

## Analyzing natural and anthropogenic-induced bottom water temperature variations in the Norwegian Trench

Obtaining a high-resolution  $\delta^{18}\text{O}$  record of planktonic and benthic foraminifera to generate valuable insights into natural variability in bottom water temperatures and changes in salinity to assess recent global warming in the North Sea-Atlantic system.

Department: Earth Sciences

Research group: Marine Palynology & Paleoceanography

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### Project description

The Norwegian Trench serves as a crucial passage connecting the Baltic and North Seas to the Atlantic Ocean, shaping the properties of the water outflow into the global ocean circulation. Within the North Sea-Atlantic Exchange (NoSE) project, our aim is to constrain the past carbon and exchange between the North Sea and Atlantic Ocean. The main objective of this project is to obtain high-resolution  $\delta^{18}\text{O}$  (delta-18 oxygen) records to understand bottom water temperature (BWT) and salinity changes in the Norwegian Trench over the last decades and centuries. Variations in paleotemperature may be strongly linked to fluctuations in the Gulf Stream system, influenced by the North Atlantic Oscillation, and/or shifts in intensity from natural to anthropogenic forces.

The student will perform oxygen isotope measurements on planktonic and benthic foraminifera, recognized as paleoclimatic indicators, from 30 cm-long multi-cores that span the Norwegian Trench from south to north. For this purpose, the sediment will be sieved, and the foraminifera will be picked under the microscope. Palynology and XRF data from the same core are available to provide a broader local and regional perspective on  $\delta^{18}\text{O}$  records. Additionally,  $\delta^{18}\text{O}$  records from other studies in the region may serve as a comparison to establish an age model for each site. Depending on the quality of the age models, the assistant's role may extend to  $\text{CaCO}_3$  measurements or picking one species of dinoflagellate cyst for carbon isotope analysis. This will be done in consultation with the student.

### Job requirements

The ideal candidate has an affinity for working in a laboratory and with a microscope. Interested in the marine carbon cycle and proxy data is a plus! Proficiency in identification of foraminifera and experience measuring oxygen isotope signals is not a requirement.

During this assistantship, the student will work in the palynology lab, which includes training in sample processing. Depending on the species of foraminifera present in the samples, the student will be trained in identifying specific species and collecting them to measure  $\delta^{18}\text{O}$  at NIOZ, Texel.