FLAPRIS – A system for predicting the risk of flash floods, optimizing and automating the activities of emergency and flood authorities
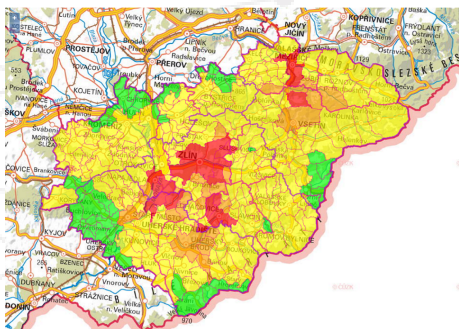
Development status

Phase 3

Technology validation and implementing it in real environment. Testing the technology outside of the laboratory and its adjustment to external conditions.

IP protection status

All project results are protected by copyright law.

Partnering strategy

Collaboration, licensing

Challenge

Currently, the issue of flash floods is solved in practice by the FFG-CZ Flash Flood Indicator of the Czech National Institute of Natural Resources and Environment. The main output is an estimate of the current risk of flash floods based on the outputs of extrapolation methods from meteorological radars for approximately one hour. These outputs are generated into maps at the level of the smaller territorial unit of the municipality. The main goal of the new technology was to develop a new method that will provide a more accurate forecast compared to the current state, including an up-to-date estimate of the risk of flash floods at the level of the village (2nd level) with the possibility of even greater precision in the form of calculated lines of concentrated runoff of torrential rainfall per pixel with dimensions of 50 x 50 meters for current data connection options in the field.

Description

The project is focused on the design and implementation of a system of accurate forecasting of the risk of flash floods and optimization of the activities of crisis and flood authorities of the region and municipalities. The outputs of the project make it possible to provide timely information on the risk of flash floods for the purposes of crisis and flood authorities, including the automation and optimization of their activities for dealing with floods at the level of the region and municipalities with extended scope. This system is based on the evaluation of the outputs of correlation analysis methods of climatological, physical-geographic, empirical characteristics of the relief, and selected forecast meteorological characteristics using artificial intelligence methods. The main output is a technology

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consisting of hardware and software components that generates maps with four levels of flash flood risk every five minutes for a selected municipality with an extended scope of the Zlín region. At the same time, this technology is complemented by a system of automation and optimization of processes associated with the activities of crisis and flood authorities of the region and municipalities with extended scope. The benefit of the implementation of the results of the project consists mainly in increasing the quality and length of advance forecast information on the possible risk of flash floods for individual ORPs and their municipalities. This information can help in the decision-making of the crisis management authorities of the region to prepare for upcoming local flash floods. In the following years, it is expected that the success of the project's outputs will increase based on the addition of other historical flood situations, which should mainly increase the success of forecasting the risk of flash floods in future years. In future years, it is also expected to increase the overall prediction success of outputs of numerical weather forecasting models, which are important as input data for the combined forecast of convective precipitation. As a result, the success and applicability of this and other outcomes of this project are expected to increase. The benefit for the owner is the very use of the functional sample from the point of view of streamlining the support for the performance of the work of the regional crisis management authorities" in the event of torrential rains that can cause flash floods.

Commercial opportunity

The results of the project will be applied through the TA, i.e. the relevant department/departments of municipalities with extended powers and regional authorities, which will be the key beneficiary of the project. The end user of the results will be the security councils and crisis teams of the ORP and regions. Result The functional model "FLAPRIS - System for predicting the risk of flash floods, optimization and automation of the activities of emergency and flood authorities" will be used to refine the forecast of the risk of flash floods and optimize the activities of crisis and flood authorities of the region and municipalities. A potential prerequisite for the use of the output will be the implementation in the design and implementation of the early warning system against dangerous meteorological phenomena. In the context of the above, it can be stated that the existing crisis management authorities of the Zlín Region can use the results of this project free of charge and thereby strengthen the quality of information and preparation for potentially dangerous storm situations and possible impacts, e.g. in the form of local flash floods. After the

required period has passed, the information quality can be re-evaluated based on the results of the forecast verification evaluation, including the evaluation of the benefit indicators from the user's position through training.