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Hydrography of the Davis Strait since the Last Glacial Maximum

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The Davis Strait forms a threshold between the deep basins of the Baffin Bay and the northern Labrador Sea. It thus holds a key position for the study of the water exchange between the two areas. The surface circulation is characterised by the West Greenland Current (WGC), which flows northwards along the Greenland coast, entraining at sub-surface depth relatively 'warm' and saline Atlantic water from the Irminger Current as well as cold, low-salinity surface water originating from the East Greenland Current. There is also a significant freshwater (and ice) input to the WGC directly from the Greenland ice sheet. Along the Canadian coast, the Baffin-Labrador Current system transports cold, low-salinity Polar Water south into the Labrador Sea. The Labrador Sea plays a key role in the modern THC system of the global ocean, as it is one of the major areas of deep-water formation. The deep circulation over the northern slope of the Labrador Sea is made of two main components: a more baroclinic current with its centre between 2000m and 1000m, and a more barotropic current centred near the 2500 m isobath, the latter being part of the large-scale North Atlantic subpolar gyre circulation also transporting overflow waters originating from the Nordic Seas (the Western Boundary Undercurrent, WBUC).

We are carrying out a multi-proxy study of four cores forming a N-S transect across the Davis Strait in order to establish its palaeoceanographic history since the last Glacial Maximum. For that purpose we study sediments (incl. colour scans, XRF-intensity,

water content, grain size and IRD content), benthic foraminifera, diatoms and dinoflagellates. The chronology of cores is based on calibrated AMS ^{14}C-datings on benthic foraminifera and molluscs.

Initial results reveal that in the deep northern Labrador Sea (2300 m depth), high percentages of the polar, planktonic species *Neogloboquadrina pachyderma* (sinistral) indicate very cold surface water from app. 25.300 ^{14}C yrs BP until app. 16.800 ^{14}C yrs BP. During the same interval, the benthic foraminiferal record shows significant changes in bottom water conditions. Initially deep convection of Polar water affected the basin, but after app. 19.600 ^{14}C yrs BP the area was influenced by the occasional influx of more saline water, possibly due to brine formation associated to increased sea ice formation. At app. 16.800 ^{14}C yrs BP (just prior to 20.000 cal. yrs BP) an influx of oceanic benthic foraminifera, which are often found linked to Atlantic water masses (*Alabaminella weddellensis*, *Nuttalides umbonatus*, *Pullenia bulloides* and *Cassidulina neoteretis*) become dominant, indicating an early phase of enhanced Western Boundary Undercurrent activity until 14.400 ^{14}C years BP (17.700 cal. years BP), i.e. in the period prior to H1, after which the influence of Atlantic Water to the deep basin decreased. This may be linked to a gradual opening of the Arctic Gateway. Surface-water conditions seem to have gradually ameliorated after 16.800 ^{14}C yrs BP as documented by an increased influx of sub-polar planktonic species.

In the shallower areas (600-700 m depth) of central Davis Strait, Atlantic Water may first have reached the area during the Younger Dryas, when we see the first indications of a strengthening of the West Greenland Current in this area. The Holocene period is only represented by very condensed sections (10-20 cm) in most of our records.