Neodymium isotopic composition of deep-sea corals from the Labrador Sea: Implications for NW Atlantic deepwater circulation during the Holocene, Bølling-Allerød, MIS 5c and 7a

L. MÉNABRÉAZ[1]*, J. MACCALI[1], A. BLÉNET[1], A. POIRIER[1], B. GHALEB[1], E. EDINGER[2] AND C. HILLAIRE-MARCEL[1]

[1]GEOTOP-UQAM, Montréal (Qc) H3C 3P8, Canada (*correspondence: menabreaz@sca.uqam.ca)
[2]Dept. of Earth Sciences, Memorial University of Newfoundland, St. John's (NFL) A1B 3X9, Canada

Live and fossil deep-sea corals (*Desmophyllum dianthus)* were collected at Orphan Knoll and Flemish Cap (southern Labrador Sea). Both sites are ~ 1800 m deep, ideally located to document changes in the intermediate to deep water mass circulation within the North Atlantic subpolar gyre. Preliminary ^{14}C and U-Th dating indicate that the corals developed during relatively warm periods of the Late Quaternary: MIS 1 (Holocene), the Bølling-Allerød, MIS 5c and MIS 7a. All samples are analyzed for their Neodymium isotopic composition (εNd) to document εNd values of ambient water mass and to compare the Northwestern Atlantic circulation regimes during these "warm" periods. εNd values of live-collected corals and of ambient seawater at both sites yield a good agreement around – 13.5. Results obtained so far on fossil corals from Orphan Knoll indicate seawater εNd of around -14 throughout the Holocene and the Bølling-Allerød, -25 during MIS 5c and -17 during MIS 7a. The strongly negative seawater εNd values during MIS 5c and 7a reveal an increased imprint of unradiogenic lithogenic sources of Nd derived from Greenland and the Canadian Shield via slope sediment remobilizations and/or an increased Baffin Bay overflow of relatively dense waters through Davis Strait. Such εNd values imply the absence of deepwater formation in the Labrador Sea through the advection of more radiogenic north Atlantic waters, and thus a drastically distinct northwest North Atlantic intermediate to deep water circulation during these time periods. On-going analysis on the Flemish Cap specimens will complement these results with information on water masses at the transition between the Labrador Sea and the open North Atlantic Ocean.