

## Operational Water Forecast Assessment of a Spatially Distributed Process-Based Snow Model: A Case Study in the East River Watershed, Colorado

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### ABSTRACT

Operational water-resource planning faces an increased challenge with a changing seasonal snowpack in mountain watersheds due to global and regional climatological factors. An example region is the western United States, where there is a demonstrated decline in extent and amount of seasonal snow in mountain ranges such as the Sierra Nevada, California, or the Rocky Mountains, Colorado. Causes for the shift include precipitation phase changes or increased amounts of dust on snow. Like the Colorado Basin River Forecast Center (CBRFC), regional forecasters cannot currently account for these factors when their prediction method relies on an empirical snow model based on historic calibration records. To evaluate the options and supplement the current method of the CBRFC, we run a physical-based snow energy balance model for past water years in a subset region: the East River Watershed, Colorado. The results are compared with *in situ* measurements, remote sensing observations, and the predictions by the current model. This assessment is an effort to include the process-based model in day-to-day CBRFC operations and to create a foundation to expand to larger domains. This project also bridges the gap between scientific advancements and benefits for society with more accurate water resource forecasting.

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