Glaciers and ice sheets constitute the reservoir of 70% of Earth's freshwater. Ice covers ca. 10% of lands and plays an important role as a white shield reflecting solar radiation. Due to that, our planet avoids overheating. From a biologist's perspective, however, glaciers and ice sheets are unique ecosystems which are inhabited by distinctive organisms adapted to live, develop and reproduce in low temperatures. They are not only the ubiquitous bacteria but also animals such as water bears (Tardigrada) or rotifers (Rotifera). In a glacial biome, they are the most common in cryoconite holes – small, water-filled reservoirs on the surface of glaciers. On the bottom of these small holes (up to a few centimetres in diameter), cryoconite material is deposited. It contains autotrophic organisms (algae and cyanobacteria) and heterotrophs. However, apart from dominant single-cell organisms, tardigrades and rotifers seem to be really important in these ecosystems. Most of these animals do not exceed the length of 1 mm but as consumers they are at the highest trophic level. It means that the role of small water bears or rotifers in cryoconite holes is comparable with the role of wolfs in primary forests or polar bears in the Arctic. Despite the fact that cryoconite sediments are mostly built from algae and cyanobacteria, at the depth of a few millimetres anoxic zones are formed which changes general physico-chemical conditions such as pH in sediments. Undoubtedly, a „puddle" on a glacier is a more complex ecosystem than one may assume at first glance. Therefore, the main goal of the project is research on the role of the biggest organisms in supraglacial zone (on glacier surface) – microinvertebrates. The primary assumption is that animals burrowing sediments in search for food, stimulate a bioturbation process and reduce anoxic zones. Such studies are extremely important due to the fact that changing environmental conditions in the holes influence their primary production. I will collect material and conduct measurements on two glaciers. The first one is a temperate valley glacier, Forni in the Alps. It is dominated by tardigrades, exclusively. The second is cold valley Longyearbreen on Spitsbergen dominated by both tardigrades and rotifers. Owing to a special probe I will measure oxygen concentration, pH and electric conductivity in cryoconite holes with and without animals. Additionally, in laboratory I will incubate sediments in jars and measure oxygen concentration, pH and electric conductivity at a various depth of sediments with and without animals. It may turn out that in search for food animals reduce anoxic zones in cryoconite holes and change pH to more favourable and supporting „ecosystem services" for glacial ecosystems. Following looking for food by animals, in the project I will check whether the animals control other biotas as the highest trophic level consumers in cryoconite holes. I will calculate the relations between a number of bacteria, algae and animals. At the same time, I will study the diet of glacial animals. To do this, I will use Next Generation Sequencing (NGS) for the identification of sediments, hungry and full animals content. I will also calculate the biomass of animals which is seems to be forgotten in glacial science. Owing to this, we will understand how animals control other biotas in the holes. The goals of the project are extremely important in understanding issues such as productivity and matter flow in glacial ecosystems. Information resulting from this study are of fundamental character but are unfamiliar to 10% of our planet. Shame on us, polar scientists, that for many years we have forgotten about small extremophile animals, which may control processes on glaciers and influence the biosphere. I am guessing then it is worth to pay more attention to these small, enigmatic tardigrades and rotifers.