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Ocean circulation changes off (south) west Greenland since the Last Glacial Maximum – A summary of results from the Davis Strait Arctic Gateway project

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Within the framework of a Danish funded research project (Davis Strait Arctic Gateway) focusing on the Davis Strait region, a number of sediment cores from the Greenland sector of the Strait and adjacent northern Labrador Sea has been studied for changes in late Pleistocene and Holocene ocean circulation. Reported changes include both surface water circulation (e.g. West Greenland Current, WGC) and variations in the strength of the Deep Western Boundary Undercurrent (DWUC) as well as ice drift. The core records from Greenland fjord and coastal water sites near Nuuk and from Disko Bugt reveal significant variability in WGC activity since early Holocene time. In the early Holocene very high, fine-grained sediment accumulation rates persisted until shortly after 8.200 cal. yr. BP. This suggests that a significant melt water discharge from the Greenland ice sheet has contributed to freshening of the surrounding ocean, which is thought to have played an important role in triggering the 8.200 cal. yr. BP North Atlantic cooling event. In late Holocene records it appears that WGC subsurface entrainment of warmer Irminger Sea water masses was particularly intensified during Northeast Atlantic cooling episodes (Little Ice Age and the European Dark Ages), while the inflow of Irminger Sea water decreased during Northeast Atlantic climate warming as the Medieval Warm Period and Roman Optimum. Deep-water records indicate that DWUC intensification succeeded the Heinrich Event 1, with a further strengthening of the DWUC recorded in the Late Holocene. Records from the

Davis Strait high suggest that the thermohaline circulation did not completely stop during the Younger Dryas period. From an older core record we tentatively conclude that Greenland glaciation was likely most extreme not during the Last Glacial Maximum, but under Marine Isotope Stage 4.