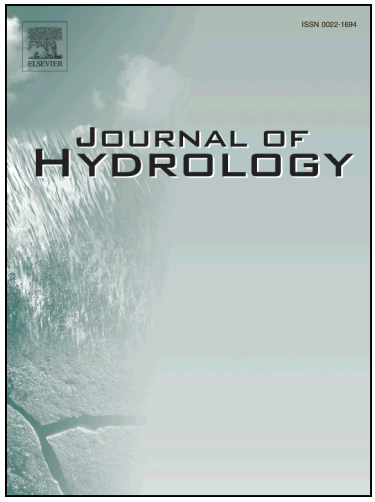

Research papers

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Getachew Tegegne, Young-Oh Kim

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Modelling ungauged catchments using the catchment runoff response similarity

Getachew Tegegne* and Young-Oh Kim

Department of Civil and Environmental Engineering, Seoul National University, Gwanak-ro 1, Gwanak-gu, Seoul 151-742, Republic of Korea

*Corresponding author: hydro@snu.ac.kr

Abstract

Various types of regionalization approaches have been proposed in the last several decades for predictions in ungauged basins. The most commonly used methods are based on the proximity of catchment centroids and physiographic and/or climatic conditions of the catchments. However, the proximity of the catchment centroids and catchment physical attributes do not necessarily translate into similarities in hydrologic behavior. It is also difficult to identify the key attributes that favor hydrologic similarity. Therefore, in this study, we proposed a new method called catchment runoff-response similarity (CRRS), in the view of reducing the hydrologic process predictive uncertainty and to solve the problem of the key attributes identification that favor hydrologic similarity. The CRRS has a two-step approach: 1) the commonly used regionalization approach is used to temporarily transpose the calibrated model parameter from gauged to ungauged catchments, and 2) the runoff response of each smaller delineated subbasin of the gauged and ungauged basins are obtained based on the parameter value computed in the first step. The similar subbasins of the gauged and ungauged basins are then identified based on their runoff response similarity. The final parameter value in the ungauged subbasins are determined based on the notion that similar subbasins with runoff responses to similar input rainfall could have similar model structure settings.