

## **Enhanced Snowpack Assessment in Colorado using Spatial Datasets**

Amy Volckens<sup>1</sup>, Michael Thiemann, Gerald Day  
Riverside Technology, inc., Fort Collins, CO

Michelle Garrison, Joe Busto  
Colorado Water Conservation Board, Denver, CO

**Abstract.** The Colorado Water Conservation Board initiated a project to determine whether spatially distributed datasets can improve snowpack assessment in Colorado. Riverside Technology, inc. (RTi) evaluated gridded snowpack estimates from the Snow Data Assimilation System (SNODAS), a relatively new modeling system developed by the National Operational Hydrologic Remote Sensing Center (NOHRSC). The SNODAS estimates snowpack characteristics and fluxes for the U.S. at a one-hour time step and a one-kilometer grid resolution. RTi evaluated the SNODAS products by comparing them to independent observations and modeled values, by developing water balances at multiple scales, and by incorporating the data into calibrated hydrologic models. The work focused on watersheds in the Upper Colorado and Upper Rio Grande river basins. The precipitation inputs to SNODAS demonstrate seasonal volume biases and show less variation with elevation than other estimates, such as from the Parameter-elevation Regressions on Independent Slopes Model (PRISM). Snow water equivalent estimates from SNODAS show similar accumulation and ablation patterns to station observations. When snowpack estimates from SNODAS are used directly in a calibrated hydrologic model, streamflows are under-simulated for the project sub-basins. The SNODAS products are available in real-time and can supply beneficial information for operational forecasting systems. For example, the energy-balance snow model in SNODAS estimates sublimation and snowmelt terms, which can be used to explain discrepancies between forecasted and actual water supply volumes.

---

<sup>1</sup> Riverside Technology, inc.  
2290 E. Prospect Rd., Suite 1  
Fort Collins, CO 80525  
Tel: (970) 498-1824  
e-mail: [amy.volckens@riverside.com](mailto:amy.volckens@riverside.com)