Geophysical Research Abstracts
Vol. 18, EGU2016-10409, 2016
EGU General Assembly 2016

Post-processing of multi-hydrologic model simulations for improved streamflow projections

sepideh khajehei (1), Ali Ahmadalipour (2), and Hamid Moradkhani (3)

(1) Portland State University,United States (khajehei@pdx.edu), (2) Portland State University,United States (aahmad2@pdx.edu), (3) Portland State University,United States (hamidm@pdx.edu)

Hydrologic model outputs are prone to bias and uncertainty due to knowledge deficiency in model and data. Uncertainty in hydroclimatic projections arises due to uncertainty in hydrologic model as well as the epistemic or aleatory uncertainties in GCM parameterization and development. This study is conducted to: 1) evaluate the recently developed multi-variate post-processing method for historical simulations and 2) assess the effect of post-processing on uncertainty and reliability of future streamflow projections in both high-flow and low-flow conditions. The first objective is performed for historical period of 1970–1999. Future streamflow projections are generated for 10 statistically downscaled GCMs from two widely used downscaling methods: Bias Corrected Statistically Downscaled (BCSD) and Multivariate Adaptive Constructed Analogs (MACA), over the period of 2010–2099 for two representative concentration pathways of RCP4.5 and RCP8.5. Three semi-distributed hydrologic models were employed and calibrated at 1/16 degree latitude-longitude resolution for over 100 points across the Columbia River Basin (CRB) in the pacific northwest USA. Streamflow outputs are post-processed through a Bayesian framework based on copula functions. The post-processing approach is relying on a transfer function developed based on bivariate joint distribution between the observation and simulation in historical period. Results show that application of post-processing technique leads to considerably higher accuracy in historical simulations and also reducing model uncertainty in future streamflow projections.