

The implementation of this project will enable us to determine the rate and dynamics of changes of glaciers, being currently one of the most important indicators of changes occurring in nature, as well as to estimate the influence of these changes on the transformations of the other components of cryosphere. Cryosphere components readily respond to climate changes, triggering transformations of their environment. Such transformations are the most common in glacierised areas, including the High Arctic with NW Spitsbergen. This is where glaciers are recently undergoing the most dramatic degradation. The intended work will involve comprehensive glaciological, hydrological, and geomorphological studies.

The objective will also include estimation and modelling of glacier changes based on an overall understanding of the rate of its changes, and the development of a model (the first of its kind for this region) and scenarios of glaciers and cryosphere transformations with reference to high-resolution surveys of its various components. Essentially, the project will comprise the formation of an original comprehensive system of evaluation of the intensity and susceptibility of glacier changes and degradation resulting from climate change and its influence on the other components of the natural environment. Project tasks will be implemented through empirical research in polar environment based on own research facilities available at the NCU Polar Station. Analysis of the directions and rate of evolution of the polar environment based on a qualitative and quantitative description of changes in glaciers and other components of the polar ecosystem provides a unique indication of the intensity of climate change. The possibility to reconstruct changes in this environment and to predict their further development will be one of the paramount research objectives of the project.

The intended research will comprise direct measurements and fieldwork regarding of glaciers of the NW Spitsbergen. The research will be considerably enhanced by state-of-the-art measurement and modelling methods (e.g. artificial neural networks). This will be the comprehensive description of the glaciers and processes occurring in the cryosphere of that part of Svalbard.

The intended research will provide a basis for evaluation of the intensity of transformations of glaciers, which result in significant changes occurring in the whole cryosphere now. Combining obtained results with modern methods of long-term modelling will make it possible to both evaluate the state of cryosphere and to develop scenarios of its changes for much larger areas of the Arctic. High-resolution surveys and a comprehensive approach to the planned work will guarantee achievement of high-quality results and the pioneering models and scenarios will contribute to significant development and enhancement of our knowledge of present-day changes observed in the polar environment, whose – often irreversible – effects may have global consequences.

It should be stressed that all contractors are researchers who are experienced in their respective scientific fields, which ensures a high quality and reliability of the planned research work.