

**Recent declines in western US snowpack in the context of 20th century climate variability**Gregory McCabe<sup>†</sup>; David Wolock<sup>†</sup> U.S. Geological Survey, USALeading author: [gmccabe@usgs.gov](mailto:gmccabe@usgs.gov)

A monthly snow accumulation and melt model was used with monthly PRISM temperature and precipitation data to generate time series of April 1 snow water equivalent (SWE) for 1900 through 2008 in the western United States (US). Averaged across the western US, SWE generally was higher than long-term (1900-2008) average conditions during the periods 1900-1925, 1944-1955, and 1966-1982; SWE was lower than long-term average conditions during the periods 1926-1943, 1957-1965, and 1984-2008. During the period 1900-2008, the temporal pattern in winter precipitation exhibited wetter-than-average and drier-than-average decadal-scale periods with no long-term increasing or decreasing trend. Winter temperature generally was below average from 1900 to the mid-1950s, close to average from the mid-1950s to the mid-1980s, and above average from the mid-1980s to 2008. In general, periods of higher-than-average SWE have been associated with higher precipitation and lower temperature. Since about 1980, western US winter temperatures have been consistently higher than long-term average values, and the resultant lower-than-average SWE values have been only partially offset by periods of higher-than-average precipitation. The post-1980 lower-than-average SWE conditions in the western US are unprecedented within the context of twentieth century climate and estimated SWE.