Geophysical Research Abstracts,
Vol. 11, EGU2009-10062-1, 2009
EGU General Assembly 2009

Late Holocene oceanic variability offshore Newfoundland based on dinoflagellate cyst assemblages.

S. Solignac (1), M.-S. Seidenkrantz (1), A. Kuijpers (2), A. Gunvald (1), C. Jessen (2), E. Zilmer Christensen (1), H. Jacobsen (1), E. V. Jorgensen (1), M. Palitzsch (1), and B. Stougaard (1)

(1) Department of Earth Sciences, University of Aarhus, (2) Geological Survey of Denmark and Greenland (GEUS)

The Labrador Sea occupies a central position in the large-scale North Atlantic atmospheric circulation patterns and storm activity, and also plays a major role in the climate system through the transportation of polar waters and icebergs towards the south and the formation of deep water. A thorough assessment of the climatic changes that took place in this area is therefore of utmost importance in order to improve our understanding of the causes and consequences of such changes, in the past as well as in the future.

Dinoflagellate cyst (dinocyst) assemblages were analyzed in two cores spanning the last ~5.7 ka BP from offshore eastern and southern Newfoundland (AI07-03G, Bonavista Bay, 48º44.321'N, 53º29.186'W; AI07-12G, Placentia Bay, 47º08.204'N, 54º33.182'W), in order to assess late Holocene sea-surface changes. Newfoundland lies in the path of southward flowing polar waters, as well as in the path of the North Atlantic cyclone track. Changes in oceanic or atmospheric circulation should therefore be effectively recorded in this region.

The dominant species of both records are Operculodinium centrocarpum and Brigantedinium spp., along with secondary species Pentapharsodinium dalei, Spiniferites elongatus, Islandinium minutum and Bitectatodinium tepikiense. Examination of modern surface sediment samples from several eastern Newfoundland bays suggests that colder waters with a more extensive sea-ice cover in the northernmost sites are characterized by higher proportions of Brigantedinium spp. and I. minutum relative to O. centrocarpum. Comparison of these modern assemblages with the two records indicates generally colder conditions from ~5.7 ka BP to ~2.9 ka BP at both sites. The exact timing of the coldest spells (as indicated by the maximum occurrence of I. minutum), however, does not seem to be synchronous in the two bays. After 2.9 ka BP, milder conditions are observed until 1.1 ka BP in Placentia Bay and ~0.5 ka BP in Bonavista Bay. In both records, a peak of I. minutum centered on 0.5 ka BP is observed.

Research is underway to explain these oceanographic changes through the comparison with other records from the area and from Greenland, in order to identify possible local processes and/or large-scale circulation patterns. Comparison of the dinocyst records with XRF, foraminiferal and pollen data obtained on the same cores might also bring additional insights on the mechanisms responsible for these changes in sea-surface conditions, notably through the identification of terrigenous inputs and their origin.