



## **Proxy Improvement of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ for Quantative Climate Reconstructions: Field and Foraminifera Culture-based Calibration Studies -an Introduction to the FrISBEe Project.**

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To predict the impact of recent abrupt climate change, it is of vital importance to understand past climate variability as well as how climate is linked to ocean circulation. Direct observations of past climate or past ocean circulation are not possible, so instead one has to rely on indirect observations, so called proxies. However, the use of proxies also requires quantified relationships between these and the desired, but inaccessible, parameters such as temperature, nutrients or salinity. Fully quantified and calibrated relationships, however, rarely exist. To address some of these issues a new project, Foraminifera and Isotopes in the Skagerrak and Baltic -Experiments and Field studies (FrISBEe), is launched this spring. We propose to improve and better understand two of the foremost used proxies in climate reconstructions using marine sediments: the oxygen and carbon stable isotopic compositions of foraminifera. We want to understand how and when the isotopic signal is incorporated in the shells of the foraminifera, and relate it to various environmental parameters. To do this we need to perform both field and culture studies. We will carry out monthly sampling of water at five different stations in Skagerrak, Swedish fjords, and the Baltic Sea during at least one seasonal cycle. We plan to analyse the different water masses for oxygen and carbon isotopes, hydrographic variables, and nutrients. We will also perform sediment sampling in Swedish fjords and in Skagerrak for micropaleontological analyses

at least once each season during the year. We also plan to culture benthic foraminifera from these samples at Woods Hole Oceanographic Institution (WHOI), USA. We will later use the acquired knowledge regarding improved quantitative temperature and salinity relationships in climate modelling studies.