Feedbacks of the use of two uncertainty assessment techniques by operational flood forecasters

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In 2013, forecasters working in the French flood forecasting services tested two automatic techniques for forecast uncertainty assessment in their operational context. These techniques were expected to characterize predictive uncertainty, and provide forecasters with confidence intervals (for example, 80% central intervals) associated to their forecasts (forecast intervals) and estimates of the probability of exceeding some warning thresholds.

The first technique was the quantile regression method (Weerts et al., 2011), while the second one was a data-based and non-parametric method. These techniques were applied to a forecasting rainfall-runoff model (GRP) and to two hydraulic models (HYDRA and MASCARET). Both techniques are based on the statistical analysis of past forecast errors. In the case of the hydrological model, the past forecast errors were estimated using a 'perfect' rainfall scenario (corresponding to a posteriori observed rainfall). The forecasters pointed out that the approaches are simple enough to be easily understood, which was stressed as a clear advantage over "black-box" tools.

The feedbacks showed that many operational forecasters enjoyed the fact that these automatic assessments brought out the qualities and the defaults of the model (e.g., bias) of which they were aware... or not. Therefore these results clearly helped them to better know the limits of their models.
The forecast intervals (80%) produced by the methods were often found too large by the forecasters to be very helpful in their decision-making. Moreover, forecasters thought they were able to give narrower intervals (still being reliable) based on their experience. The methods were considered as providing very good starting points by the forecasters, encouraging them to build their own forecast intervals.

Forecasters use the probability of exceeeding a threshold as one piece of information (among others) to decide whether to issue a warning or not. It is considered as very informative and valuable by the forecasters, even in the case different future precipitation scenarios would be used. Operational perspectives are the combination of ensemble precipitation forecasts and these techniques.