**Reconstruction of postdepositional evolution of tills of the last Pleistocene glaciation**

The till is a rock composed of sediment material of varied sizes and shapes, forming as a melt-out product released from glacier or ice-sheet. Thus, it is the best proof of past glaciation events in a given area. Moreover, it covers a significant part of northern and central Poland. Tills building the geological structure of Poland are related to glaciations, which took place over the last million years. The youngest of them formed about 15–25 thousand years ago. The development and disappearance of ice sheets on the European continent and the complexity of processes leading to the formation of tills are already relatively well known. However, relatively little is still known about glacial deposits history after ice sheet retreat, including how weathering processes, such as those associated with the effects of frost and precipitation, changed the rocks and minerals that formed it. It is also unknown how much the thickness of a given till has been reduced since then, and thus how much of preserved geological record analysed today.

The project aims to recognize the till evolution since the last glaciation. The study focus on quantitative analysis of processes and products of weathering (destruction of minerals and rocks under the influence of environmental factors) and determination of the degree of denudation (removal of destroyed sediments from the place of deposition) of these tills. The expected outcome of the work is also the development of research methods used to analyse the processes mentioned above. The project aims to answer the following research questions:

1) What is the impact of weathering on the mineralogical and petrographic (rock) composition of tills?
2) How valid are particular geological or geochemical proxies in estimating the weathering degree of tills?
3) How fast tills of the last glaciations are being denudated at the Polish Lowlands?
4) Can weathering proxies be combined to a modelled degree of till profile reduction?

The answer to these questions requires carrying the studies at a sufficiently large number of sites. Therefore, the research team consisting of seven scientists from Poland and abroad will study ten sedimentary profiles that represent varied geological structures and degree of weathering. The planned research methods comprise fieldwork (description of deposits and sampling) and laboratory work (measurements of $^{10}$Be isotope concentration, petrographic, mineralogical and geochemical analyses). The results will be used to evaluate potential indicators of weathering processes. Modelling of denudation of the top part of the profile using $^{10}$Be isotope concentration results will be performed for each site. The aggregated results from all the sites will allow us to investigate the general relationships between weathering, denudation and changes in concentrations of cosmogenic isotopes (such as $^{10}$Be) in till profiles of the last glaciation.

The planned project will be one of the first attempts to perform a quantitative approach to analysing weathering and denudation processes in glacial deposits. It will extend knowledge on basic geological processes at various scales (micro, meso and macro). Conclusions from the conducted studies will be helpful for other researchers focused on glacial sediments to reconstruct and interpret processes that took place after the deposition of tills. It may be important not only for the study of the environment in the past, but also for forecasting its evolution in the future in the face of increasing human pressure (e.g., resulting soil erosion) and the possible intensification of denudation caused by climate change.