



Paleoenvironmental change on the eastern Canadian continental margin during the last 500 years: implications from Lake Melville and the Gulf of St. Lawrence

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Lake Melville and the Gulf of St. Lawrence are estuarine environments that are influenced by the freshwater run-off from eastern Canada and, in addition, are sensitive to broad scale oceanographic changes via the subsurface inflowing Labrador Current (LC) and the Laurentian Bottom Current, an offshoot of the Gulfstream, respectively. Paleoenvironmental reconstructions from the eastern Canadian continental margin help to improve our understanding of the southward freshwater advection via the LC and the northward heat advection via the Gulfstream through time, which have important implications for the climatic and oceanic development of the North Atlantic Ocean.

Here, we present new and well-dated multi-proxy records that allow high-resolution reconstructions of surface and subsurface water mass changes in the two sub-regions, Lake Melville and the Gulf of St. Lawrence. The short sediment cores MSM46-12 (Lake Melville) and MSM46-12 (Gulf of St. Lawrence) have been collected during the RV Maria S. Merian cruise MSM46 in 2015. Age-depth models for both sites have been developed based on the combined information from radionuclide (^{137}Cs , ^{210}Pb) and AMS ^{14}C radiocarbon dating. Both short sediment cores cover the last 500 years and sedimentation rates average 0.7 cm yr^{-1} , which allow our proxy records (0.5 to 1 cm sample interval) to be resolved at a multi-decadal to centennial time scale. Results from surface and downcore samples show a well-preserved and diverse planktic and benthic foraminiferal fauna. At site MSM46-3, we reconstruct high surface water productivity, indicated by the near-surface dwelling *Neogloboquadrina pachyderma*, *Alabaminella weddellensis*, *Pullenia osloensis* and *Bulimina elegans* var. *exilis*. A clear influence of warm and saline Atlantic Water on bottom water conditions in the Gulf of St. Lawrence is indicated by the occurrence of *Cassidulina neoteretis/laevigata* and *Bolivina subaenariensis*. At site MSM46-12, cold and fresher bottom water conditions and a temporal sea-ice cover is indicated by the occurrence of *Reophax subfusiformis*, *Spiroplectammina biformis*, *Islandiella helenae*, *Stainforthia concava* and *Cassidulina reniforme*. Combined with information on sediment provenance changes, obtained from x-ray fluorescence (XRF) analyses, our reconstructions provide information on climatic and oceanic changes during the last 500 years.