Biogenic sediments (lake and mire) are exceptional sources of information about the transformation taking place in the natural environment due to climate change, but also human pressure. As a result, lake and peatlands sediments are becoming a focus for multidisciplinary research.

The authors of the project propose to undertake a unique research problem, namely the analysis of natural environmental changes caused by a tornado in the Tuchola Forest in 2012. Previous studies of tornadoes focused on their synoptic characteristics and the effects of those extreme events on the forest ecosystem. The aim of this project is to expand the current knowledge and reconstruct the processes that took place during the passage of the tornado and to determine its effects on the environment of the lake and mire ecosystems. The project is expected to precisely determine the reactions of the natural environment through the use of a number of paleoecological analyses based on bioindicative capabilities of microorganisms.

In order to examine comprehensively the effects of the tornado it is necessary to use different high resolution research methods. The study of the environmental effects of the tornado will be based mainly on sediment cores collected from lakes and peatlands. The aim of the project will be based on the results of several paleoecological studies (macroremains and palynological analysis, testate amoebas, Chironomidae midges, water fleas Cladocera, diatoms and beetles) as well as analysis of geochemical elements using a scanner μXRF. High resolution (analysis every 5 mm) of the biogenic sediments in the collected profiles will determine how lake and mire ecosystems reacted to the violent event of the tornado. An important element of the project is chronostratigraphy of the deposits. The time scale will be based on the dating AMS14C, Cs-137 and Pb-210, and then "anchored" in the time frame using the results of the tephrachronological analyses. The authors of the project expect to find volcanic glass from the Eyjafjöll eruption of 2010 in the studied profiles, based on the studies from Western Europe.

What should be emphasised is the originality of the undertaken research theme and its uniqueness. The presented project deals with a natural experiment that has not been previously carried out on the territory of Poland, or even Europe, and there are only a few studies from other areas of the world (USA and Australia). However, Europe lacks sites showing how such high energy phenomena influence the environment in this part of the world. The results of the obtained research along with new quantitative data on the effects of tornadoes passing through lake and mire or forest ecosystems can serve as a basis for predicting the consequences of similar events in the future.

Implementation of the research project related to the effects of tornadoes on lake and peatland ecosystems is only possible through the selection of a broad team of experts. The project involves employees of the Institute of Geography and Spatial Organisation of the Polish Academy of Sciences in Toruń, Adam Mickiewicz University in Poznań, Nicolaus Copernicus University in Toruń, GFZ Potsdam and Heidelberg University.