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Development of pre-processing method for use of meteorological ensemble predictions as input to hydrological models: case study of the Huai River Basin, China

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Hydrological models are run with precipitation and other meteorological data as input. With adequate spatial and temporal coverage, observed meteorological data is more reliable and more accurate for hydrological models, conventionally. However, when an early warning with several days ahead needs to be provided (for example for flood forecasts) in many cases Numerical Weather Prediction (NWP) has to be used. Hydro-meteorological forecasters and researchers aim to understand and minimize the forecast uncertainties.

This research's focus is on testing existing methods and/or developing new methods to improve the integration between meteorological models and hydrological models. The output of the fixed version of the NCEP GFS meteorological ensemble prediction system for the Huai river basin is used in this research with the lead time of 1 to 15 days. There are a number of pre-processing methods to be tested, such as Quantile-to-Quantile correction methods, Analog methods, and Logistic regression. Apart from a single method, a multi-methods system could be developed as well – employing BMA, ANN or other model combinational algorithms.

Furthermore, the processed ensemble meteorological data can be fed into hydrological models to generate ensemble discharge forecasts. Performance of this approach is tested by comparing its output with ensemble discharge forecasts on the basis of the raw meteorological ensemble forecast input.