



Building a modelling chain for impact-based flood early warning systems

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Recently, relevant progress has been made in short-term river discharge forecasting based on weather forecast models. Forecasts of flood events with short lead times -about 6-72 hours in advance of a forecasted precipitation event- support local crisis intervention forces in undertaking emergency measures, such as the temporary evacuation of people from hazard zones. The prediction of the direct consequences of a forecasted rainfall event, the prediction of site-specific flood losses and the reliability of these are poorly investigated topics. A translation from discharge forecasts to potential impacts in terms of flood losses is therefore needed.

Here we present the implementation of the hydrological building block, as part of a modelling chain for an impact-based flood early warning systems, to be operationalized at national scale. Considering most of the well-known shortcomings and challenges usually encountered in hydrological modelling over larger domains, such as inhomogeneous data in time and space, large heterogeneity in hydrological behaviour, the problem of identifying model parameters and generating sensible spatial and statistical distributions at the same time, the higher computational costs, etc.. we explore readily available (open source) data and hydrological tools, testing different configurations of these.

The main aim is steering towards setting up a modelling ground which:

- is transparent, exchangeable, as well as easily accessible and expandable in terms of data availability, process understanding and modelling structure;
- despite its flexibility, it should be automated to a great extent;
- offers a practical modelling framework for characterizing a wide range of hydrological behaviours, based on different degrees of complexity and information, while still providing a neat instrument to check its realism and its sensitivity;
- is a simulation tool for testing and increasing the predictability of hydrological forecasts;
- is applicable and transferable to other regions;
- is by now and in the future comparable with existing studies –by making use of existing data and tools.