



Use of probabilistic rainfall forecasts for fluvial flood forecasting and warning

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A probabilistic weather forecast provides added customer value when compared to an equivalent deterministic forecast. In conjunction with the customer's cost-loss model, a quantitative estimate of the probability of an event occurring enables the customer to manage risk effectively, and optimize their response (in terms of economic impact, Mylne, 2002) to a predicted severe weather event.

This concept may be applied to the preparation of flood warnings. The generation of ensembles of forecast precipitation (for pluvial warnings) and river flow (for fluvial warnings) will facilitate the adoption of optimal responses to flood warning by stakeholders, including local authorities, businesses and the general public.

Fluvial flood warnings in England and Wales are prepared by the Environment Agency (hereafter referred to as the Agency). In order to exploit the additional value offered by probabilistic forecasts, the Agency is planning to implement a probabilistic flood forecasting capability over the next few years.

As a first step, the Met Office is supplying probabilistic precipitation forecasts to the Agency (beyond short lead times, the dominant source of uncertainty in a forecast of river discharge is the rainfall input). The aim is to introduce users to a variety of probabilistic precipitation forecast products and enable them to develop expertise in their interpretation and use.

The products are generated from the regional configuration of the Met Office Global and Regional Ensemble Prediction System (MOGREPS). They include maps of probability of exceedence for a selection of thresholds relating to precipitation accumula-

tion in model grid squares and regions, and stacked probability charts showing time series of the probability distribution of precipitation accumulation over regions.

References

Mylne, Kenneth, R., 2002. Decision making from probability forecasts based on forecast value. *Meteorol. Appl.* 9, 307-315.