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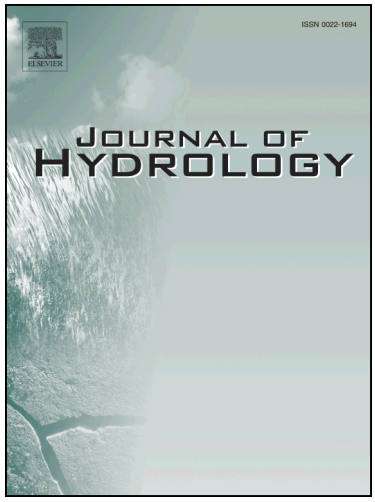

Research papers

Calibration of the Global Flood Awareness System (GloFAS) using daily streamflow data

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ACCEPTED MANUSCRIPT

Calibration of the Global Flood Awareness System (GloFAS) using daily streamflow data

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Abstract

This paper presents the calibration and evaluation of the Global Flood Awareness System (GloFAS), an operational system that produces ensemble streamflow forecasts and threshold exceedance probabilities for large rivers worldwide. The system generates daily streamflow forecasts using a coupled H-TESSEL land surface scheme and the LISFLOOD model forced by ECMWF IFS meteorological forecasts. The hydrology model currently uses a *priori* parameter estimates with uniform values globally, which may limit the streamflow forecast skill. Here, the LISFLOOD routing and groundwater model parameters are calibrated with ECMWF reforecasts from 1995 to 2015 as forcing using daily streamflow data from 1287 stations worldwide. The calibration of LISFLOOD parameters is performed using an evolutionary optimization algorithm with the Kling-Gupta Efficiency (KGE) as objective function. The skill improvements are quantified by computing the skill scores as the change in KGE relative to the baseline simulation using *a priori* parameters. The results show that simulation skill has improved after calibration (KGE skill score > 0.08) for the large majority of stations during the calibration (67% globally

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