As a consequence of climate change, worldwide glaciers melt and recede rapidly that, in turn, lead to high transport of water, suspended sediments and dissolved matter. The transported material also includes glacier derived nutrients, which affect biological activity (increase in the amount of autotrophic and heterotrophic organisms) in aquatic environments. The intensive development of autotrophic organisms (e.g., algae) occurs and is facilitated by a high mass flux of nutrients derived from glacierised areas. This leads to an increase in photosynthesis, processes consuming CO_2 in water and air, that is related to algae. Taking into account the increase of CO_2 on Earth, responsible for high dynamics of global air temperature rise, natural processes of CO_2 consumption associated with nutrients sourced from glacierised basins appears to be crucial in our understanding of the carbon cycle in the environment. What is less known is a change in CO_2 consumption resulting from long-term glacier recession (~hundreds of years) as glacier's foreland is invaded by plants and animals (Fig. 1). This leads to an unknown change in the quality and quantity of nutrients transported by glacier-fed rivers.

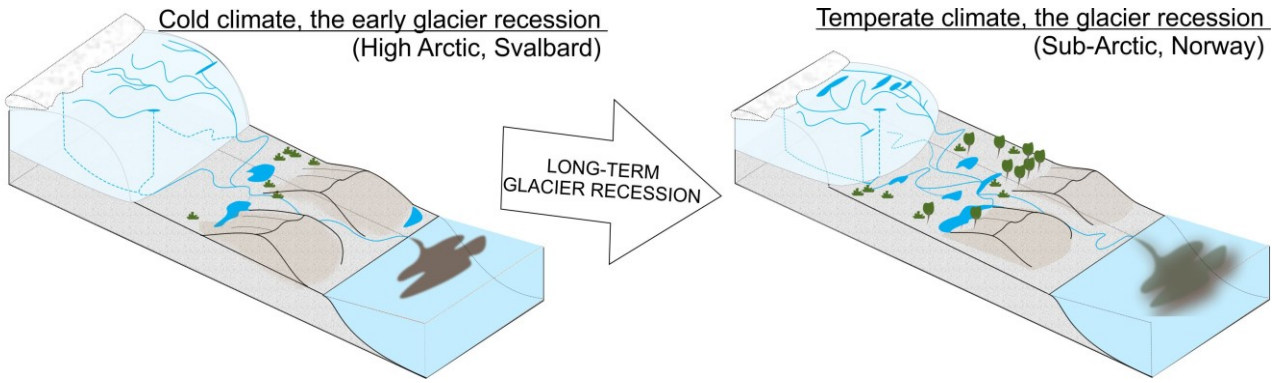

Fig. 1. Sketch shows future changes of glacier recession and changes to biological expansion and quality of material transported by rivers.

The FLOURISH project aims at determining the impact of long-term glacier recession (~hundreds of years) on the quality and quantity of nutrients sourcing the aquatic environment and their role in the consumption of CO_2. To achieve this aim, research will be conducted in two sets of sites showing future climatic change in environments associated with glacier recession: 1) High Arctic (Svalbard) with intensively glacierised area in the stage of early vegetation expansion and cold climate, 2) Sub-Arctic (Jostendalsbreen and Jotunheimen, Norway), the advanced stage of glacier recession with advanced development of vegetation and temperate climate (Fig. 2). The transport of nutrients will be determined by multiple analytical methods aimed at dissolved, sediment-bound and organic-complexed nutrients. The former nutrients are adsorbed ("stick") to suspended sediments. The FLOURISH project will particularly focus on the former type of nutrients as their concentration tend to be 100-1000 higher than dissolved nutrients. The expected result of the FLOURISH project will be a determination of future changes of nutrient riverine transport resulting from glacier recession. We expect that, in the future, these changes lead to favourable conditions for the aquatic ecosystem by delivering highly bioavailable nutrients.

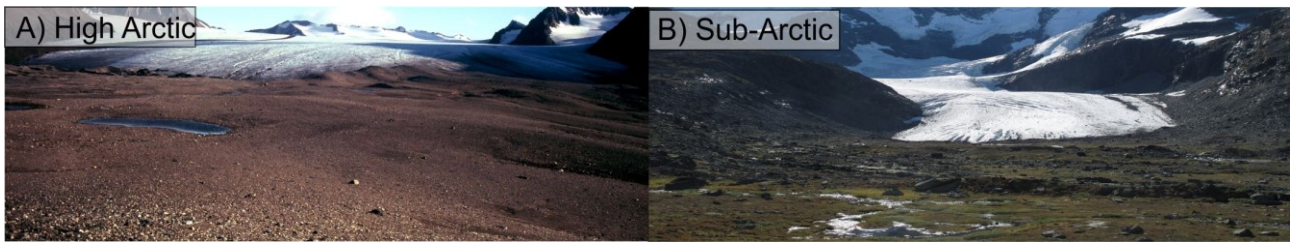

Fig. 2. Foreland of a glacier at the different stages of recession: A) early (High Arctic) B) late (Sub-Arctic).