FACTSHEET RISK REDUCTION MEASURES

Recommendations for the improvement of the warning and alarm tool of the City of Graz

Where was it implemented?

City of Graz, Styria, Austria

Fields of action

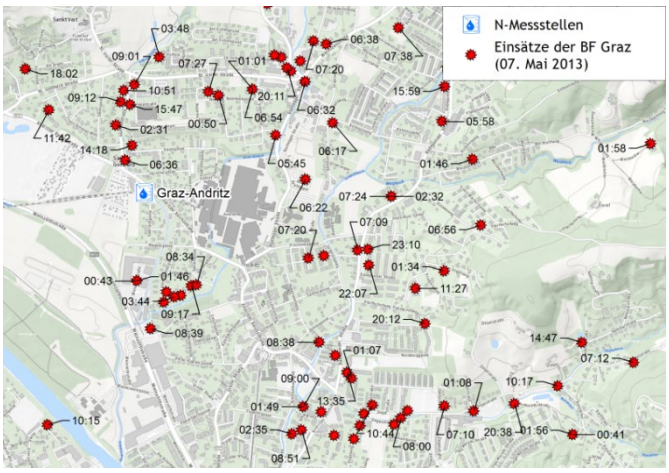
- Early warning

Related to measure from the catalogue of measures

- Implementation and usage of early warning systems incl. collection and assessment of supplementation information

Area characterisation

- **Area type:** urban
- **Landscape type:** hilly/flat



Source: City of Graz, Professional Fire Brigade

Problem

Heavy rainfall events usually occur on a very small scale in connection with severe summer thunderstorms. Uncontrolled run-off of water in the area leads to local flooding and sometimes causes extreme damage. Almost any location can be affected. Numerous such heavy rain events have occurred in the City of Graz in the last years. One major event hit the southwestern part of the city center on 16th April 2018 causing flooding of underpasses, cellars, underground garages and a shopping center. Forecasts by the weather services are well advanced, but precise location is difficult. This results in extremely short advance warning times. The City of Graz uses a traffic light system for triggering predefined operational measures and for informing the population of Graz about the current hazard situation. The major challenge in this process is dealing with uncertainties in the forecast.

Description and aim

The aim of this activity was to use all data currently available to receive more precise heavy rain warnings. By automating the processes, the short time between the onset of precipitation and the onset of flooding could be used more effectively. In a first step, past heavy rain events were analysed by the Central Institution for Meteorology and Geodynamics. Based on that, and on the occurrence of the first operations of the fire brigade, thresholds were derived, that can be used for an automated heavy rain warning. Further recommendations for improving the forecast, for estimating the spatial occurrence and the scale of the event, as well as for informing the public were elaborated.

Effect of measure

Improving and strengthening the skills and the knowledge of the City of Graz's civil protection in dealing with heavy rain events

Enhancing the City of Graz's preparedness for heavy rain events

Description of implementation	
Effect horizon: medium	**Involved stakeholders:** City of Graz: Departement Civil Protection, Professional Fire Brigade; Central Institute for Meteorology and Geodynamics
Implementation: July 2019 / Mai 2020	**Initiator / responsible** Office of the Styrian Government, Department 14 Water Management, Ressources and Sustainability; External contractor: RIOCOM Engineering Office for Environmental Engineering and Water Management
Lessons-learned	
Main success factor: • For informing the population, a system that is already known and easy to understand should be used. • An automated heavy rain warning can help to use the available time between the first warning and the onset of flooding in the best possible way.	**Main challenge:** • Very short lead times • Forecasts involve uncertainties (affected area, precipitation intensity) • In addition to the precipitation, other parameters influence the runoff, such as preceding soil moisture, vegetation cover, snow melting, snowfall, degree of sealing in the affected area • Meteorological services often only provide precipitation forecasts, not forecasts of the expected runoff in a small area
Synergies / beneficial aspects: Available basic data	**Conflicts / constraints:** Improvements for forecasting heavy rain events for defined areas have been achieved within the project. However, an operational test is pending to evaluate the developed emenergency response plan and adapt it, if necessary.
Key message to others starting with a similar task	
“The focus should be set more on current measurement data, than on precipitation forecasts…” “An essential point of discussion is the assessment between the risk of misjudging the hazard situation and taking action, that would not have been necessary.”	
Contact	
Office of the Styrian Government, Department 14 Water Management, Resources and Sustainability abteilung14@stmk.gv.at	