

For U.S. biomes, climate change will decrease vegetative productivity

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One recurrently forecast effect of global climate change is that in general, precipitation patterns will become more extreme, with fewer, larger storms and longer dry spells in between. The aftermath of this shift, borne out by the effect the changing water availability will have on vegetative productivity, however, is less well known. Previous research showed that productivity changes with the total annual precipitation, but the measured effect of a shift to a more extreme distribution is less consistent. Research seeking to understand this aspect of the changing precipitation pattern question has typically been conducted through small-scale or short-duration intervention experiments, where the availability of rainwater is artificially manipulated. This makes extrapolating the research to other climes or biomes difficult.

To overcome this difficulty, Zhang et al. conducted an investigation into the observed effect of precipitation variability from 2000 to 2009 on 11 different sites within the continental United States—experimental plots that represented a range of climate and ecological conditions. Using satellite observations of canopy photosynthetic capacity, the authors estimated the aboveground net primary productivity for the experimental sites. Long-term precipitation and temperature records enabled the authors to calculate the occurrence of extreme events. Using their records, the authors could then compare the effect of more or less extreme [precipitation patterns](#) for a single site and also compare across experimental sites.

The authors find that for all biomes tested a more extreme precipitation

pattern had either a neutral or negative effect on vegetative productivity. Also, [extreme rainfall](#) distributions were related to, on average, a 20 percent reduction in rain use efficiency. The decreases were more pronounced for arid grasslands and Mediterranean forests, while mesic grasslands and [temperate forests](#) were less affected.

More information: Extreme precipitation patterns reduced terrestrial ecosystem production across biomes, *Journal of Geophysical Research-Biogeosciences*, [doi:10.1029/2012JG002136](https://doi.org/10.1029/2012JG002136) , 2012 .
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