Multiproxy reconstruction of the variability of the East Greenland Current during the last 150 000 years (REHEAT).

principle investigator: Dr. Katarzyna Melaniuk
mentor: Dr. Joanna Pawłowska

Due to climate change the Arctic region is warming at a rate two to three times higher than the global rate. Most strikingly this becomes evident by the expansion of the warm Atlantic Water (so-called Atlantification) into the Arctic Ocean. The process further causes severe reductions in sea-ice coverage and a decrease in winter sea-ice thickness. These processes lead to increased open water areas and further the oceanic uptake of atmospheric heat which can lead to ice-free Arctic conditions by the end of this century. In recent years, Atlantification was observed also near the coast of Greenland where warm Atlantic water mixes with the East Greenland Current. Despite the fact that the heat fluxes, caused by the inflow of Atlantic Water threaten to destabilize the Greenland Ice Sheet there is a lack of long-term information regarding ocean variability at the Greenland shelf. Therefore, the main ambition of this project is to reconstruct the changes in the strength of the East Greenland Current and the behavior of the Eastern Greenland ice sheet throughout the last 150 000 years. The project emphasizes the Eemian period (~130 000–115 000 BP). Due to the higher than today temperature, Eemian is considered a past analogue for future climatic warming. To overcome the limitations due to the lack of fossils e.g. shells, material creating several gaps in marine records, a traditional palaeoceanographic approach such as analyses of foraminiferal species and measuring oxygen and carbon stable isotopes recorded in their shells, will be combined with biomarker data (IP_{25}) for sea-ice reconstructions, and state-of-the-art analysis of sedimentary DNA (*seda*DNA). Analyses of *seda*DNA is based on the reconstruction and analysis of genomic information of species preserved in marine sediment and indicate the presence of marine organism also foraminifera, even in the absence of visible residues e.g., calcareous shells. This will allow to create so far missing, a coherent baseline of information on the variability of the East Greenland Current, and the Eastern Greenland ice sheet in response to climate warming. This information can further provide an evaluation basis for ocean and ice sheet models, and information regarding ocean ecosystem shifts to come.

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