In the modern paleoceanographic studies, a number of methods utilize marine organisms to reconstruct environmental conditions. One of the most important groups of these organisms are foraminifera. Despite their microscopic size, they are considered to be the most species-diverse shelled organisms in modern oceans, and are an important element of the food web. A feature that decides about the high scientific value of foraminifera are their calcium carbonate shells (tests) that preserve well in sediments, what makes possible to use foraminifera as a proxy- an indirect source of information about environment. Foraminiferal species composition, diversity and elemental composition of their tests are used to reconstruct the temperature and salinity of sea water, oxygen availability, or identification of specific water masses in the past. Despite the widespread use of Foraminifera in various fields of science, their role in carbon burial process remains unclear. The proposed project aims to provide the first quantitative data on the share of foraminiferal organic and inorganic carbon in the total carbon pool in the sediments of the Northern Europe and Svalbard. Preliminary studies have shown that foraminiferal carbon makes up to 40% of total inorganic carbon in the sediments of Adventfjorden (Spitsbergen). This suggests that foraminifera are one of the largest producers of calcium carbonate in the fjord environment.

Svalbard and Northern Europe are the key regions considering the carbon cycle. This is due to their particular sensitivity to climate warming, caused by increasing amount of carbon dioxide in the atmosphere, and the fact that they are placed in one of the Northern Hemispheres largest carbon sinks. The progressive increase of temperature in XX century causes a decrease in ice cover, as well as an increase of marine productivity. Carbon is located in the center of speculations about climatic and ecologic dependences. It is a component of a greenhouse gas (carbon dioxide) and also one of the main components of organic matter. Results of this project are designed to determine the share of foraminiferal carbon in the total carbon pool of the fjords sediments. Conclusions based on the project's results will make reference for the future studies of foraminiferal communities and will contribute to the knowledge about ecological dependences in the Svalbard and the Northern Europe. Material subjected to the study comes from regions with different temperature regimes. This will allow to investigate the relationship between temperature conditions and foraminiferal carbon (organic and inorganic) contribution in the total sediment carbon pool. The project will be conducted on the basis of data obtained in the analysis sediment cores sampled in the fjords of northern and southern Norway and Svalbard. This arrangement of sampling sites will allow to obtain a cross-section of different environmental conditions in the Northern Europe and Svalbard, and will enable to study the correlation between temperature and foraminiferal assemblages. Sedimentary material was pretreated in a way that allows carrying out qualitative and quantitative analysis of communities of foraminifera. The content of organic and inorganic carbon in selected foraminifera species will be examined. Sediment grain size as well as quantity of organic and inorganic carbon in the sediment will be determined. The results will be complemented by measurements of seawater temperature and salinity. This project will extend the knowledge about communities of foraminifera in Svalbard and the Northern Europe. It will help to develop a model that will be used in future studies on carbon cycling, as well as on the role of foraminifera in the ecosystem.

The proposed project will provide the first numerical data for quantity of organic and inorganic carbon in foraminiferal communities and will let us define the participation of Foraminifera in the total carbon pool in bottom sediments of Svalbard and the Northern European fjords. The results will contribute to estimation of foraminiferal carbon level changes in contemporary environments influenced by modern global warming, as well as will make an important reference for research on climatic and environmental changes in the past. It will also let us develop new tools for monitoring contemporary environment and at the same time find effective ways of predicting climatic and environmental transformations in the future. It will also help with providing information for paleoenvironmental analysis as well as direction of present changes in ecological linkages in the Arctic.