The significance of Atlantic Water routing in the Nordic Seas during the present interglacial

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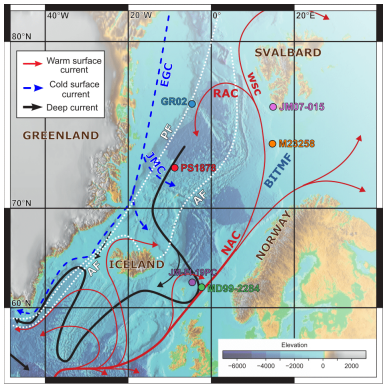


Fig. 1. Map of major surface and deep currents in the Nordic Seas. Location of studied cores PS1878 and GR02 and other presented records is marked with dots. White dotted lines indicate oceanic fronts. AF – Arctic Front, BITMF – Bear Island Trough Mouth Fan, EGC – East Greenland Current, JMC – Jan Mayen Current, NAC – North Atlantic Current, PF – Polar Front, RAC – Return Atlantic Current, WSC – West Spitsbergen Current.

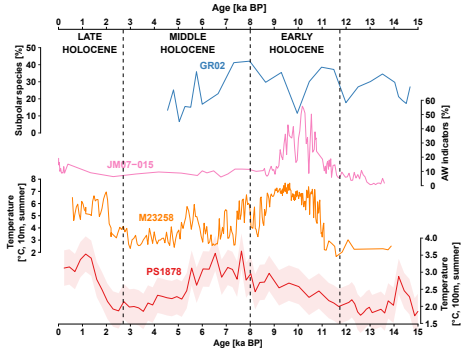


Fig. 2. Proxy data used as indicators of AW advection: the relative abundance of subpolar foraminiferal species in core GR02 (this study), the relative abundance of benthic foraminiferal AW-indicating species in core JM07-015 (Telesiński et al., 2018), summer sSST (10 m water depth) reconstruction in core M23258 (Risebrobakken et al., 2011) and summer sSST (100 m water depth) reconstruction in core PS1878 (Telesiński, Spielhagen and Bauch, 2014).

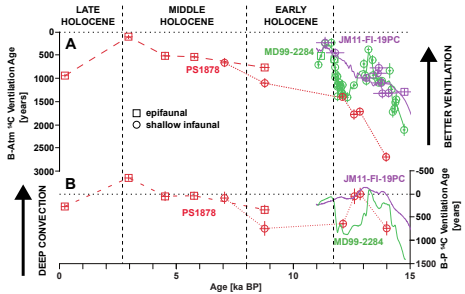
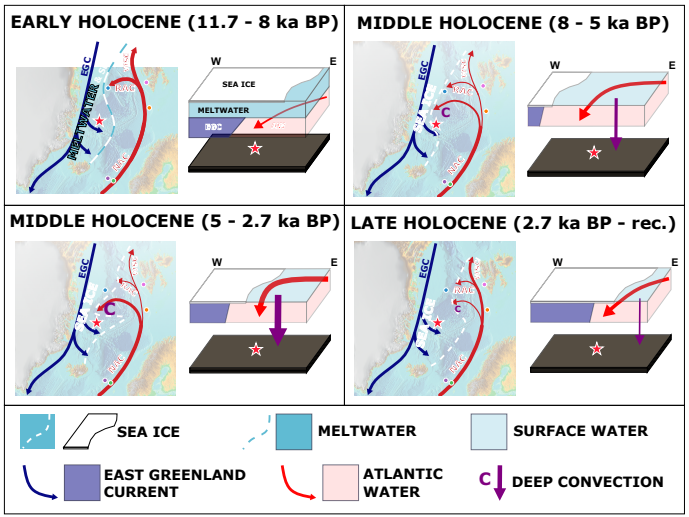


Fig. 3. We have reconstructed (A) Benthic-Atmosphere (B-Atm) ventilation ages and (B) Benthic-Planktic (B-P) offsets of core PS1878 (red; this study and Telesiński et al., 2021). Data points of epifaunal and infaunal benthic foraminifera are marked with squares and circles, respectively. B-Atm and B-P estimates from cores JM11-FI-19PC (purple) and MD99-2284 (green) are also shown (Telesiński et al., 2021).



EARLY HOLOCENE (11.7-8 ka BP):
The Holocene thermal maximum caused by an "overshoot" of AW and high insolation was limited to the eastern Nordic Seas, while the western part of the basin remained cold due to the meltwater blocking the spreading of AW. Open-ocean deep convection could not develop. AW was gradually subducting below Arctic water masses.

MIDDLE HOLOCENE (8-5 ka BP):
As the surplus heat and salt reservoir of the North Atlantic rapidly emptied, the AW inflow into the Nordic Seas diminished. The retreat of the freshwater lid from the Greenland Sea allowed AW spreading and the development of deep convection.

MIDDLE HOLOCENE (5-2.7 ka BP):
The increase in sea-ice production and export from the Arctic into the western Nordic Seas caused a cooling but also strengthened deep convection as sea ice plays an important preconditioning role in this process. The AW flow shifted further westwards.

LATE HOLOCENE (2.7 ka BP-rec.):
During the time of low insolation, a minimum in solar activity triggered a disruption of convectional activity around 2.7 ka BP, caused cooling and expansion of sea ice in the Nordic Seas, possibly contributing to a global climatic deterioration. Even though the 2.7 ka BP atmospheric cooling was a rather brief event, the overturning circulation in the Nordic Seas most probably did not recover to its previous state until the present.

Read more: Telesiński, M. M., Łącka, M., Kujawa, A., Zajączkowski, M.: The significance of Atlantic Water routing in the Nordic Seas: the Holocene perspective. The Holocene, in review.

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