One of the effects of the ongoing global climate changes is the poleward migration of typical Atlantic water species. This process accelerated recently and changes the Arctic ecosystem at an unprecedented scale. However, "Atlantification" is not a new process, as the Arctic experienced it already during the warmest intervals of the Holocene- a present interglacial that started c. 11,700 cal yr BP. Therefore we have decided to examine the foraminiferal assemblages (marine protists) over the entire Nordic Seas through Holocene in order to assess the potential source of Atlantic water (AW) species in the European Arctic waters.

Foraminifera are among the most abundant and scientifically important groups of organisms. Due to their short life span and quick reactivity to environmental changes they can be used as indicators of the "atlantification" process. Foraminifera play also a major role in the inorganic carbon burial process, which is one of the most important mechanisms for removing carbon from marine ecosystems. Therefore the knowledge of the future of the foraminiferal communities is of global importance, especially as some foraminifera species are more valuable for the carbon burial process than others.

We could expect that the source of thermophilic species appearing recently in Svalbard waters might be located in the waters west and north of Norway. However, this is not true for foraminifera communities as our latest study shows that the similarity between modern Norwegian and Svalbard foraminifera communities reach only 30%. Therefore we hypothesize that the source of the modern Atlantic species might come from the southern part of the northern North Atlantic, and the northward transport of the "propagules" (small foraminifera juveniles) is driven via Faroe-Shetland Channel and Iceland-Faroe Channel.

Using several precisely dated high-resolution sedimentary archives we will be able to trace the migration of Atlantic-sourced foraminifera species when the Arctic was warmer than today. Combining sedimentological (grain size, sortable silt, ice-rafted debris counts), micropaleontological (planktic and benthic foraminifera), geochemical (stable oxygen and carbon isotopes) and biomarker (alkenones) analysis will allow a complex reconstruction of paleoenvironmental conditions. The AW domain will be identified in the sediment cores by the reconstruction of the sea surface and sea bottom temperatures. Stable isotopes records will also point to the AW presence, as AW is isotopically heavier than the Arctic Water. The modern foraminifera AW species like *Melonis barleeanum*, *Pullenia bulloides*, *Epistominella pusilla*, *Eggerella bradyi*, *Sigmoilopsis schlumbergeri*, and *Epistorninella decorata*/*Alabarninella weddellensis* are broadly described in the literature of the region and will be used as proxies of AW as well. Finally, the assemblages from the different environments will be compared using statistics and similarity between assemblages will be calculated.

The expected results of the project will answer the question of origin of the AW species in the Arctic during the warmest periods of the Holocene. The combination of AMS radiocarbon dating with tephrochronology will allow obtaining age models as accurately as possible. Potentially, new tephra horizons will be identified, characterized, and dated which will allow their use in further paleoceanographic research and correlation of sediment records. Furthermore, the proposed research project will also expand our knowledge of the late Quaternary paleoceanographic evolution of the Iceland Sea. This region, despite its importance in shaping the ocean environment and regional climate, has hitherto been largely neglected.