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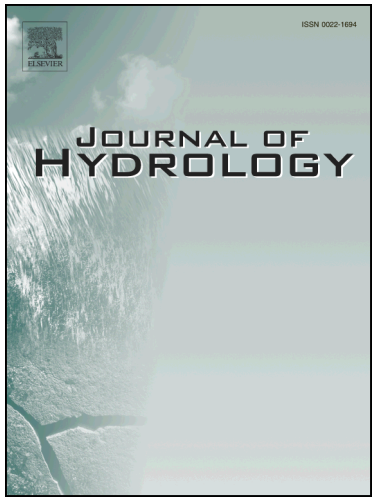

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Use of Beta Regression for Statistical Downscaling of Precipitation in the Campbell River Basin, British Columbia, Canada

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Abstract

Impacts of global climate change on water resources systems are assessed by downscaling coarse scale climate variables into regional scale hydro-climate variables. In this study, a new multisite statistical downscaling method based on beta regression (BR) is developed for generating synthetic precipitation series, which can preserve temporal and spatial dependence along with other historical statistics. The beta regression based downscaling method includes two main steps: (1) prediction of precipitation states for the study area using classification and regression trees, and (2) generation of precipitation at different stations in the study area conditioned on the precipitation states Daily precipitation data for 53 years from the ANUSPLIN data set is used to predict precipitation states of the study area where predictor variables are extracted from the NCEP/NCAR reanalysis data set for the same interval. The proposed model is applied to downscaling daily precipitation at ten different stations in the Campbell River basin, British

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