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FLOPRES - Fast Flood Modelling and Early Warning System: implementation and first test in pilot plots in Poland and Slovakia

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Introduction

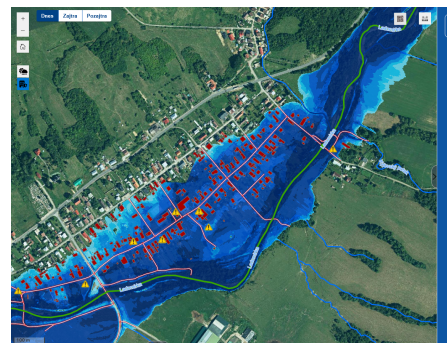
In the face of the increasing frequency of extreme weather events and floods, effective management of hydrological risk is becoming a key challenge for meteorological and hydrological services. The FLOPRES project responds to these needs by developing and implementing a modern early warning system based IoT sensors, hydrological modeling, and Web GIS tools to enhance flood resilience.

Data

As part of the project, modern IoT measurement sensors were installed in pilot areas in Poland and Slovakia, monitoring water levels, precipitation and other meteorological and hydrological parameters in the real time. Data from the sensors are sent to a central analytical system, enabling immediate analysis of the situation. The whole FLOPRES system uses not only the measurements from IoT sensors, but also relies on the data from meteorological radars and numerical weather forecasts. Such approach enables to capture upcoming flood events in both the short and long term.

Results

The early warning module developed within the project is capable to generate flood forecasts in short-range (up to 4h) and long-range time periods (up to 3 days). The system is already collecting and providing data, as exemplified by the case of April 24, 2025. On that day, southern Poland was under the influence of a dynamic synoptic situation, which led to the development of strong storms and heavy rainfall. One of the areas affected by the rapid increase in river flows was the Roztoczanka catchment, where the hydrological monitoring system of the FLOPRES project recorded a significant increase in water levels.



The presentation will include an overview of the applied measurement technologies, forecasting algorithms and the first results of field tests, emphasizing the potential of the FLOPRES system in reducing the effects of natural disasters. The presentation will also show a prototype version of the system (as shown in the figure above) and indicate future directions of its development.

FLOPRES project is an example of the effective use of modern meteorological and hydrological tools to improve the safety of residents of flood-prone areas.