Geophysical Research Abstracts
Vol. 16, EGU2014-12922, 2014
EGU General Assembly 2014


# Holocene paleoceanography of Disko Bugt area, west Greenland

Marie-Michèle Ouellet-Bernier (1), Anne de Vernal (1), Matthias Moros (2), and Claude Hillaire-Marcel (1)
(1) Geotop, Université du Québec à Montréal, CanadaCanada , (2) Leibniz Institute for Baltic Sea Research Warnemuende, Germany

Micropaleontological, palynological and isotopic analyses of sediment core MSM343300 (68˚28,311'N, 54˚00,118'W; 519 m water depth) raised off Disko Bugt area (West Greenland) were undertaken in order to document Holocene paleoceanographical changes in the Eastern Baffin bay, at a site now influenced by the Western Greenland Current. Palynological analyses were performed with special attention paid to dinocysts in order to characterize sea-surface conditions whereas isotopic analyses on benthic foraminifers aimed at documenting the "deep" water mass bathing the shelf edge. Palynological assemblages are largely dominated by dinocysts, which suggest high pelagic productivity during the Middle and Late Holocene. The assemblages are dominated by *Islandinium minutum* accompanied of the cyst of *Pentapharsodinium dalei*, *Brigantedinium* spp., *Operculodinium centrocarpum*, *Spiniferites elongatus*, *Selenopemphix quanta* and *Islandinium*? *cezare*. The application of the Modern analogue technique (MAT) highlighted a major change in sea-surface conditions at ∼7300 cal. yr BP.

Harsh conditions with dense sea-ice cover, low temperature and low productivity prevailed at surface from at least ∼ 10 000 (age of core bottom) until ∼7300 cal. yr BP with a large dominance of *Islandinium minutum* in the dinocyst assemblages. The overall low productivity resulted in low benthic foraminiferal abundances. However a few benchmark isotopic values could be obtained. At ∼10 000 cal. yr BP, delta $^{18}$O values near +4‰ pointed to the presence of cold and relatively saline waters at the sea floor. A short interval corresponding to a large amplitude $^{13}$C excursion is recorded at ∼8200 cal. yr BP, with deltagalues as low as -4.5 and -6.03‰ in *Islandiella norcrossi* and *Nonionella labradorica,* respectively, whereas $^{13}$C content in total sedimentary organic carbon did not vary much from the background value of ∼ -22‰ . We tentatively concluded at some linkage with a sea floor methane burst.

Postglacial conditions in surface waters were recorded from ∼7300 cal. yr BP, with a dinocyst diversity rise and increasing reconstructed summer temperatures, linked to incoming West Greenland Current waters. This late settlement of interglacial conditions was probably due to important discharge of ice and meltwaters from the Greenland ice sheet (GIS) mostly through the Jakobshavn Isbrae. After a gradual transition, optimal conditions were finally achieved at ∼6000 cal. yr BP. Accordingly, $^{18}$O values in *Islandiella norcrossi* showed a slight decrease from ∼6000 to ∼4900 cal. yr BP that might correspond to a temperature rise (≤1˚C) and/or a salinity decrease in the sub-surface water mass occupying the sea-floor of the study site. Cooling pulses were then recorded at ∼4200-4000 and ∼1500-1000 cal. yr BP. *I. norcrossi* depicted slightly increasing $^{18}$O-contents between ∼2100 and ∼1100 cal. yr BP, thus matching broadly the later cooler interval. Surface temperature finally increased from ∼1000 to ∼800 cal. yr BP, initiating the Medieval Warm Period with a reconstructed mean summer temperature of 10˚C, while it is presently of ∼4.4˚C at the site.

Throughout the postglacial, there is an opposition between SSTs and surface salinity, with warmer intervals being characterized by more diluted surface waters, resulting from higher freshwater discharge along the ice margin and notably the Jakobshavn Isbrae.