

Attribution of changes in River Floods in Poland (ATRIFLOP).

Poland is characterised by hydrometeorological variability. Conditions such as snowmelt and extreme precipitation can lead to river flooding - one of the most common natural hazards with serious implications for socio-economic activities in the country. River floods are extreme phenomena that vary in time as a function of local properties and climatic conditions. When an extreme weather event such as a flood occurs more frequently than in the past, the naturally resulting question is: which factors contributed to this change? Answering this question by providing quantitative estimates is a part of the attribution science. The identification of the main flood change factors is necessary for the understanding of hydrometeorological processes, and for expanding knowledge that can enhance flood risk reduction. Attribution of changes in floods has been rarely studied in Poland. The goal of this project is to reduce the information gap on flood attribution in Poland.

The main objective of the proposed project is to determine the attribution of drivers such as climate change (e.g. extreme precipitation, snowmelt, soil moisture) and urban development on river floods in Poland. The project will employ two parallel approaches: one for selected urban areas, and the second one for the country scale. In the first one, we will investigate whether extreme rainfall and urban land use change are the two key factors that explain historical river flood changes in selected urban areas in the country, including parts of the cities such as Warszawa, Katowice, and Białystok. The second topic will be the identification of the climatic factors (e.g. precipitation, snow melt, soil moisture) that most influence changes in river floods at country scale. The project will be based on three main tasks, namely data collection and integration, flood attribution analysis in urban areas, and comprehensive analysis at the national scale. The latter will apply artificial intelligence techniques to determine which climate variables contribute the most to flood variability and change.

This project will be one of the first attempts to perform flood change attribution at a country scale. The lack of studies on the effect of factors that contribute to observed changes in river flood indicators in Poland will allow this research to advance the discipline through generating tools for improved understanding of the spatial-temporal dynamics of floods in the study area. The practical importance of this project is its contribution to strategic planning in water management at national and regional levels, as well as to the improvement of adaptation to climate change. One of the potential benefits is the enhanced implementation of the EU Flood Directive that aims to assess the impacts of floods in the European region. Finally, the obtained products can be used for decision making, monitoring, and river basin management plans in Poland.