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Operational flood risk management based on ensemble predictions - Mulde case study

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Flood forecasts are essential to issue reliable flood warnings and to initiate flood control measures on time. The accuracy and the lead time of the predictions for headwaters depend primarily on the meteorological forecasts. Additional uncertainties result from model and parameter uncertainties and from the availability and quality of measured data.

The poster presents the conceptualization and first results of an ensemble based probabilistic flood management system. This system is designed to support decision makers in issuing flood warnings and alerts. Meteorological ensemble forecasts are transformed into discharge ensembles at different sites by application of a river basin model. The flood management system integrates methods for parameter optimization and real-time parameter updating using assimilated measured data. Recommendations for flood alerts consider input uncertainties, model uncertainties and known sources of subjective uncertainties. As a result, probabilistic maps of potential inundation areas and of the current risks of flooding will be produced and presented to the decision makers in an adequate manner.

The case study is located at the mountainous Mulde River Basin (Germany, Czech Republic). The basin is formed by several parallel sub-basins, draining from South to North. During West-cyclonic rainfall events, which caused several extreme flood events in the past, the spatial uncertainties of the precipitation forecasts are crucial. This results in high uncertainties of flood alerts with regard to the locations of a possible inundation. First results using ensemble predictions for the 2002 flood event are shown.