

England set for 'substantial increase' in record-breaking warm years

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The likelihood of record-breaking warm years in England is set to substantially increase as a result of the human influence on the climate, new research suggests.

In a study published today in the journal *Environmental Research Letters*, an international team of researchers has shown that the chances of England experiencing a record-breaking warm year, such as the one seen in 2014, is at least 13 times more likely as a result of [anthropogenic climate change](#).

This is according to climate [model simulations](#) and detailed analyses of the Central England Temperature (CET) record—the world's longest instrumental temperature record dating back to 1659.

The results of the study showed that human activities have a large influence on extreme warm years in England, which the researchers claim is remarkable given England is such a small region of the world.

Lead author of the study Dr Andrew King, from the ARC Centre of Excellence for Climate System Science at the University of Melbourne, said: "When you look at average annual temperatures over larger regions of the world, such as the whole of Europe, there is a lower variability in temperatures from year to year compared with smaller areas.

"As a result of this low variability, it is easier to spot anomalies. This is why larger regions tend to produce stronger attribution statements, so it is remarkable that we get such a clear anthropogenic influence on temperatures in a relatively small area across central England."

To arrive at their results, the researchers firstly used [climate model simulations](#) to calculate the likelihood of very warm years when there is just natural forcings on the climate and no human influence, and then when there is both natural forcings and [human influence](#). The change in the likelihood of warm years due to human influences on the climate was then calculated.

The researchers then observed the CET and picked out the warmest years from the record since 1900. The warmest years were then plotted onto a graph which the researchers used to calculate the likelihood of warm years happening now and warm years happening 100 years ago.

The model-based method suggested at least a 13-fold increase (with 90% confidence) due to human influences on the climate, whilst the observation-based approach suggested at least a 22-fold increase in the probability of very warm years in the climate of today compared with the climate of a century ago (again with 90% confidence).

"Both of our approaches showed that there is a significant and substantial increase in the likelihood of very warm years occurring in central England," Dr King Continued.

According to the CET, 2014 was the warmest year on record in central England. It has been reported that during the last 60 years there has been rapid warming in the CET in line with the anthropogenic influence on the climate, with the highest average annual temperature of 10.93 °C recorded in 2014.

The Central England Temperature (CET) series, which is the longest instrumental time series of temperature in the world, has monthly recordings of average temperatures dating back to 1659 and recordings of average daily temperatures dating back to 1772.

The CET is designed to represent the [climate](#) of the English Midlands, which is approximated by a triangular area enclosed by Lancashire in the north, Bristol in the south-west and London in the south-east. The CET has undergone thorough and extensive quality control, making it an ideal resource for studying long-term temperature trends across the region.

As to whether these results can be seen to be representative of areas outside of central England, Dr King said: "I would expect that other areas near the UK would produce similar results.

"For larger regions, stronger attribution statements can often be made. For example, we performed a similar attribution study for Europe as a whole and found a 35-fold increase in the likelihood of extremely warm years using model simulations."

More information: Attribution of the record high Central England Temperature of 2014 to anthropogenic influences, King et al 2015 *Environ. Res. Lett.* 10 054002.

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