

## **Spatio-temporal Variability in Snowmelt Rates Observed Across the Southern Rocky Mountains, U.S.A.**

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**Abstract.** About 20% of the world's population relies on melting snow for their main water supply. Many of these areas are mountainous and there is limited *in situ* monitoring of snow accumulation and melt due to few stations and the lack of representativeness of these stations in this complex terrain. Most of the existing stations only collect precipitation and temperature data, thus modeling of snowmelt often uses temperature as an index of the full energy balance needed to physically model melt. Across the Western United States (U.S.), there are currently about 700 snow telemetry (SNOTEL) stations that monitor precipitation and temperature, as well as snow water equivalent (SWE) and snow depth. Across the Southern Rocky Mountains in the central-western U.S., 90 SNOTEL stations have been operating since the late 1970s or mid-1980s. These stations were used to estimate the daily snowmelt rate as a function of the daily average air temperature over ½ month periods to consider the seasonality of incoming solar radiation. The various melt rates, in millimeters of snow per day per degrees Celsius were then evaluated based on the location, topography, and canopy characteristics of each station. It is anticipated that the spatio-temporal variability in the melt rates can applied to other continental regions.