Geophysical Research Abstracts
Vol. 17, EGU2015-306-1, 2015
EGU General Assembly 2015

Annually resolved sclerochronological reconstructions of the climate variability of North Atlantic water masses around the Faroe Islands

Fabian Bonitz (1,2) and Carin Andersson (1,2)

(1) Uni Research Climate, Allégaten 55, N-5007 Bergen, Norway, (2) Bjerknes Centre for Climate Research, Bergen Norway

The aim of this study is to provide a better understanding of the natural climate variability of the North Atlantic realm especially the short-term climate variability in Europe and Arctic regions. The marine climate variability in North Atlantic areas largely influences climatic conditions in northwestern Europe and Arctic regions. To predict future climate conditions in these regions, a fundamental knowledge of past climatic conditions on an annual time scale is needed. Commonly used marine climate archives such as sediment cores commonly provide a maximum resolution of 5 – 10 years. Annually resolved climate archives such as corals are only sparsely available in higher latitudes and systematic instrumental observations exist only for the last 50 years. However, at high latitudes molluscan sclerochronology provides a promising approach for reconstructing climate on annual time scales. This approach has been successfully but only sporadically used in North Atlantic areas. In this study, we develop a molluscan shell-based paleo climate record from the shelves around the Faroe Islands by investigating the annual growth increments of the ocean quahog Arctica islandica. A. islandica is a long-lived species and its growth increments can be measured in the umbo as well as along the ventral margin in direction of the maximum shell height. By cross-matching growth increment patterns of live-collected and sub-fossil specimens we build a multi-centennial master chronology, which we compare with instrumental records of temperature, salinity and primary productivity. The master chronology comprises around 20 living and 100 – 150 dead specimens, some of which are radiocarbon dated to avoid spurious cross-matching. This is the first shell-based chronology from the Faroe Islands region. Additionally, we will analyse the δ18O composition of single growth increments in selected intervals in the master chronology to reconstruct past sea surface temperatures in the Faroe Current. We compare the sclerochronological data to instrumental data to test the applicability and reliability of molluscan sclerochronology-derived temperature records. This study contributes to the evaluation of the potential and limitations of molluscan sclerochronology-derived climate records.