

UK HEATWAVES

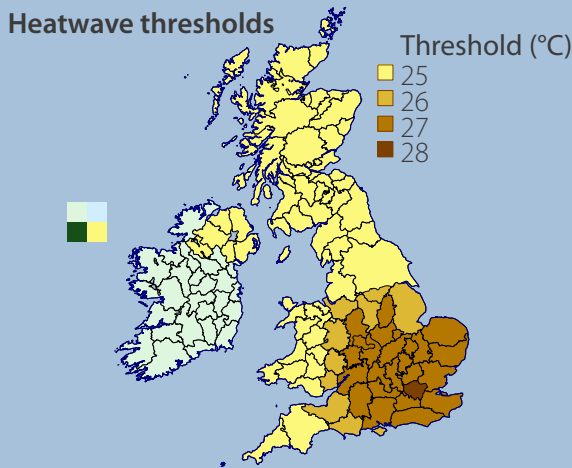
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Introduction

The World Meteorological Organisation (WMO) defines a heatwave as:

‘A period of marked unusual hot weather over a region persisting for at least three consecutive days during the warm period of the year based on local climatological conditions, with thermal conditions recorded above given thresholds.’

In 2018, the Met Office defined those thresholds for the UK (Figure 1).

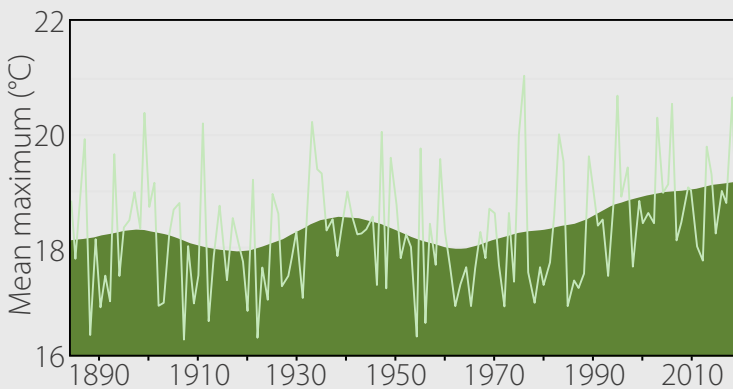


Historical observations reveal strong variability in the occurrence of heatwaves.¹ A recent review of weather stations operational for more than 85 years found positive trends in the number and length of heatwaves at some locations. However, there were also declines in the duration of long heatwaves in the south-east since the 1970s (see figure below),² but a slight lengthening of shorter ones.

The study found that natural oceanic cycles had a significant influence on both the frequency and length of heatwaves in the UK. The authors warn that any effects of a warming climate on heat waves in the UK in the near future could be moderated by changes in the AMO.

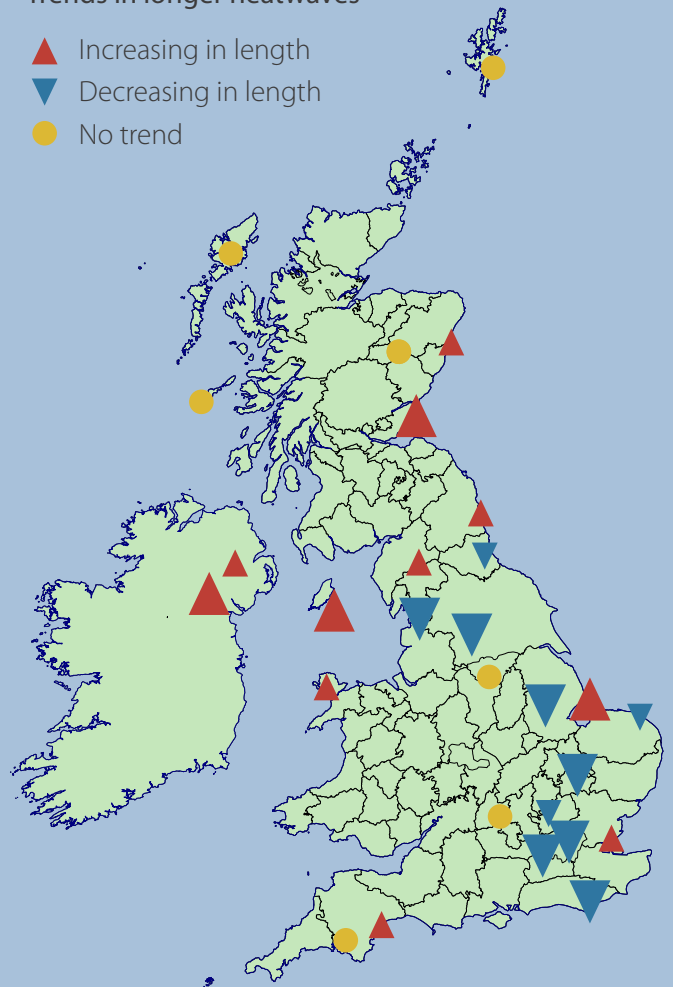
Long-term trends

Since the 1960s, UK summers have become about 1°C hotter on average. This positive trend followed a slight cooling during the 1940s and 50s.



Trends in longer heatwaves

- ▲ Increasing in length
- ▼ Decreasing in length
- No trend



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Costs and benefits

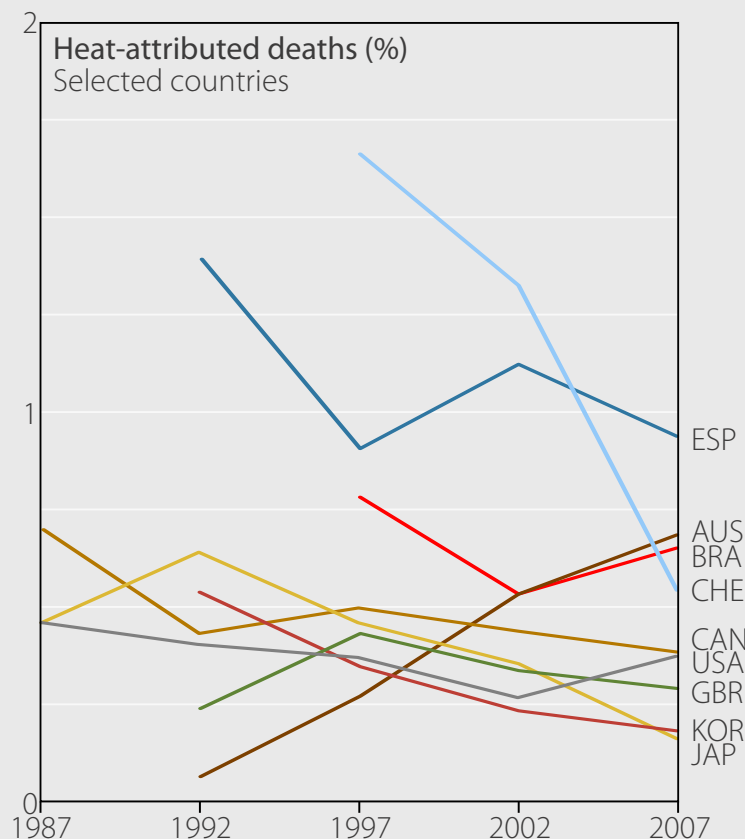
There are benefits as well as costs from associated with heatwaves in the UK. Warm temperatures can result in a temporary boost in consumer spending and domestic tourism, as people make the most of sunny and warm conditions.

However, extreme warm temperatures can cause significant problems to transport infrastructure, railways in particular. Workers' productivity levels can also fall in higher temperatures.

Heat-related mortality

An influential paper has suggested that rising temperatures would result in annual heat-related deaths of 7,000 in the UK annually by the 2050s.³ This compares to fewer than 2,000 heat-related deaths per year on average in recent years.

However, the study made the assumption that no adaptation would take place and so this cannot be taken as a credible prediction.



In fact, as shown in the figure, people around the world appear to be adapting well to higher temperatures – in most countries, heat-related deaths are falling even as average temperatures rise.⁴ For the UK as a whole, there does not seem to be much in the way of any increase or decrease in heat-related mortality, but in London, a decrease has been observed over the 20th century.⁵

Cold-related mortality remains a more significant and persistent problem, both in the UK and internationally.⁶ There are 20 times as many cold-related deaths as heat-related deaths worldwide, and the UK has had 35,000 cold-related deaths a year on average over the past 5 years.⁷

Conclusion

The observational data show mixed heatwave trends across the UK. Large-scale natural climate cycles do appear to play an important role in influencing spatial and temporal trends, and these could moderate the influence of rising temperatures on heatwaves for the immediate future.

Further temperature rises could eventually lead to heatwaves becoming more frequent and severe. However, if suitable adaptive measures are introduced, then these potential changes should not lead to any increase in heat-related mortality.

Notes

1. McCarthy, M., Armstrong, L. and Armstrong, N. (2019), A new heatwave definition for the UK. *Weather*, 74: 382-387
2. Sanderson MG, Economou T, Salmon KH et al. (2017), Historical trends and variability in heat waves in the United Kingdom. *Atmosphere* 8: 191.
3. Hajat, Shakoor, et al. (2014) Climate change effects on human health: projections of temperature-related mortality for the UK during the 2020s, 2050s and 2080s. *J Epidemiol Community Health* 68.7: 641-648.
4. Vicedo-Cabrera AM, et al. (2018) A multi-country analysis on potential adaptive mechanisms to cold and heat in a changing climate. *Environment International* 111: 239-246. See also: Åström et al., 2013, Barreca et al., 2016, Bobb et al., 2014, Carson et al., 2006, Coates, 2014, Ekamper et al., 2009, Guo et al., 2012, Heo et al., 2016, Nordio et al., 2015, Petkova et al., 2014.
5. Carson C, et al. (2006) Declining vulnerability to temperature-related mortality in London over the 20th century, *American Journal of Epidemiology*, 164(1): 77.
6. Gasparrini, A et al. (2015) Mortality risk attributable to high and low ambient temperature: a multicountry observational study. *The Lancet* 386.9991: 369-375.
7. Office of National Statistics (2020) Excess winter mortality in England and Wales: 2018 to 2019 (provisional) and 2017 to 2018 (final). <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/excesswintermortalityinenglandandwales/2018to2019provisionalanda2017to2018final>.