

Stable isotopes in invertebrate chitin as a tool to identify processes affecting mountain lake ecosystems

The Tatra Mountains are one of the wildest area of the Central Europe. Beside them remote location, the nature of this mountain range changed intensively during the last centuries. These changes were caused by local and global factors, that influenced many components of environment, including mountain lakes. The most important factors were climate changes, acid rain, pasturage, fish introduction and tourism. These processes were describe in many studies concerning hydrology, geology, biology and paleolimnology. However, researches done so far have not clearly identified which of these environmental factors had the greatest impact on plants and animals inhabiting the waters of the Tatras.

In the planned project, we will analyze the composition of stable carbon, nitrogen, hydrogen and oxygen isotopes in chitin carapaces of freshwater animals. We have chosen daphnia (*Daphnia*) and non-biting midge larvae (*Tanytarsus*) - popular inhabitants of the Tatra ponds. The remains of these animals will be selected from precisely dated lake sediment profiles. Thanks to this, we will be able to link the observed changes in the isotopic composition with specific dates and processes taking place in the lakes and their surroundings. The sediments will be taken from lakes of various nature: the relatively shallow Toporowy Staw Niżni and Długi Staw Gąsienicowy as well as the deep ponds - Czarny Staw pod Rysami, Przedni Staw and Zielony Staw Gąsienicowy. In this way, we will be able to separate the impact of local factors (those that have only been registered in one pond, such as fish stocking or intensification of tourism) from factors that have at least regional scale, including climate change. These studies will allow us to determine to what extent the observed lake changes are caused by human activity, and they can be used in planning the protection of the Tatra lakes and similar ecosystems.