

Can discharge assimilation methods be used to improve flood forecasting when few data are available ?

LIONEL BERTHET^{1,2}, MARIA-HELENA RAMOS¹, CHARLES PERRIN¹, VAZKEN ANDRÉASSIAN¹ & CÉCILE LOUMAGNE¹

¹ *Cemagref, Hydrosystems and Bioprocesses Research Unit, BP 44, F-92163 Antony Cedex, France*
lionel.berthet@cemagref.fr

² *AgroParisTech ENGREF, 19 Avenue du Maine, F-75732 Paris, France*

Abstract Forecasting floods is a major issue for public safety all over the world. Due to the difficulties inherent in the flood forecasting exercise, data assimilation techniques have been developed to cope with model errors. Unfortunately, these techniques require recent (real or near real-time) observations which may not be readily available in regions lacking automatic measurements networks. This paper investigates the impact of data assimilation techniques on discharge forecasts and model performance when few (but not zero) discharge measurements are available for the data assimilation. A parsimonious rainfall–runoff model is applied to a set of 178 French catchments. We explore the time properties of different discharge data assimilation schemes. Life times of the updates and model performance are assessed as a function of the time between the last available discharge observation and the forecast. State updating proves to have an added value to the forecasting system, even when data availability is limited.

Key words flood forecasting; data availability; rainfall–runoff modelling; data assimilation