

In order to determine precipitation or evaporation variability over the last tens of years, we only need to make use of the appropriate data from precise instrumental measurements. But what should we do to determine these parameters for the last few hundreds or few thousands of years? After all, the medieval man, not to mention the prehistoric man, did not carry out any regular measurements or take notes that we could use today. Therefore, in such cases we have to use the so-called geological archives such as lake and peat sediments, from which – using specialized analysis – we could then decipher how the humidity has changed over such a long period of time. Similarly, as one can compare instrumental measurements, there is a common trend to compare reconstructions from the two aforementioned geological archives in order to recognize not only temporal but also spatial variability. However, someone could note the differences between hydrological characteristics of lakes and peatlands as well as differences between indicators that are used for reconstructions. Hence, are these records comparable at all? In the planned project we hope to answer this question.

To achieve our goal, we plan to set together the records from closely located lakes and peatlands. This allows us to assume that not only climate changes but also local factors (e.g. deforestations, fires) influenced the hydrology of both sites to the same extent. An excellent area to conduct such studies is northern Poland, where one can find numerous neighbouring lakes and peatlands. Moreover, the history of hydrological and related environmental changes in two peatlands from this area – Stążki and Kusowskie Bagno – is already well-known. This allows us to focus our research only on two selected lakes (Miłoszewskie Lake and Brzeźno Lake). The planned geochemical and sedimentological analysis will help us obtain detailed reconstructions such as those developed for the aforementioned peatlands. As a result, we will have a solid base for comparisons that allow us to resolve the research problem.

However, there is still one question: will the results of our project bring anything new? Well, it is commonly known that hydrological or more broadly climatic changes proceeded differently in various parts of our planet. For instance, ca. 4200 years ago, when the Akkadian empire was collapsing due to prolonged drought in central Mesopotamia, northern Europe experienced lower temperatures and higher precipitations. And so, it is clearly visible that on the basis of a single reconstruction we cannot infer anything about changes in global, continental or – as was demonstrated in many works – even regional scale. For these purposes, we need to put together reconstructions from different areas. If our results would show that compared records are similar, the extant spatial reconstructions of past hydrologic variability based on lake and peat sedimentary records would be positively verified. On the other hand, if these results would show significant differences, the important indication for future elaboration would be that such reconstructions should be based on the geological archive of one type. Finally, whatever results we would obtain, the planned project would be a step towards more representative hydrologic reconstructions. This, in turn, is important because the more we understand past changes in the water cycle, the better we predict its future changes.