

## August heat-wave

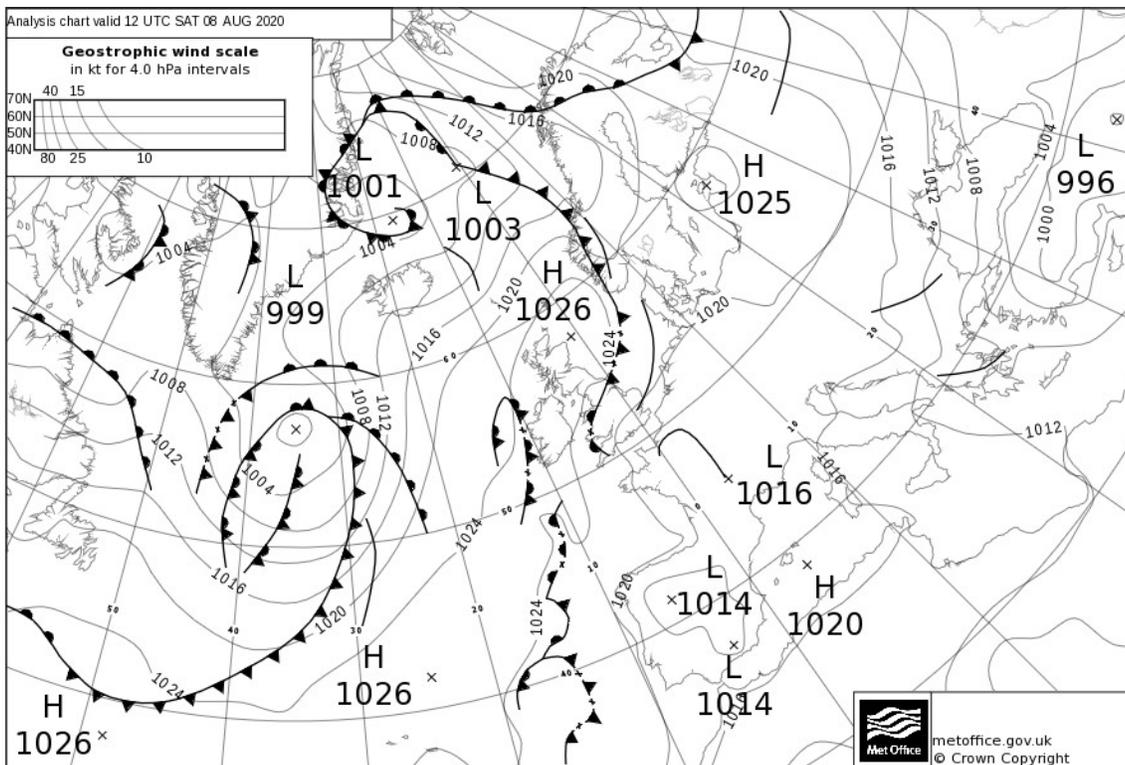
Southern England experienced a significant heat-wave during early August 2020 as hot, humid air moved north from the near continent. Temperatures exceeded 34°C across parts of the south-east for six consecutive days and there were several tropical nights with overnight temperatures remaining above 20°C. The heat and humidity brought some thunderstorms, torrential downpours and flash-flooding. This was one of the most significant heat-waves to affect southern England in the last sixty years.

### Impacts

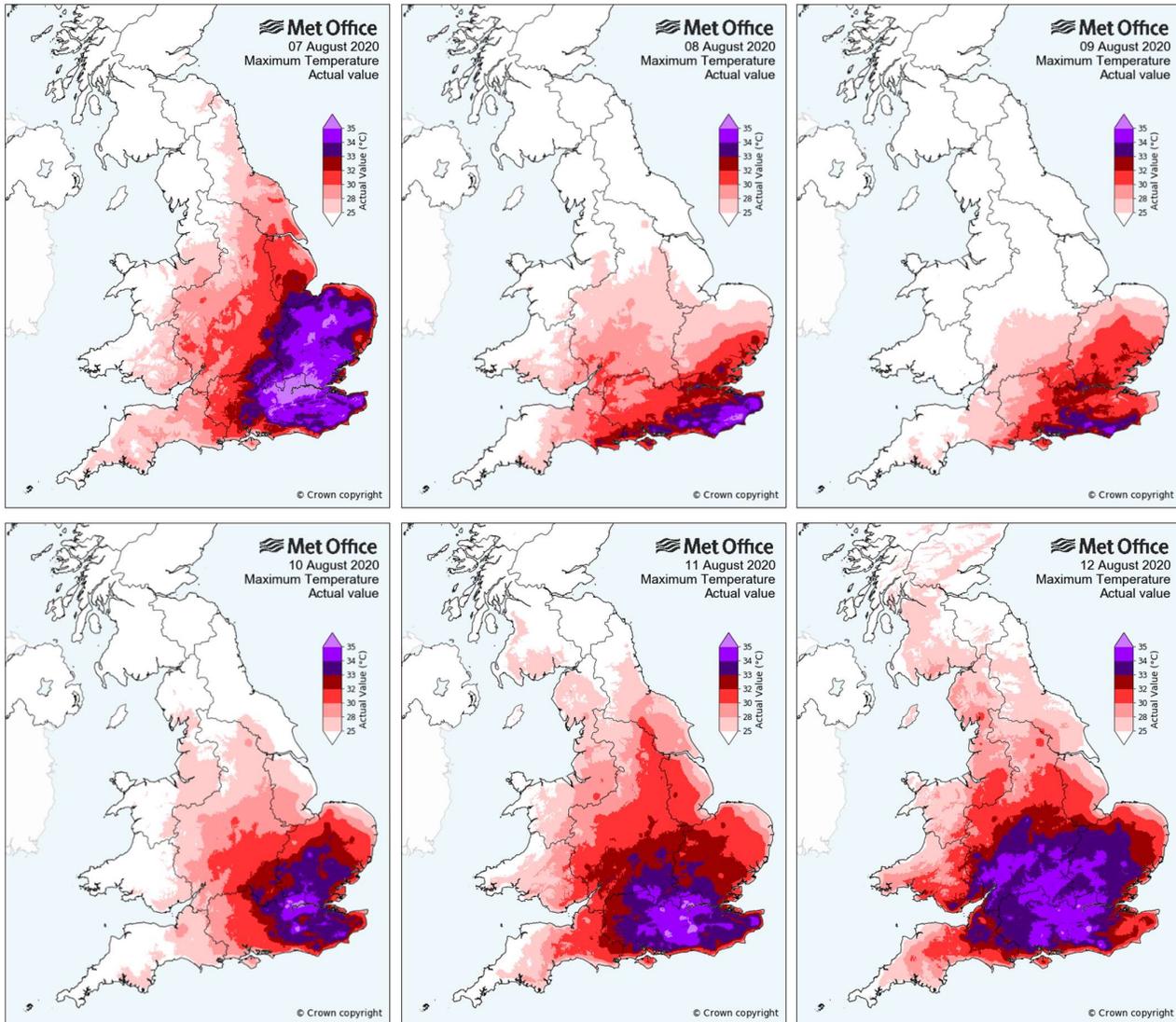
The hot weather made conditions difficult for the elderly and vulnerable and was likely responsible for a rise in registered deaths in England and Wales during the week<sup>1</sup>. Many beaches became exceptionally busy – for example in Sussex and Dorset. Firefighters tackled a large heathland fire in Surrey. The hot weather also saw the development of some impactful thunderstorms. Part of the M25 was closed due to flash-flooding and a train in Kent was evacuated after a landslide. A wooden pavilion in Hampshire caught fire after a suspected lightning strike and there were reports of large hailstones falling.

### Weather data

The analysis chart at 12 UTC 8 August 2020 shows a slack airflow over the UK with south-east England in a hot, humid air-mass extending from the near-continent, separated by a front from cooler, fresher conditions to the north.



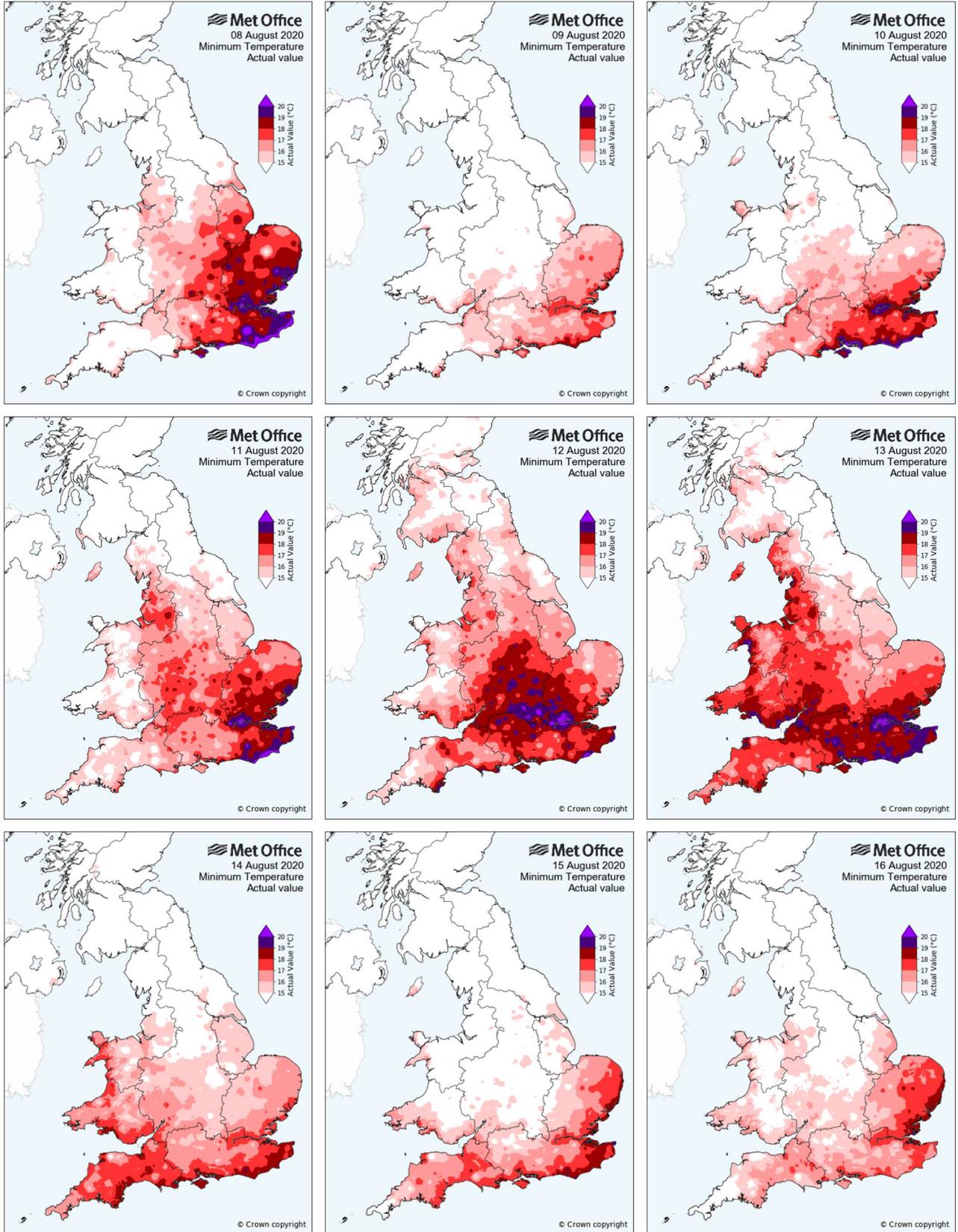
The maps below show daily maximum temperatures from 7 to 12 August 2020; the hottest days of the heatwave. Temperatures exceeded 30°C widely across south-east and parts of central England - and locally 34°C - every day, with 35°C reached on 7th, 10th, 11th and 12th and 36°C on 7th and 11th. The highest temperature was 36.4°C on 7th August at Heathrow and Kew Gardens, with 36.2 also reached at Charlwood, Surrey on 11th. The highest temperatures were approximately 12°C above the August 1981-2010 long-term average (35°C compared to 23°C that might be expected in Greater London, for example). Although 31 July 2020 was hotter with 37.8°C at Heathrow, this was a single day in isolation, rather than a sequence of hot days lasting almost a week.



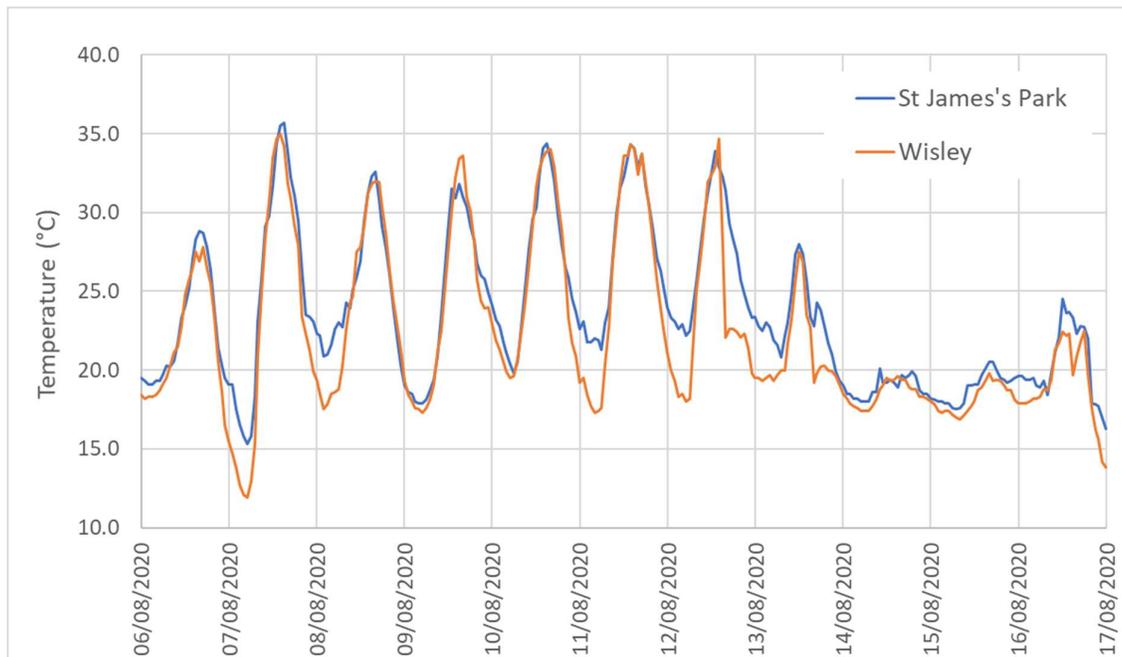
The maps below show daily minimum temperatures from 8 to 16 August 2020, with a succession of uncomfortably mild and humid nights with temperatures held up above 18°C. The heatwave lasted longer in terms of minimum temperatures than maximum temperatures, and this sequence included five 'tropical nights' on 8th, 10th, 11th, 12th, and 13th where temperatures locally remained above 20°C.

The highest daily minimum temperatures were generally in London (strongly influenced by the urban heat-island effect) but, in contrast to daily maximum temperatures, often also around the coastline of the south-east from Suffolk to Hampshire due to the increased humidity from the maritime influence. The highest daily minimum temperature was 22.3°C at Langdon Bay (Kent) on 8th (0900UTC 7th to 0900UTC 8th); while London St James's Park also recorded a minimum of

22.0°C on 12th. The 'patchy' nature of these maps reflects the influence of individual station exposure – particularly the local topography – on minimum temperatures.

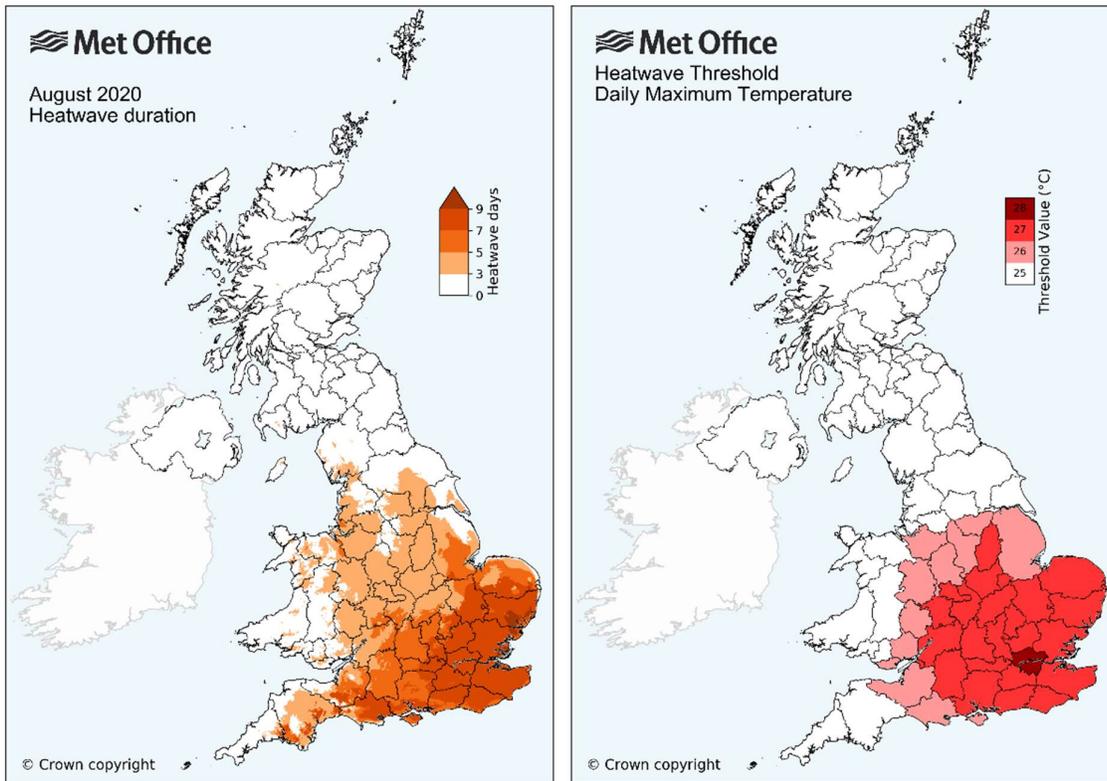


The chart below shows hourly air temperature at London St James's Park and Wisley, Surrey through the heatwave. Daily maximum temperatures at both stations reached the low- to mid-30s for six consecutive days 7th to 12th August and were broadly comparable at both locations. However, in contrast daily minimum temperatures were several degrees higher on 8th, 11th and 12th at St James's Park - in central London - (generally over 20°C i.e. 'tropical nights') compared to Wisley – a rural station approximately 40km from central London (around 18°C); clearly showing the urban heat-island influence on St James's Park retaining higher temperatures at night.

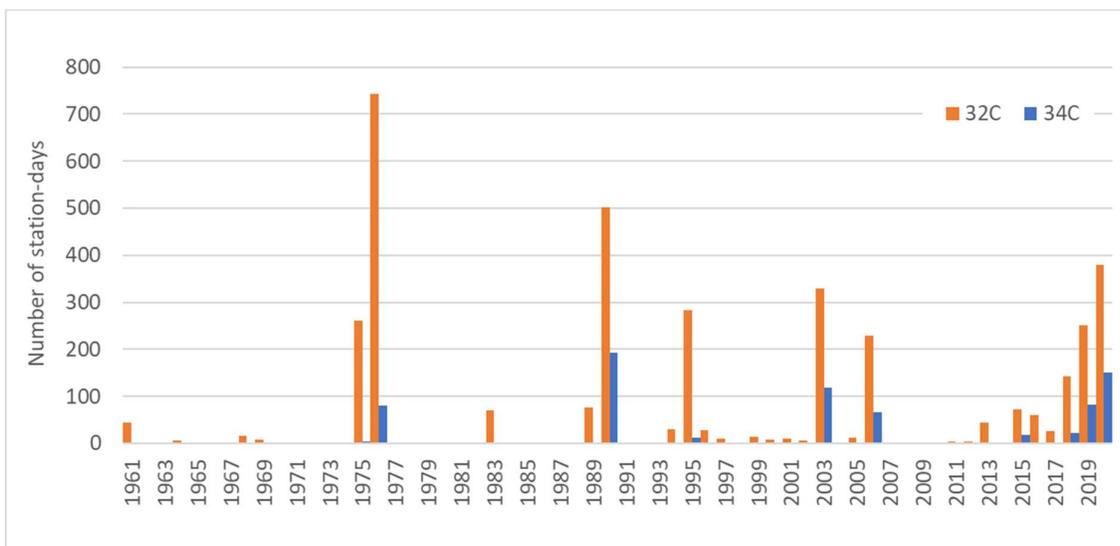


## Historical context

Heatwave comparisons are complex if they are to consider severity, duration and spatial extent. The August 2020 heatwave saw a combination of both unusually high temperatures and sustained duration for approximately a week, although the highest temperatures were mostly confined to London and the south-east. The figure below shows the duration of the heatwave based on the Met Office heatwave thresholds in the adjacent panel which requires daily maximum temperatures to exceed the given thresholds for at least three consecutive days. Heatwave conditions were met as far north as Cumbria, but were confined to England and Wales. Nevertheless, at least 20 stations across the UK recorded temperatures of 32°C or higher for six consecutive days during August 2020, the last time this occurred was from 1 to 6 July 1976. It was also the only occasion in at least the last 60 years with 34°C recorded somewhere in the UK for six consecutive days.



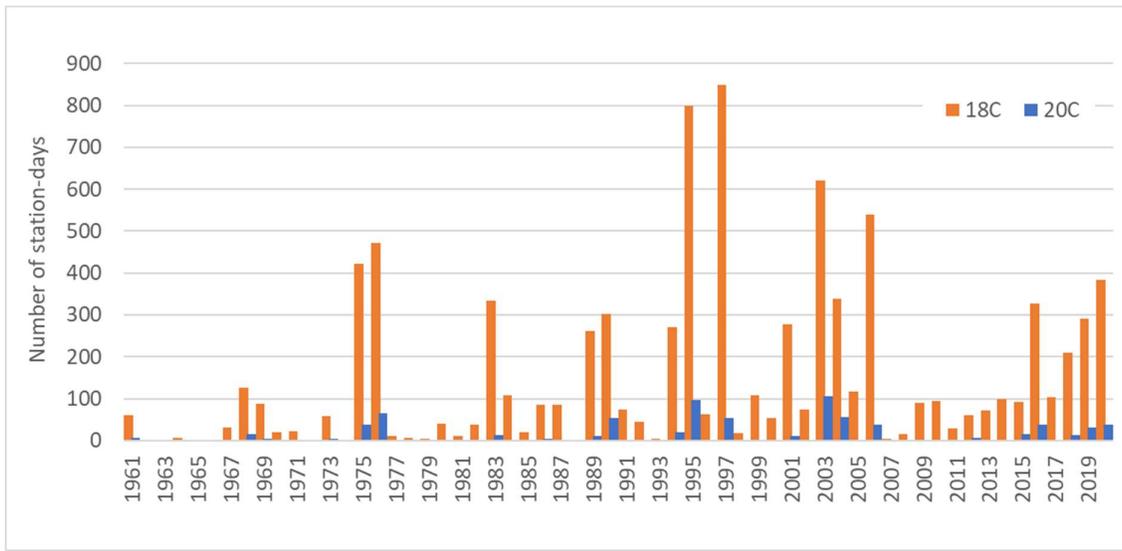
The figure below plots the number of ‘station-days’<sup>2</sup> by year across the UK with temperatures exceeding 32°C and 34°C. This gives an indication of both duration and spatial extent of hot weather through the year, although the counts may come from several events (2020 includes also 24 and 25 June and 31 July). In terms of hot days with temperatures exceeding 32°C, 2020 is one of the most notable years in the UK’s observational records, although the exceptional summer of 1976 still stands out, and so does the summer of 1990. Remarkably, 34°C has been recorded in the UK during seven out of the last ten years 2011 to 2020, compared to seven out of the previous fifty years 1961 to 2010, suggesting that temperatures of 34°C or higher occurring at some point during the summer are becoming a much less uncommon occurrence.<sup>3</sup>



<sup>2</sup> ‘Station-days’ are a sum of the number of stations each day through a period exceeding a value. For example, 100 station-days might represent 20 stations exceeding a value on 5 separate days.

<sup>3</sup> Bars of 5 station-days or less (for 34°C in 1975, 1989, 2013, 2016 and 2017) are too short to be seen at this vertical scale.

A further indication of the changing nature of the UK's climate is the number of 'tropical nights' – ie days where the daily minimum temperature has remained above 20°C. Similarly, the figure below plots the number of station-days by year across the UK with daily minimum temperatures exceeding 18°C and 20°C. This century, a daily minimum temperature of 20°C has been recorded in all but three of the last twenty years 2001 to 2020. This compares to only half of the years from 1961 to 2000 (twenty out of forty years). Year 2020 has also had one of the higher station-day counts over 18°C but there are still higher years, notably 2006, 2003, 1997, 1995, 1976 and 1975. So, while these figures do demonstrate an increase in the occurrence of heatwaves in the most recent decade, these series are still dominated by the large annual variability inherent in the UK's climate.



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