



The response of glacier melt runoff to climate change: a glacierized catchment in Tieshan Mountains

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Water resources are sensitive to climate change for the arid inland basins, whose water originates largely from the glacierized mountains. In this study, we simulated the glacial process and then analyzed its response to future climate change in a typical Tieshan Mountains watershed – Aksu watershed. To simulate glacial process, we developed a glacial module into a semi-distributed hydrologic model and then performed multi-objective sensitivity analysis and optimization by combining observed flow data and water isotope data. The calibrated model was then used to analyze the response to climate change through future climate forcing obtained by applying BMA (Bayesian Model Averaging) technique to an ensemble of one RCM and 21-GCM simulations from the Coupled Model Intercomparison Project Phase 5 (CMIP5) under RCP4.5 and RCP8.5. Results indicated that the parameters related to groundwater flow and its interaction with surface water flow are the most sensitive parameters, and glacier-related parameters are also sensitive, indicating a large part of the streamflow is recharged by glacier melt water. Runoff will overall increase in the near future but will decrease at the end of the 21st century. The combined use of different data sources sheds some sights on hydrological modelling in the Tianshan mountainous.