

# UK FLOODING AND RAINFALL

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## Introduction

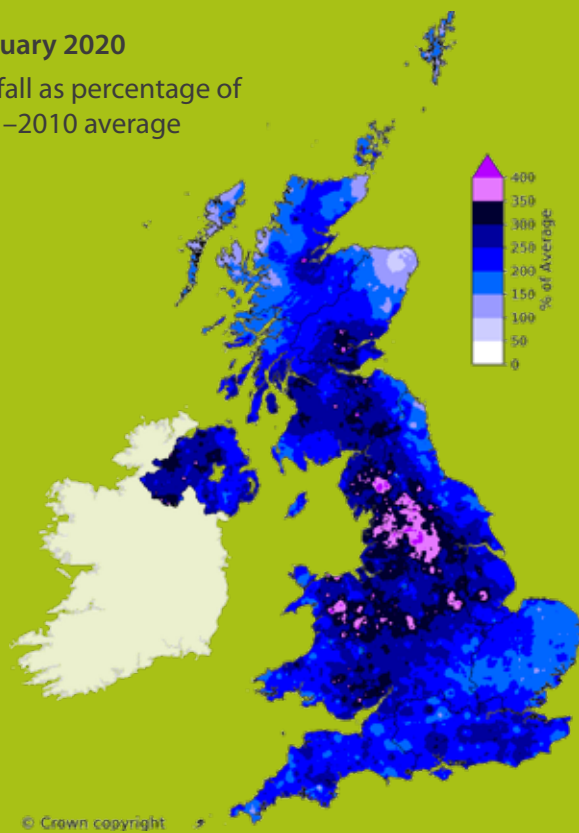
In response to this winter's severe floods there have been some alarming claims about climate change and the impact it may be having on flooding throughout Britain.

But what does the evidence actually show?

## Recent intense rainfall

February 2020

Rainfall as percentage of 1981–2010 average

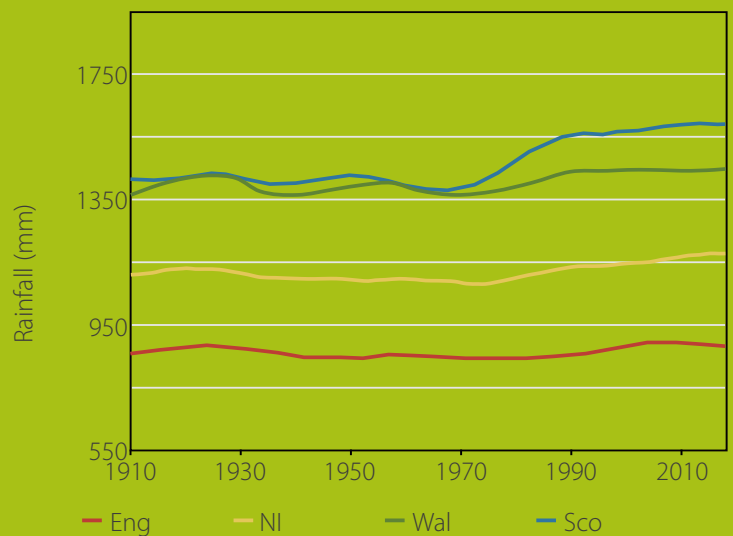


Rainfall in February 2020 was the heaviest February rainfall on record for the UK as a whole, but also notably in both England and Wales, which suffered severe floods as a result.

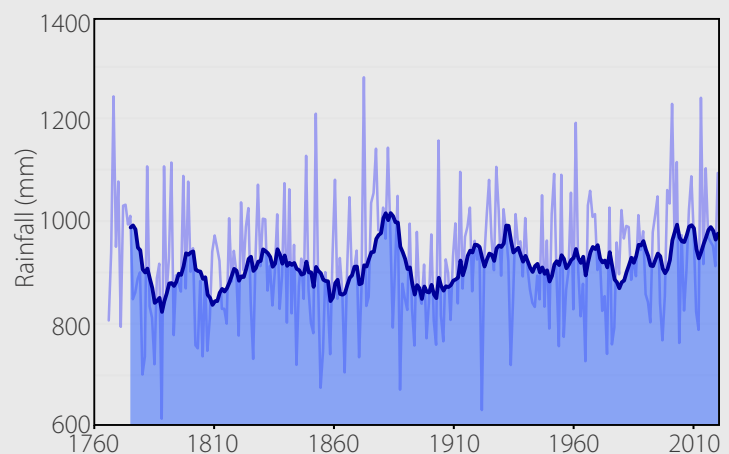
This kind of event is very unusual. However, before drawing broader lessons, it is important to review the historical data, so we can place it in the context of longer-term trends.

## Long-term precipitation trends

According to Met Office data,<sup>1</sup> England, Wales and Northern Ireland have not seen any significant increases in annual rainfall since 1910. In Scotland however, precipitation levels have risen slightly since the 1970s. There also have been seasonal variations in rainfall trends, with winters becoming wetter in recent decades and summers becoming slightly drier.



Going back further, to 1766, the England and Wales precipitation series shows that annual rainfall has been remarkably consistent since that time.<sup>2</sup>



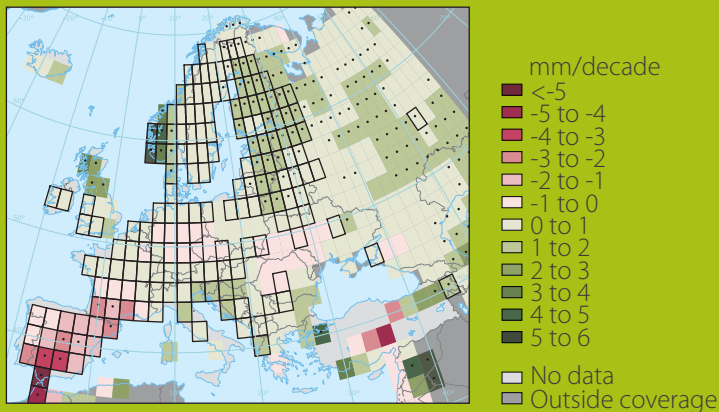
## Notes

- <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-and-regional-series>
- <https://www.metoffice.gov.uk/hadobs/hadukp/>
- <https://www.eea.europa.eu/data-and-maps/indicators/precipitation-extremes-in-europe-3/assessment-1>
- <https://rmets.onlinelibrary.wiley.com/doi/pdf/10.1002/joc.5356>
- <https://www.nature.com/articles/s41467-018-04253-1>

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Looking specifically at the prevalence of sustained heavy rainfall, of the kind that can lead to flooding, a small positive trend of 0–3 mm/decade in maximum annual consecutive five-day precipitation has been identified over recent decades.<sup>3</sup>

However, the trend was only statistically significant in parts of Scotland and during the winter. The period covered was 1960–2018.



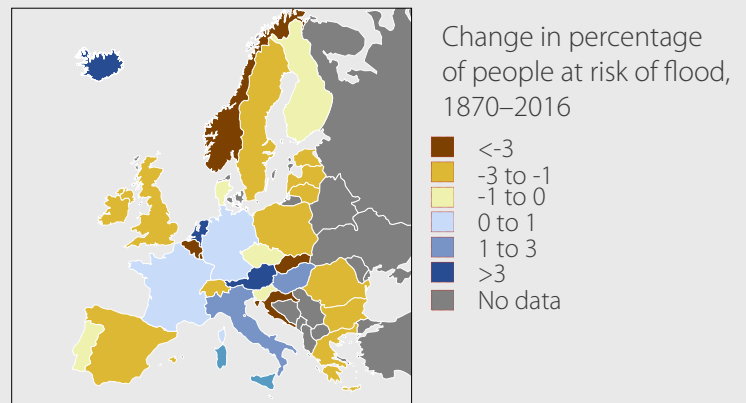
Observed trends in maximum annual five-day precipitation in winter. Boxes with a dot are statistically significant trends.

It has been suggested that these modest changes are related to anthropogenic climate change, because of increased moisture in the air owing to warmer temperatures (the Clausius–Clapeyron relation). However, trend attribution is complicated by interference from cyclical drivers of natural variability. The North Atlantic Oscillation (NAO) and El Niño Southern Oscillation (ENSO), which are recognised drivers of natural climate variability, have been found to influence extreme rainfall in the UK.<sup>4</sup>

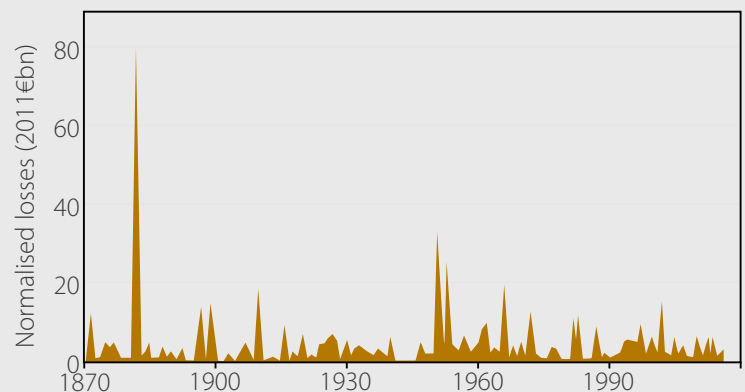
## Impact on flooding

Changes in precipitation levels do not necessarily equate to increases in the intensity, extent, or harmfulness of flooding. This depends on many factors, such as land management, investment in flood defences, population dynamics, as well as other physical processes.

A recent study showed that the percentage of the population in Europe exposed to river flooding has been falling since 1960, and that the UK specifically has seen a decline in the percentage of people at risk of flood over the period 1870–2016.<sup>5</sup>



The study also looked at financial losses caused by flooding and found that between 1870 and 2016, after adjusting for demographic and economic growth, there were no significant trends in flood losses, both on European scale, and for individual countries. However, the biggest shift in financial losses occurs for the period between 1950 and 2016 where the negative trend (–2.6% per year) is statistically significant.



## Conclusion

There appears to have been a modest increase in the frequency of sustained heavy rainfall, but this is only apparent in the winter, and it is largely centred on Scotland. Over most of the UK's land area there appear to be no significant trends.

The share of the UK population exposed to flooding is not increasing, and if anything, economic losses from flooding are becoming less severe rather than more so. With appropriate land management and flood defences, there is every reason to expect and demand that flood risk can be contained and managed effectively.