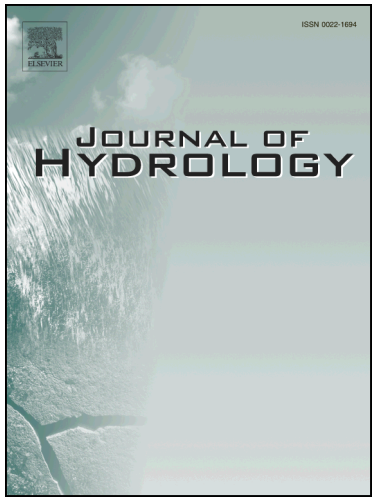

Research papers

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A Multi-Objective Approach to Improve SWAT Model Calibration in Alpine Catchments

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Abstract

Multi-objective hydrological model calibration can represent a valuable solution to reduce model equifinality and parameter uncertainty. The Soil and Water Assessment Tool (SWAT) model is widely applied to investigate water quality and water management issues in alpine catchments. However, the model calibration is generally based on discharge records only, and most of the previous studies have defined a unique set of snow parameters for an entire basin. Only a few studies have considered snow observations to validate model results or have taken into account the possible variability of snow parameters for different subbasins. This work presents and compares three possible calibration approaches. The first two procedures are single-objective calibration procedures, for which all parameters of the SWAT model were calibrated according to river discharge alone. Procedures I and II differ from each other by the assumption used to define snow parameters: The first approach assigned a unique set of snow parameters to the entire basin, whereas the second approach assigned different subbasin-specific sets of snow parameters to each subbasin. The third procedure is a multi-objective calibration, in which we