Reconstructing the Labrador Current during the past 1,400 years using dynamic sediment and organic geochemical proxies

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Understanding the impact of Labrador Current in providing freshwater to the North Atlantic is pivotal due to its role in modulating the Atlantic meridional overturning circulation (AMOC). Temperature is one of the key seasonal environmental factors as sea-ice covers pathway of the Labrador Current during six to eight months per year, similar to the temperature of the Hadal Zone. Here we used two sediment cores from the eastern Canadian continental margin which were retrieved from the Labrador Shelf and Slope bathed by the Labrador Current and Labrador Sea Water. Two paleo-proxies, namely the sediment dynamic proxy (i.e., mean size of the sortable silt) and an organic paleothermometer (i.e., glycerol dialkyl glycerol tetraethers (GDGTs; TEX_{86}) were used to reconstruct the variability of the Labrador Current vigor and accompanying temperature changes for the last 1,400 years. Further, the X-ray fluoresces (XRF) data were used to characterize changes in the bulk sediment geochemistry. Our data suggest a gradual strengthening in the vigor of the Labrador Current which was accompanied by a similar trend in the proxy record of subsurface temperature (i.e., TEX_{86}). Further, there are anomalies in the subsurface temperature which could be correlated to the climatic variability associated with the Little Ice Age and Medieval Warm Period. However, our records need robust chronological constraints to ascertain the correlation with the climatic anomalies and require further testing the application of TEX_{86} in near-Arctic climate.