

The challenge of transforming rainfall nowcasting into rainfall hazard assessment

Heavy rainfalls are the cause of a number of hazards affecting our society through their impacts over the outdoor exposed activities and assets. Classically floods, and specifically flash floods, have been considered the main natural hazard directly caused by heavy rainfalls, but this perception is moving towards the new paradigm of "heavy rainfall induced hazards" as new areas requiring specific hazard assessment appear. Activity areas that are of relevant socioeconomic interest and that range from traffic and transportation (traffic on highways, in-route flight planning...), to outdoor economic activities (construction, agriculture...) or recreation activities (golf, tourism, sports, wildlife recreation...).

Regarding all these weather-affected activities, and more precisely in the case of Flash Floods (torrential floods with response times between 15 minutes to few hours and associated with intense rainfalls that can accumulate over 25% of the annual rainfall in a few hours), the main requirement is to anticipate the occurrence of heavy rainfalls with high spatial and time resolution. Capability that is the crucial point to provide appropriate hazard assessment to be used by civil protection authorities, emergency managers or even directly by the concerned individuals to assume their self-protection under the principle of subsidiarity.

The advancements of the last decades in rainfall forecasting with Numerical Weather Prediction models have been completed with the advancements in the techniques to improve very short-term rainfall forecasting (called nowcasting) using radar rainfall mosaics. The high-resolution of radar-based estimates and their capability to capture the short-term evolution of the rainfall field make them a crucial source of information to anticipate these intense rainfalls. And consequently in the last years we have seen a number of applications showing that radar-based rainfall nowcasting can be successfully applied even to continental radar networks, as those in the USA and Europe.

Nevertheless, how to transform these improved high-resolution rainfall nowcasts into efficient hazard assessment still remains the main challenge to cope with.

In the last years, a number of projects have been carried out in Europe aiming to propose a sensible strategy to deal with this challenge and to develop a number of tools to deal with this paradigm shift in the framework of the implementation of the European Flood Directive and on the Flood Risk Management Plans the Directive requests for prevention, protection and preparedness by 2015.

The basic concepts of the proposed methodologies, as well as the main results obtained over selected case studies will be the central point of the presentation.