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## **Bayesian Ensemble Forecast of River Stages**

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The problem is to provide a short-term, probabilistic forecast of a river stage time series based on a probabilistic quantitative precipitation forecast. The Bayesian forecasting system for this problem is implemented as a Monte Carlo algorithm that generates an ensemble of realizations of the river stage time series. This talk (i) outlines the forecasting algorithm, (ii) shows examples of the Bayesian ensemble forecast, (iii) highlights properties of the Bayesian ensemble forecast, and (iv) discusses the ensemble size requirement.

The Bayesian ensemble forecast correctly represents the total uncertainty about the river stage time series, provided the ensemble size is large enough. A numerical experiment demonstrates that the required ensemble size depends upon the probability of precipitation occurrence, the distribution function of the precipitation amount, the lead time, and the kind of probabilistic forecast that is constructed from the ensemble. Two kinds of forecasts are constructed: (i) a probabilistic river stage forecast (which for each time specifies a predictive distribution function of the river stage), and (ii) a probabilistic stage transition forecast (which for each time specifies a family of predictive one-step transition distribution functions). Overall, the experimental results indicate that for any acceptable level of accuracy of the distribution functions, the required ensemble size is substantially larger for the latter kind of forecast. The requirement of the latter also exceeds substantially the size of the largest meteorological ensembles available currently for real-time forecasting.