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# A Hydrologic Regionalization of the Conterminous United States to Estimate Variability in Future Hydrologic Conditions

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The increasing availability of downscaled climate projections provides a large number of scenarios of future climate. Simulation of current and future hydroclimatic conditions from these datasets requires the development of robust calibration and validation methods for hydrologic models. A calibration and regionalization strategy was developed for the conterminous United States using a five-parameter monthly water-balance model (MWBM). The regionalized MWBM was used to simulate current and future conditions using down-scaled CMIP3 and CMIP5 climate data. Spatial patterns in model parameter sensitivity derived from the Fourier Amplitude Sensitivity Test were used as the basis for organizing hydrologic response units into distinct regions for calibration and regionalization. Model calibration was implemented with a weighted objective function for simulated streamflow aggregated at multiple time steps using measured streamflow and estimates of snow-water equivalent from SNODAS (Snow Data Assimilation System) to constrain the parameter optimization. Optimized parameters were derived for each region and applied to both gaged and ungaged areas within the region. The results for simulated streamflow were evaluated through scaling the simulated and measured streamflow, and examining the dispersion at mean monthly and annual summaries. This allowed the results to be validated for both the different calibration regions and timesteps.