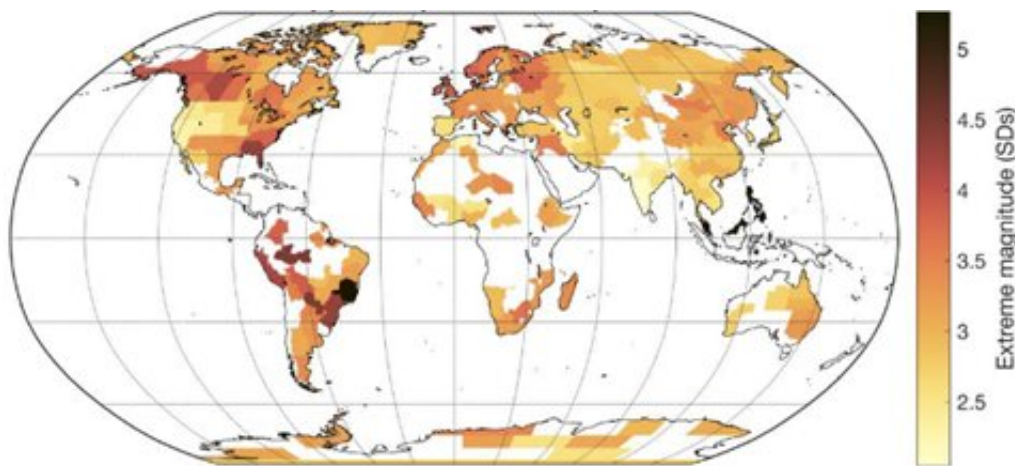


Scientists identify the most extreme heatwaves ever recorded globally

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Map showing the magnitude of the greatest extreme since 1950 in each region, expressed in terms of deviation from average temperatures, with climate change trend removed. Darker colors indicate greater extremes. Credit: University of Bristol

A new study has revealed the most intense heatwaves ever across the world—and remarkably some of these went almost unnoticed decades ago.

The research, led by the University of Bristol, also shows heatwaves are projected to get hotter in future as [climate change](#) worsens.

The western North America [heatwave](#) last summer was record-breaking

with an all-time Canadian high of 49.6 °C in Lytton, British Columbia, on June 29, an increase of 4.6 °C from the previous peak.

The new findings, published today in *Science Advances*, uncovered five other heatwaves around the world which were even more severe, but went largely underreported.

Lead author, [climate](#) scientist Dr. Vikki Thompson at the University of Bristol, said: "The recent heatwave in Canada and the United States shocked the world. Yet we show there have been some even greater extremes in the last few decades. Using [climate models](#), we also find [extreme heat events](#) are likely to increase in magnitude over the coming century—at the same rate as the local average temperature."

Heatwaves are one of the most devastating [extreme weather events](#). The western North America heatwave was the most deadly weather event ever in Canada, resulting in hundreds of fatalities. The associated raging wildfires also led to extensive infrastructure damage and loss of crops.

But the study, which calculated how extreme heatwaves were relative to the local temperature, showed the top three hottest-ever in the respective regions were in Southeast Asia in April 1998, which hit 32.8 °C, Brazil in November 1985, peaking at 36.5 °C, and Southern U.S. in July 1980, when temperatures rose to 38.4 °C.

Dr. Vikki Thompson, from the university's Cabot Institute for the Environment, said: "The western North America heatwave will be remembered because of its widespread devastation. However, the study exposes several greater meteorological extremes in recent decades, some of which went largely under the radar likely due to their occurrence in more deprived countries. It is important to assess the severity of heatwaves in terms of local temperature variability because both humans and the natural eco-system will adapt to this, so in regions where there is

less variation, a smaller absolute extreme may have more [harmful effects](#)."

The team of scientists also used sophisticated climate model projections to anticipate heatwave trends in the rest of this century. The modeling indicated levels of heatwave intensity are set to rise in line with increasing [global temperatures](#).

Although the highest local temperatures do not necessarily cause the biggest impacts, they are often related. Improving understanding of climate extremes and where they have occurred can help prioritize measures to help tackle this in the most vulnerable regions.

Co-author Professor Dann Mitchell, Professor in Climate Sciences at the University of Bristol, said: "Climate change is one of the greatest global health problems of our time, and we have showed that many heatwaves outside of the developed world have gone largely unnoticed. The country-level burden of heat on mortality can be in the thousands of deaths, and countries which experience temperatures outside their normal range are the most susceptible to these shocks."

In recognition of the dangerous consequences of climate change and a clear commitment to help tackle this, in 2019 the University of Bristol became the first UK university to declare a climate emergency.

More information: Vikki Thompson, The 2021 western North America heat wave among the most extreme events ever recorded globally, *Science Advances* (2022). [DOI: 10.1126/sciadv.abm6860](https://doi.org/10.1126/sciadv.abm6860). www.science.org/doi/10.1126/sciadv.abm6860

Provided by University of Bristol

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