Met Office

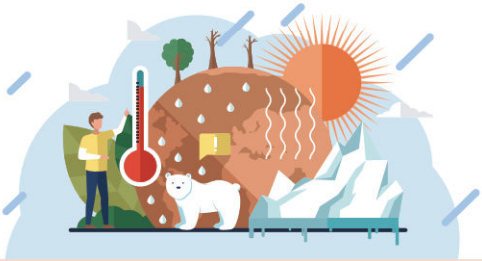
Document issued: January 2024
Next review: July 2024

Go-to guide on UK severe weather and climate change

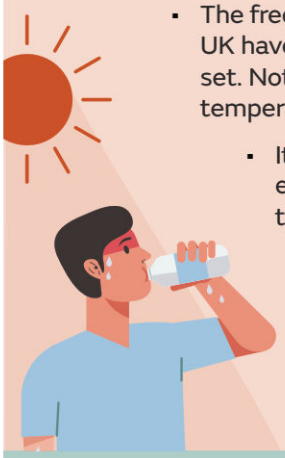
This guide provides top lines on the influence of climate change on the types of severe weather we experience in the UK. These lines are based on published academic literature and should be attributed to the Met Office. The purpose is to provide confidence when talking about severe weather in the UK in the context of our changing climate by using short, clear and authoritative lines from the Met Office.

Overview

Since the Industrial Revolution, the average temperature of the planet has risen by around 1.1°C (IPCC AR6). Using a methodology which includes projections alongside observations, recent research by the Met Office indicates the current global warming level could be as high as 1.25°C. This is a rapid change in terms of our global climate system and is already leading to changes in the extreme weather we experience on the Earth's surface, including in the UK.



Extreme Heat



- The frequency and intensity of heatwaves have increased worldwide. A number of major heatwaves in the UK have occurred in the past 5 years (2018, 2019, 2021 and 2022), each seeing new temperatures records set. Notably the England record has been set three times over, including the first official recording of temperatures exceeding 40°C.
    - It is virtually certain that human influence has increased the occurrence and intensity of extreme heat events. Numerous climate attribution studies have shown that human influence increased the chance that specific extreme heat events, such as the summer of 2018 and July 2022, would occur.
        - The headline findings from UK Climate Projections (UKCP) indicate that on average, summers will become hotter.
            - Met Office UKCP Local projections indicate that hot spells will become more frequent in future climate, particularly over the south-east of the UK. Temperatures are projected to rise in all seasons, but the heat would be most intense in summer.

Intense rainfall from thunderstorms

- Extreme sub-daily precipitation, such as that associated with thunderstorms, is projected to intensify with climate change.
- In the recent climate, trends in sub-daily rainfall are difficult to detect, due to historically sparse sub-daily observations and natural year-to-year and decade-to-decade variability.
- In the future, rainfall events exceeding 20mm/h, which can cause flash flooding, are expected to be four times as frequent by the 2070s compared to 1980s, under a high emissions scenario.
- Changes are not projected to happen gradually, but instead extreme years with lots of events could tend to cluster. When and by how much these changes are projected to occur varies in different regions of the UK.

Drought

- Whilst there have been observed changes in the drivers of drought in the UK, there is much less evidence of trends in many drought metrics at present.
- However, the impact of extreme hot periods in summer has been noticeable in recent years (2018 and 2022) and shows the impact rising temperatures can have on water supply and demand.
- Currently, there are no UK climate attribution studies available that clearly link human induced climate change with an altered risk of drought events. However, attribution studies have been carried out for extreme temperature events, which can lead to increases in evaporative demand, soil-moisture deficits and considerable impacts on water supplies.
- Most studies into our future climate point towards general increases in frequency and extended duration of meteorological drought for the UK. This general rainfall deficit can exacerbate other forms of drought such as hydrological drought or agricultural drought, but these other forms of drought can have other drivers such as groundwater storage, soil-moisture deficits and low flows.