ice Age and the