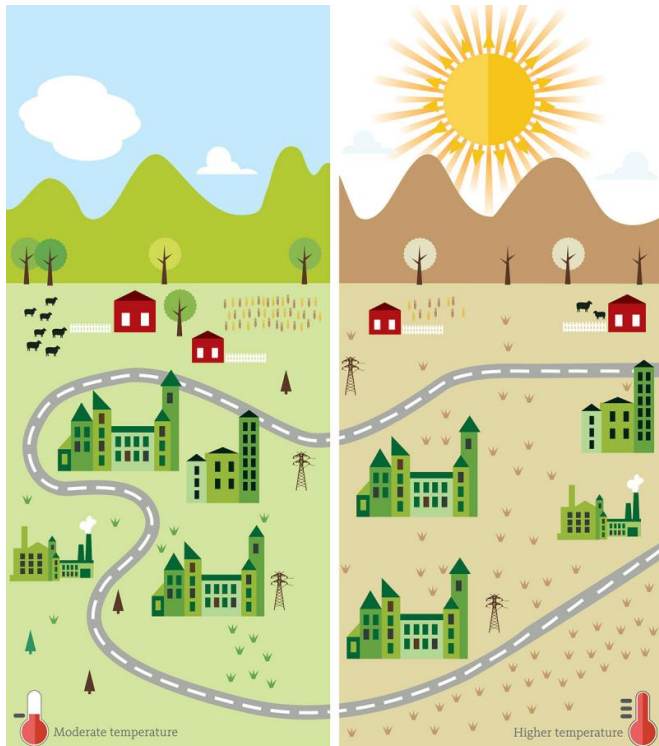


# Study shows increase in concurrent droughts and heat waves in US

1 September 2015, by Bob Yirka



Heatwaves place substantial stress on natural and man-made environments. The impact is exacerbated when heatwaves and droughts occur simultaneously. Credit: Jennie Brewton (University of California, Irvine, CA).

(Phys.org)—A pair of researchers with the University of California has found that heat waves and droughts overlapping occurred more frequently during a twenty year span between 1990 and 2010 than occurred during the twenty year span 1960 to 1980. In their paper published in *Proceedings of the National Academy of Sciences*, Omid Mazdiyasn and Amir AghaKouchak describe their study and suggest their results indicate a statistically significant shift in concurrent extremes.

Long heat waves can not only cause damage to crops, they can cause cooling bills to skyrocket stressing budgets and sometimes leading to area

wide economic problems. When combined with [droughts](#), as the researchers note, they can lead to significant damage to both society and the environment.

As the research pair also note, the second period of time they looked at occurred during what has been called a hiatus of rising global temperatures (which some have suggested is due to heat being sequestered in the oceans) a period when they were not able to spot any increase in frequency of droughts or heat waves—but they were able to see very clearly that the frequency of droughts coinciding with heat waves increased dramatically. They noted also that the greatest increases were associated with the longest and most severe heat waves.

To come to these conclusions, the researchers studied heat and drought records over the past half century and then assigned certain definitions to conditions to allow for conducting a statistical analysis—a drought for example, was defined as a period of time during which the likelihood of precipitation was approximately 80 percent below the median precipitation level for a given area for a given time. Their analysis shows that most parts of the country experienced more concurrent droughts, but they were most prominent in the South, South West and some of the West. Notably, the reverse was found to be true for some parts of the Midwest and Northern parts of the country.

The researchers conclude by suggesting their study and others like it may help officials, farmers and other people better plan for future meteorological events, perhaps helping to mitigate the damage that is caused by long concurrent [heat wave](#) and drought events.

**More information:** Substantial increase in concurrent droughts and heatwaves in the United States  
[www.pnas.org/cgi/doi/10.1073/pnas.1422945112](http://www.pnas.org/cgi/doi/10.1073/pnas.1422945112)

## Abstract

A combination of climate events (e.g., low precipitation and high temperatures) may cause a significant impact on the ecosystem and society, although individual events involved may not be severe extremes themselves. Analyzing historical changes in concurrent climate extremes is critical to preparing for and mitigating the negative effects of climatic change and variability. This study focuses on the changes in concurrences of heatwaves and meteorological droughts from 1960 to 2010.

Despite an apparent hiatus in rising temperature and no significant trend in droughts, we show a substantial increase in concurrent droughts and heatwaves across most parts of the United States, and a statistically significant shift in the distribution of concurrent extremes. Although commonly used trend analysis methods do not show any trend in concurrent droughts and heatwaves, a unique statistical approach discussed in this study exhibits a statistically significant change in the distribution of the data.

[Press release](#)

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