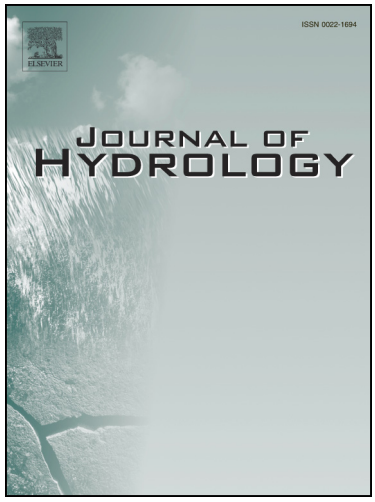

Research papers

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A framework for streamflow prediction in the world's most severely data-limited regions: test of applicability and performance in a poorly-gauged region of China

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Abstract

A framework methodology is proposed for streamflow prediction in poorly-gauged rivers located within large-scale regions of sparse hydrometeorologic observation. A multi-criteria model evaluation is developed to select models that balance runoff efficiency with selection of accurate parameter values. Sparse observed data are supplemented by uncertain or low-resolution information, incorporated as 'soft' data, to estimate parameter values *a priori*. Model performance is tested in two catchments within a data-poor region of southwestern China, and results are compared to models selected using alternative calibration methods. While all models perform consistently with respect to runoff efficiency (NSE range of 0.67 - 0.78), models selected using the proposed multi-objective method may incorporate more representative parameter values than those selected by traditional calibration. Notably, parameter values estimated by the proposed method resonate with direct estimates of catchment subsurface storage capacity (parameter residuals of 20 and 61 cm for maximum soil moisture capacity (C_{max}), and 0.91 and 0.48 for soil moisture distribution shape factor (B); where a parameter residual is equal to the centroid of a soft parameter value minus the calibrated parameter value). A model more traditionally calibrated to observed data only