

Development of a national Flash flood warning system in France using the AIGA method: first results and main issues

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Developing a national flash flood (FF) warning system is an ambitious and difficult task. On one hand it rises huge expectations from exposed populations and authorities since induced damages are considerable (ie 20 casualties in the recent October 2015 flood at the French Riviera). But on the other hand, many practical and scientific issues have to be addressed and limitations should be clearly stated.

The FF warning system to be implemented by 2016 in France by the SCHAPI (French national service in charge of flood forecasting) will be based on a discharge-threshold flood warning method called AIGA (Javelle et al. 2014). The AIGA method has been experimented in real time in the south of France in the RHYTMME project (<http://rhytmme.irstea.fr>). It consists in comparing discharges generated by a simple conceptual hourly hydrologic model run at a 1-km² resolution to reference flood quantiles of different return periods, at any point along the river network. The hydrologic model ingests operational rainfall radar-gauge products from Météo-France.

Model calibration was based on ~700 hydrometric stations over the 2002-2015 period and then hourly discharges were computed at ~76 000 catchment outlets, with areas ranging from 10 to 3 500 km², over the last 19 years. This product makes it possible to calculate reference flood quantiles at each outlet. The on-going evaluation of the FF warnings is currently made at two levels: in a 'classical' way, using discharges available at the hydrometric stations, but also in a more 'exploratory' way, by comparing past flood reports and warnings issued by the system over the 76 000 catchment outlets. The interest of the last method is that it better fit the system objectives since it is designed to monitor small ungauged catchments.

Javelle, P., Demargne, J., Defrance, D., Pansu, J., Arnaud, P. (2014). Evaluating flash-flood warnings at ungauged locations using post-event surveys: a case study with the AIGA warning system. *Hydrological Sciences Journal-Journal Des Sciences Hydrologiques*, 59(7), 1390-1402. doi: 10.1080/02626667.2014.923970