Heatwave blamed on climate change

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We know climate change made the heatwave that swept the northern hemisphere last year more probable, but can we say that it actually caused it?

In a bold claim, a group of researchers are suggesting that the extent of the heatwave would have been impossible without the carbon dioxide we have pumped into the atmosphere. Other scientists have cautioned against unequivocally pinning the blame on climate change.

Many regions were hit by extreme heat between May and July 2018. An area of 5 million square kilometres was affected by “hot days” over the period, which is around 22 percent of populated and agricultural land areas in the northern hemisphere. There were record temperatures in Japan, and wildfires in Sweden.

“The area affected could not have occurred without climate change,” says Martha Vogel at ETH Zurich in Switzerland.

Vogel and her colleagues modelled the extent of areas concurrently affected by heat in a world without the 1°C rise of warming that humanity has caused since the days of the Industrial revolution.

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When the team compared this with the size of observed heatwave areas since the 1950s, they found the two were mostly in line. But their simulations couldn't replicate the size of the area affected in 2018. The largest region they could reach was just 20 percent of the actual affected area.

When the researchers

The sun sets over London on the hottest day of 2018

reintroduced our warming impact, they found comparable heatwaves could occur every six years. “So it is not unlikely to have such an event like last year,” says Vogel.

The team's research suggests that if temperatures rise by a further 1°C, as they are on track to do, heatwaves like that in 2018 could occur every year. Vogel presented the findings at the European Geosciences Union General Assembly in Vienna.

Other efforts to attribute specific extreme weather events to climate change look at how much more probable an event was made by the warming we have caused. For example, an assessment last year found that the 2018 heatwave was five times more probable because of climate change.

“Climate models aren’t good at simulating heatwaves, so people are usually cautious about reporting the results as having been impossible,” says Geert Jan van Oldenborgh of the Royal Netherlands Meteorological Institute in De Bilt.

The research also set a relatively low threshold for what constitutes a hot day: temperatures above the 90th percentile of the historical long-term average. A higher bar, closer to what most people would define as a hot day, would yield a different result, says Oldenborgh.

The time frame of May to July also excludes August, meaning around half the heatwaves of a typical year are left out.

“There are many uncertainties involved in attribution studies which make concrete statements very difficult to defend,” says Hannah Cloke at the University of Reading, UK.

It is reasonable to measure the area affected by hot days but it isn’t the only way of looking at heatwaves. Equally, there are many different ways of defining what extreme heat is, Cloke says.