

Variability and Trends in Rocky Mountain Snowpack

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The interannual variability and decadal scale trends of snowpack and snow accumulation in the Rocky Mountain region are investigated using 44 seasons of data from the Natural Resources Conservation Service's Snow Telemetry (SNOTEL) Network. A long term decreasing trend in water year peak snow water equivalent (SWE) is evident at numerous sites particularly in the southern Rockies, but absent in the northern Rockies. The date of peak SWE is also trending earlier across a broader area. Decreasing trends are more pronounced and cover a larger area when examining SWE present in both the very early season and very late season, but mid-winter SWE exhibits minimal long-term decline. Interannual variability in snowpack is also examined. SNOTEL sites in northern Colorado and southern Wyoming carry the least interannual variability relative to their median, while sites in Utah, Arizona, and New Mexico experience much larger swings between seasons. One notable source of interannual variability is the El Niño Southern Oscillation (ENSO). The warm state (El Niño) correlates with a reduction in SWE in the northern Rockies, but an increase in SWE in the southern Rockies. The cold state (La Niña) generally produces the opposite. Little signal due to ENSO was identified in the central Rockies including most of Colorado and southern Wyoming.