Geophysical Research Abstracts
Vol. 21, EGU2019-14027, 2019
EGU General Assembly 2019

A multi-decadal record of oceanographic changes of the past ∼150 years (1850-2015 AD) from North of Iceland.

Margit H. Simon (1), Francesco Muschitiello (2), Amandine A. Tisserand (1), Are Olsen (3), Matthias Moros (4), Kerstin Perner (4), Trond M. Dokken (1), Eystein Jansen (5,1)

(1) NORCE Norwegian Research Centre, Bjerknes Centre for Climate Research, Norway (msim@norceresearch.no), (2) Department of Geography, Cambridge University, UK, (3) Geophysical Institute, University of Bergen, Bjerknes Centre for Climate Research, Norway, (4) Leibniz Institute for Baltic Sea Research, Department of Marine Geology, Germany, (5) Department of Earth Sciences University of Bergen, Bjerknes Centre for Climate Research, Norway.

Extending oceanographic data beyond the instrumental period is highly needed to better characterize and understand multidecadal to centennial natural ocean variability. Here we present new reconstructions from offshore North Iceland –a particularly important location in order to investigate changes in the i) southward fluxes of freshwater from the East Greenland Current, via the East Icelandic Current, ii) relative contribution of the Irminger Current water (temperature, salinity) to the North Icelandic Irminger Current (NIIC), and iii) shifts in the location of the North Atlantic Polar Front. The NIIC is one of the three main branches of Atlantic Water inflow to the Nordic Seas, playing a central role in the formation of Denmark Strait overflow water. However, as yet the NIIC is still poorly studied. In this study we present a new and well-dated multi-proxy record that allows multi-decadal reconstruction of surface, Atlantic-derived Subpolar Mode Water and Arctic Intermediate Water (AIW) mass changes on the western North Iceland shelf over the last ∼150 years. The reconstruction overlaps with historical observations and the direct comparison reveals that the δ18O, Mg/Ca ratios and δ18Osw record of near surface-dwelling planktic foraminiferal Neogloboquadrina pachyderma (NPS) is reliably representing temperature and salinity fluctuations on the North Iceland shelf that links to large-scale atmospheric and oceanic changes in the North Atlantic region such as the Atlantic Multidecadal Oscillation. Moreover, our data suggest the variability in the δ13C record of NPS appear to reflect upwelling of nutrient-enriched AIW to the near surface layers during periods of stronger easterly winds and advection of more cold/fresh and nutrient-poor Polar surface waters to the North Iceland shelf– a mechanism that occurred, for example, during the Great Salinity anomaly in the late 1960′s. Finally, we show that geochemical proxies derived from the benthic foraminifera, Melonis barleeanus and Cassidulina neoteretis, track variability in AIW, matching and supporting the observed increase in temperature and salinity values around Iceland since the 1970′s. This study provides evidence that oceanographic proxies from North of Iceland can be used to reconstruct past regional shifts in water mass properties linked to decadal scale large-scale atmospheric and oceanographic changes beyond the instrumental record.