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A Decision Support System for effective use of probability forecasts

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Often, water management decisions are based on hydrological forecasts. These forecasts, however, are affected by inherent uncertainties. It is increasingly common for forecasting agencies to make explicit estimates of these uncertainties and thus produce probabilistic forecasts. Associated benefits include the decision makers' increased awareness of forecasting uncertainties and the potential for risk-based decision-making. Also, a stricter separation of responsibilities between forecasters and decision maker can be made.

However, simply having probabilistic forecasts available is not sufficient to realise the associated benefits. Additional effort is required in areas such as forecast visualisation and communication, decision making in uncertainty and forecast verification. Also, revised separation of responsibilities requires a shift in institutional arrangements and responsibilities.

A recent study identified a number of additional issues related to the effective use of probability forecasts. When moving from deterministic to probability forecasting, a dimension is added to an already multi-dimensional problem; this makes it increasingly difficult for forecast users to extract relevant information from a forecast. A second issue is that while probability forecasts provide a necessary ingredient for risk-based decision making, other ingredients may not be present. For example, in many cases no estimates of flood damage, of costs of management measures and of damage reduction are available.

This paper presents the results of the study, including some suggestions for resolving these issues and the integration of those solutions in a prototype decision support system (DSS). A pathway for further development of the DSS is outlined.