



Projected changes in seasonal drought and flood conditions in the Sierra Nevada and Colorado River basins (USA)

Iris Stewart-Frey (1), Darren Ficklin (2), Carlos Carrillo (1), and Russell McIntosh (1)

(1) Department of Environmental Studies and Sciences, Santa Clara University, USA (istewartfrey@scu.edu), (2) Department of Geography, Indiana University, Bloomington, USA

The Sierra Nevada and Colorado River mountain ranges are the principal source of water for large urban and agricultural demands in the North American Southwest. In this region, GCM ensemble output suggests varying and modest precipitation changes, while air surface temperatures are expected to increase by several degrees by the end of the century. This study used the downscaled output of an ensemble of 16 GCMs and 2 emission scenarios to drive the SWAT watershed model, and to assess the impact of projected climatic changes on water availability and water quality through 2100. We then assess the changes in likelihood of occurrence of high ($> 125\%$, $> 150\%$) and low ($< 75\%$, $< 50\%$, $< 25\%$) flow conditions and stream temperature increases by the end of the century. Our results indicate significant increases in the likelihood of occurrence for high flows for the winter and spring seasons with a high probability of occurrence of flows $> 150\%$ of historic averages in high elevation regions and in main channels. The occurrence of extreme low flows are likely to significantly increase for the spring and summer seasons, with low flows of $< 25\%$ of historic average increasingly likely in the most vulnerable basins. These hydrologic extremes can severely disrupt water supplies and ecosystem function and are thus a key concern for future water resource management.