

Regional shifts in snowfall, melt in the intermountain west

The freshwater supplies of the American West rely, for the most part, on snow. The Colorado River, the Rio Grande, and other rivers in the intermountain west—bounded by the Sierra Nevada and Cascade mountains to the west and the Rockies to the east—are the main sources of water for one of the driest parts of the continent, and their flows are predominantly fed by the spring-time melt of snow accumulated over the winter. With winter mean temperatures rising in some places by as much as 2.5°C in the past 2 decades, some scientists are concerned that the current hydrological regime of the region could be overthrown, with snow giving way to rain as the dominant form of precipitation. Decreasing snow accumulation and earlier snowmelt onset have been observed in Colorado. Whether these trends extend to the larger intermountain west region, however, is unknown.

Drawing on daily observations from 202 snowpack telemetry (SNOTEL) stations, *Harpold et al.* found that although there have been changes in snowpack behavior, the effects of rising temperatures on snow properties are regionally variable. They suggest that a regime shift is not underway for the intermountain west.

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Researchers conduct a snow survey in the Valles Caldera National Preserve, New Mexico.

Using daily observations of snow depth, snow-water equivalent, and the precipitation rate from 1984 to 2009, the authors calculated the length of the snow-covered season, the onset of melt, the date of maximum accumulation, and other parameters. Using a regional analysis the authors found that trends in these properties were highly variable across the intermountain west but that negative trends were most prominent in the Colorado River basin and in high-elevation regions that were above 2800 meters. (*Water Resources Research*, doi:10.1029/2012WR011949, 2012) —CS