

Extreme heat increasing in both summer and winter

November 26 2018



Soybeans show the effect of the Texas drought near Navasota, TX on Aug. 21, 2013. Credit: USDA

A new study shows extreme heat events both in the summer and in the winter are increasing across the U.S. and Canada, while extreme cold events in summer and winter are declining.

A new study in the *Journal of Geophysical Research: Atmospheres*, a

publication of the American Geophysical Union, examined absolute extreme temperatures—high temperatures in summer and [low temperatures](#) in [winter](#)—but also looked at relative extreme temperature events—unusually [cold temperatures](#) and unusually [warm temperatures](#) throughout the year.

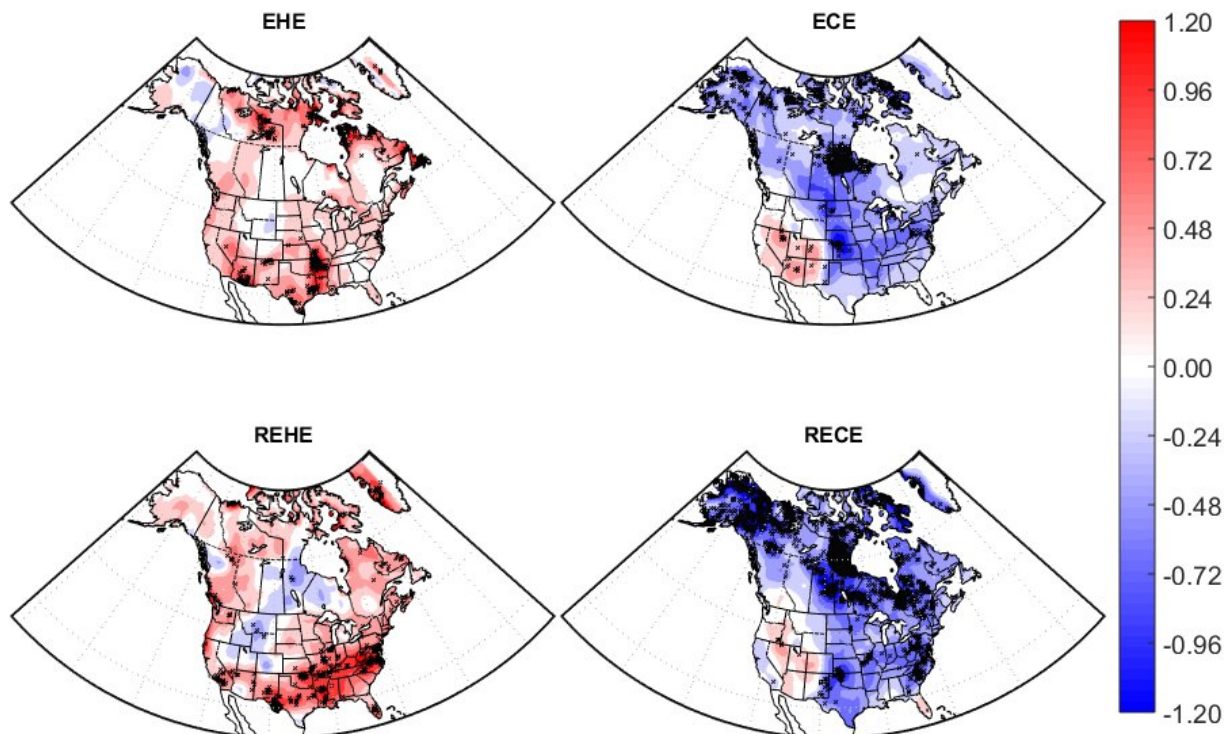
The new study found both relative and absolute extreme heat events have increased across the US and Canada since 1980. This upward trend is greatest across the southern US, especially in the Ozarks and southern Arizona, as well as northern Quebec. That means there are more extremely hot days during the summer as well as more days that are considered extremely hot for the time of year, like abnormally warm days in the winter.

The new research also found both relative and absolute extreme cold events are decreasing, most notably in Alaska and Northern Canada, along with patches along the US Atlantic coast. In these areas, there are fewer instances of temperatures that are extremely cold either compared to the normal range, like in winter, or for the time of year, like unusually cold days in the summer.

Global mean surface temperature, the most frequently cited indicator of climate change, has been steadily increasing since the 1970s. However, [temperature extremes](#) pose a greater ecological risk to many species than average warming, according to the study's authors.

The new study is one of the first to explore relative extreme temperature events, which are changing more rapidly than absolute temperature extremes, and can have important implications for the environment, agriculture and [human health](#), according to Scott Sheridan, professor in the department of geography at Kent State University and lead author of the new study.

"Typically for this kind of research we look at the highest temperatures in the summer and lowest temperatures in the winter. But we've also seen that extreme temperatures that are really anomalous for the time of year can have a high impact—these relative extremes are important and underappreciated," he said.



Trends in Extreme Heat Events (EHE), Extreme Cold Events (ECE), Relative Extreme Heat Events (REHE), and Relative Extreme Cold Events (RECE) in days per decade, 1980-2016. Dots indicate grid cells in which the trend is statistically significant (p

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