



Temperature reconstructions for the Faroese region based on the analysis of the d18O signal in *Arctica islandica* shells

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Highly-resolved and precisely-dated paleotemperature records are sparse at high latitudes but urgently needed to better understand the natural climate variability and to place the observed modern warming into a longer term perspective. In the northern North Atlantic, the d18O signal in *Arctica islandica* shells is a promising temperature recorder: this bivalve species forms its shell in near-equilibrium with the ambient water and it forms annual growth increments which can be used to cross-date live-collected and sub-fossil specimens from the same population based on similar growth patterns. This enables the construction of long, annually-resolved, and absolutely-dated shell-based paleo proxy records. Here, we use the d18O signal in five temporally-aligned shells from the Faroe Shelf to reconstruct the temperatures for the wider Faroese region for the period 1657-2009. Overall, the d18O_{shell} record suggests a trend of increasing temperatures towards today, reflecting the transition from relatively cold conditions during the Little Ice Age towards the modern warming. From 1667-1720 the water temperature on the Faroe Shelf was relatively cold. After 1720, the water temperature continuously increased with a maximum around 1850. Between 1850 and 1880 the water temperature remained high. After 1880 the water temperature decreased again and remained relatively low until 1920. The rest of the 20th century was characterized by a trend of increasing water temperatures from 1920-1960 followed by a trend of decreasing water temperatures until the mid-1980s. In the 1990s the water temperature increased again. The general warming trend seen in our temperature record from the Faroe Shelf largely reflects the signal commonly observed throughout the wider Northern Hemisphere during this time period. However, between approximately 1800 and 1850, the temperature signal on the Faroe Shelf strongly deviates from this wider Northern Hemisphere trend, showing similarities to other records of climate variability specifically from Europe.