Regional models expect drier, stormier western United States

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As American southwestern states struggle against ongoing drought, and the Northwest braces for a projected shift from a snow- to a rain-dominated hydrological system, climate researchers strive to provide precipitation projections that are fine grained enough to be of value to municipal water managers. Estimates derived from large general circulation models show that in a warming world, water availability in the western United States will be increasingly dictated by extreme events.

However, such large models tend to lack necessary detail for the small-scale interactions and topographic influences that dominate daily changes in local precipitation. To convert the broad predictions of global models into practical predictions, Dominguez et al. used an ensemble of regional models, set to fit within the projections of general circulation models, to estimate future winter average and extreme precipitation for the western United States.

The authors find that for the years 2038-2070, winter average precipitation in the southwestern states would be 7.5 percent below 1979-1999 levels. They also find, for the entire areal-averaged western United States, a 12.6 percent increase in the magnitude of 20-year-return-period winter storms and a 14.4 percent increase for 50-year winter storms. In some regions, like southern California and northwestern Arizona, this increase in strength of 50-year storms was pushed as high as 50 percent.

Though the temporal and spatial granularity of the regional climate models is much improved over that of general circulation models, workable and useful measurements for hydrological engineering and water management design will need ever-better estimates of future rainfall patterns.

More information: Changes in winter precipitation extremes for the western United States under a warmer climate as simulated by regional climate models, *Geophysical Research Letters*, doi:10.1029/2011GL050762 , 2012

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