Human Activity to Blame For 2003 Heatwave

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Human activity has increased greenhouse gases in the atmosphere and more than doubled the risk of record-breaking hot European summers, like that of 2003, according to a new study by Peter Stott from the Met Office's Hadley Centre for Climate Prediction and Research, and Dáithí Stone and Myles Allen of the University of Oxford.

A previous study at the Hadley Centre for Climate Prediction and Research at the Met Office, demonstrated that large-scale global warming is not a result of urban development. Measurements of night-time air temperature, averaged across a number of weather stations worldwide, show a rate of warming of around 0.19 °C per decade during the period 1950-2000. This rate is the same for calm conditions as it is for windy.

David Parker of the Hadley Centre, who undertook the research, says: "Urban developments have not affected the estimated worldwide warming trend; if they had, the rate of warming would have been greater on calm nights than on windy nights."

This new research - reported today (2 December) in Nature - shows how human influence, mainly fossil fuel burning, can be blamed for increasing the risk of such a heatwave and that this type of summer could be expected to occur as often as every other year by the middle of this century. Linked to more than 27,000 excess deaths across the continent, the temperatures of summer 2003 were almost undoubtedly the highest in Europe for over 500 years.

As climate naturally varies, with some very hot summers and some very cool ones, the hot summer of 2003 could have been dismissed as just another quirk of nature. However, by using sophisticated climate models and new statistical techniques, this study has been able to separate the human factors from natural ones.

"We simulated 2003 summer temperatures over Europe - with and without the effect of man's activities - and compared these with observations," explains Peter Stott. "We found that although the high temperature experienced in 2003 was not impossible in a climate unaltered by man, it is very likely that greenhouse gases have at least doubled the risk and our best estimate is that such a heatwave is now four times more likely as a result of human influence on climate."

Myles Allen has also co-authored (with Richard Lord QC) a commentary on the legal implications of the research, which is published in the same edition of Nature. He says: "Quantifying the costs of climate change requires being able to separate natural from man-made contributions to weather risk. If a dice is loaded to come up six and does so, then clearly there is a sense in which the loading helped this to happen, but when several sixes turn up, it makes no sense to ask which of these are due to the loading. In the same way, we cannot say which of the heatwaves were man-made and which were natural, but we can apportion blame for the change in risk."

Changes in the frequency of extremes are often the most sensitive aspects of climate change for ecosystems and societal responses. According to Dáithí Stone: "This research will help us understand how human influences on climate affect the increased risk of deaths, forest fires, and crop losses."

"We know that 2003-type hot summers and associated heatwaves won't happen every year, but continuing man-made global warming will

increase the chance," adds, Peter Stott. "According to our model, by the middle of this century every other summer could be even hotter than 2003."