

## **Variational data assimilation with the YAO platform for hydrological forecasting**

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**Abstract** In this study data assimilation based on variational assimilation was implemented with the HBV hydrological model using the YAO platform of University Pierre and Marie Curie (France). The principle of the variational assimilation is to consider the model state variables as control variables and optimise them by minimizing a cost function measuring the disagreement between observations and model simulations. The variational assimilation is used for the hydrological forecasting. In this case four state variables of the rainfall–runoff model HBV (those related to soil water content in the water balance tank and to water contents in rooting tanks) are considered as control variables. They were updated through the 4D-VAR procedure using daily discharge incoming information. The Serein basin in France was studied and a high level of forecasting accuracy was obtained with variational assimilation allowing flood anticipation.

**Key words** variational assimilation; YAO; HBV model; hydrological forecasting; optimisation; SCE-UA