



Probabilistic forecasting for urban water management: A case study

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ABSTRACT

This paper illustrates the application of a probabilistic approach for the estimation of the uncertainty in rainfall forecast from a numerical weather prediction model in combination with a 1D/2D hydrodynamic model for producing probabilistic flood forecasts. The approach quantifies the uncertainty conditioned on the rainfall forecast in the form of probability distribution functions. The method utilized in this paper involves a retrospective comparison at different lead times between archived forecasted rainfall and its corresponding observed rainfall for the second largest city in Denmark, Aarhus. Since there were no large events on record to generate flooding, a synthetic forecast event is used for illustration of the method. The Latin hypercube sampling technique was used to generate ensembles of rainfall for the synthetic rainfall forecast which has been used in conjunction with the 1D/2D hydrodynamic model. For comparison, a direct quantile approach was used to generate rainfall quantiles which were also ingested into the 1D/2D model to enable the selection of a robust approach that can be used in real time.

KEYWORDS

Flood forecasting, numerical weather prediction model, probabilistic rainfall forecasting, real-time modelling, urban flooding