Improving flash flood risk management for Europe

An analysis of flash flood forecasting in Europe has produced recommendations for emergency planners and others to improve flood risk management in vulnerable regions. In particular, the researchers recommend improved data collection and sharing, a common European policy for flash flood forecasting, and that local risk management recognises the specific challenges presented by flash floods.

The EU Floods Directive\(^1\) requires Member States to assess flood risk along water courses and coastlines. However, ensuring risk management strategies encompass flash flooding is particularly difficult, as flash floods present several unique challenges. In particular, they often happen quickly and affect relatively small areas. As a result, national weather and hydrological observing systems may not be able to monitor flash flooding effectively.

To address these challenges, researchers working on the EU-funded HYDRATE project\(^2\) analysed previous flash flood events and produced recommendations for planners and policymakers in three areas: data requirements, forecasting and warning, and risk management. The researchers began by characterising past flash floods. Looking at previous studies, the researchers found that flash floods caused an average of 52 casualties per year across Europe between 1950 and 2006. This is fewer casualties than caused by storm surge floods, but more than those caused by river flooding. However, flash flood casualties were spread across more events (23, from 1950 to 2006) than storm surge flood casualties (just three events, between 1953 and 1962).

Flash floods also occur seasonally. For instance, flash floods affecting inland continental areas, such as Austria, Romania and Slovakia, tend to occur in the summer, whereas Mediterranean areas, including France, Crete and Slovenia, tend to see most flash floods in autumn.

The researchers then looked at current monitoring and forecasting approaches, and how these could be improved to aid flash flood risk management. Unlike other flood forecasts, flash flood forecasts need to be produced rapidly (often in just a few hours) and to consider the impact of rainfall on even the smallest channels and tributaries across a region. In these conditions, forecasters rely on weather radar to provide the information they need, so the researchers recommend that national weather radar networks be able to monitor localised high rainfall reliably. Radar data assimilation into Numerical Weather Prediction models has been shown to greatly improve rainfall forecasts for flash flood forecasting.

They also suggest that, with the localised nature of flash floods, local authorities are best placed to respond to flash flooding. To help such organisations share their experience of these relatively infrequent events, the researchers advise that Europe should adopt a common flood protocol. However, the researchers also found several barriers which prevented organisations from sharing data on weather and flooding across Europe, such as cost and legal issues surrounding licensing of data. To address these they recommend national authorities use a standardised post-flood survey to build up a Europe-wide database of flood information. They also propose that the EU introduces regulations to encourage data sharing, and that the collection of such data is publicly funded to overcome economic barriers.

Finally, general flood risk management strategies, such as flood risk management plans required to be prepared by 2015 by the Floods Directive, should include flash flood risk management, taking account of limited response times for flash floods. Such strategies will also need to consider other hazards that accompany flash flooding, such as landslides.

2. Hydrometeorological Data Resources and Technologies for Effective Flash Flood Forecasting (HYDRATE) was supported by the European Commission under the Sixth Framework Programme. See: [www.hydrate.tesaf.unipd.it](http://www.hydrate.tesaf.unipd.it)


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