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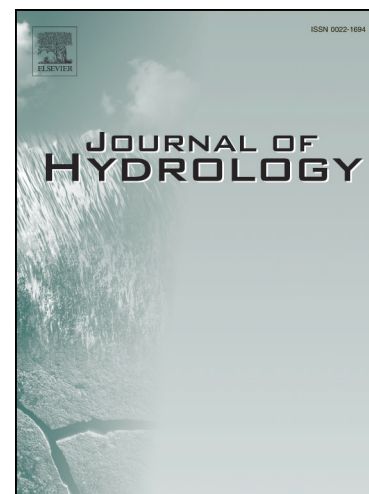
Real-time flood forecasting downstream river confluences using a Bayesian approach

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## REAL-TIME FLOOD FORECASTING DOWNSTREAM RIVER CONFLUENCES USING A BAYESIAN APPROACH

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**Abstract:** Accurate forecast stages at river sections is of paramount importance to properly address Flood Forecasting and Warning Systems (FFWSs) operating in real-time. The forecast values can be provided by flood wave routing models to be implemented when gauged sections are operative along the channel. Different models have been proposed in the literature and the forecast can be approached by neglecting or involving the contribution of lateral inflows. Among the latter, recently STAFOM-RCM (STAge FOrecasting Model-Rating Curve Model) has been proposed assuming a lateral contribution uniformly distributed along the reach. Therefore, the model application is not suitable for future stage prediction at hydrometric sections located just downstream river confluences. To overcome this issue, we propose a methodology that exploits the probabilistic forecast estimated at a gauged site on a tributary through a Bayesian approach and the probabilistic relationship between the stages recorded here and the ones at a downstream site located along the main channel, where the forecasted stage estimate is of interest.

The Paglia River basin, in central Italy, is selected as case study. The results indicate that the procedure can be useful to address real-time hydraulic risk management even at river sections located downstream important confluences, provided that gauged sites are operative along the tributary.

**Keywords:** flood forecasting, river confluences, real-time, lateral inflow, predicative uncertainty.

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