

Highly variable Holocene climate from the Laurentian Fan using coccolith and palynomorph proxies

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Coccolith, dinocyst and pollen analyses from the IMAGES core MD95-2033, collected from the Laurentian Fan (lat: 44°39.87N, long: 55°37.21W; water depth 1412m), provide new data set in millennial scale, to assess the magnitude of climatic changes during the Holocene. Today, the area is under the influence of the North Atlantic Current (NAC). North Atlantic circulation, through its heat transport and deepwater formation, is an important contributor in the climate system. Several dramatic reorganizations of the ocean circulation have occurred during the last glacial and interglacial period. During the Holocene period in particular, the surface ocean circulation shows different patterns and the mechanisms behind them are very still much under debate.

In this research, coccolith, dinocyst and pollen diversity and concentrations are used as proxies to trace those surface water circulation changes. In particular, in the coccolith assemblages, the abundances of *Emiliana huxleyi*, *Calcidiscus leptoporus* and *Gephyrocapsa* spp. show millennial-scale oscillations. Dinocyst assemblages are dominated by *Operculodinium centrocarpum* followed by *Spiniferites elongatus*, *Bitectatodinium tepikiense* and *Alexandrium excavatum*. These species show large-amplitude temperature and salinity fluctuations, which indicate major climate and/or hydrographic change, at least on a regional scale. Estimates of sea-surface temperatures, salinity and sea-ice cover, reconstructed using dinocysts, were also performed.

This work provides new data in order to better understand the key processes in Holocene regional cooling and warming of North Atlantic surface waters and the variability of NAC formation.