

## **Abstract for the general public**

Fjords have been shown to be important sites for controlling carbon burial and the concentration of atmospheric carbon dioxide (CO<sub>2</sub>). Organic matter deposited in fjord sediments comes from a multitude of marine and land-based sources, which differ in their stability. As the climate conditions of the fjords influence their biological processes, including primary productivity and input of land-based organic matter from the fjord drainage areas, it is likely that climate change may impact the relative contributions of marine and land-based sources in the fjords, resulting in changes in carbon burial.

It should be noted that fjords in the Northern Hemisphere impacted by warm Atlantic Water, one of the most important components of the global climate system, are important sites for carbon burial. However, the relationship between recent climate warming and organic carbon cycling in these areas has not yet been thoroughly investigated.

The aim of this project is to verify the **hypothesis** that that the recently observed climate change impacts on organic matter inputs and sources in the fjords influenced by warm Atlantic Water, located along the latitudinal gradient from southern Norway to Spitsbergen. To achieve this main scientific goal of the project the following **objectives** have been set: (i) reconstruction of organic matter inputs and sources in the fjords located along the latitudinal gradient from southern Norway to Spitsbergen over the last century, (ii) Assessment of the relationship between environmental factors and organic matter inputs / sources in the studied fjords, and (iii) Assessment of human-induced influences on organic matter inputs / sources in the studied fjords.

This project will be based on the study of distribution of various organic matter markers in undisturbed dated sediment cores collected in the fjords located along the latitudinal gradient from southern Norway to Spitsbergen. Correlation of these markers with other sediment proxies related to past environmental conditions, and sediment lithology will provide information on climate change impacts on organic matter inputs and sources in the studied fjords. In addition to environmental factors, human-induced influences will be investigated using contamination markers. To our knowledge, such a comprehensive and complex approach has never been conducted for European coastal marine areas impacted by warm Atlantic Water. In addition, the results of this project will also provide a valuable baseline for further studies on modelling future scenarios for sedimentary organic matter sources and efficiency of carbon burial in North Atlantic fjord systems, influenced by ongoing dramatic climate changes.