

## **Homogenization of High Elevation Temperature Data Across Colorado**

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**Abstract.** The most obvious indicator of climate change is an increase in temperature. Across the high elevation mountains of Colorado, warming has been reported that is an order of magnitude more than global averages and much more than nearby lower elevation locations. Such extreme warming can impact water resources and ecosystem sustainability throughout the whole region. However, temperature observations at these Snow Telemetry (SNOTEL) stations have been suspected of errored systematic artifacts. The main causes for the extreme warming are sensor change, sensor movement, change in the radiation shield and an altering of the data collection programming. In this paper, historical minimum, average, and maximum temperature data from the 1980s through 2014 at 68 long-term SNOTEL stations in Colorado were evaluated. Temperature data before the date of sensor change, etc., was homogenized using an equation derived from field studies. The Mann-Kendall significance of trend and Thiel-Sen's slope tests were applied to annual average temperature data for all sites for the original time series and the homogenized time series. Results indicated significant warming trends in most of the SNOTEL sites before the changing of sensor for minimum temperature, but much less significant for the homogenized minimum temperature data. The new, homogenized dataset is now much more consistent over time and trends are more comparable to nearby, lower elevation stations.