

# New scientific review investigates potential influences on recent UK winter floods

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Flooding in Key Haven caused by hurricane Wilma on 10/24/2005. Credit: Marc Averette/Wikipedia

A comprehensive review of all potential factors behind the 2013/2014 UK winter floods is published today in the journal *Nature Climate Change*. The paper does not definitively answer whether human activity played a role in the magnitude of the winter flood events. It does,

though, examine how factors such as the state of the global oceans may have interacted with wind patterns and subsequent high-level atmospheric features.

The review was led by scientists at the Centre for Ecology & Hydrology, in collaboration with the Met Office and the Universities of Oxford, Exeter and Reading.

Lead author, Dr Chris Huntingford from the Centre for Ecology & Hydrology said, "The challenge is to understand in full the subtle balances between the competing influences on UK winter weather, whether they are from the oceans, the amount of polar sea ice, or the atmospheric state itself. Highly refined modelling techniques are now emerging that can tease apart often large natural fluctuations in these drivers from any effects of increasing atmospheric carbon dioxide concentrations."

Many possible influences on last winter's UK rainfall exhibit large natural fluctuations. The study builds on existing research to make qualitative statements as to if humans have adjusted further these effects. In some instances, such as the known decreases in Arctic sea-ice cover, this is believed not to have been a factor in the particular 2013/14 winter rainfall characteristics.

Dr Chris Huntingford added, "The continual advance in scientific understanding of how the climate system operates implies that we will soon be able to assess better if there is any likelihood of the rainfall patterns of last winter occurring with altered frequency. Capitalising also on the UK's extensive datasets of meteorological and river measurements, in tandem with advanced hydrological models, this understanding can be translated to any expected future flood risk. This review provides a roadmap towards that aim."

Co-author Terry Marsh from the Centre for Ecology & Hydrology said, "The winter flooding was exceptional for its geographical extent and, particularly, its longevity – the duration of the floodplain inundations created rarely experienced disruption for the affected communities, transport and agriculture."

Co-author Dr Peter Stott of the Met Office said, "Last winter was the wettest winter in England and Wales since such measurements began in 1766. Detailed climate monitoring carried out at the National Climate Information Centre at the Met Office shows that large parts of southern England and central Scotland had more than 170% of the average winter rainfall for 1981-2010. This new review shows how a complex chain of events involving the Pacific Ocean and an unusual jet stream led up to this unprecedented winter. More work is needed to robustly detect any changes in storminess in the UK and quantify how the risk of such extreme winters varies with climate variability and change. However climate models of sufficient resolution to capture storms and their associated rainfall are now becoming available and need to be deployed as soon as possible to provide a solid evidence base for future investments in flood and coastal defences."

Co-author Dr Jason Lowe of the Met Office said, "We saw a number of examples last [winter](#) that demonstrated the vulnerability of coastal regions to flooding from surge events. At present our best evidence points towards future increases in coastal flooding being driven by global sea-level rise. We still need to better understand if changes in atmospheric storminess can also play a part."

**More information:** Chris Huntingford, Terry Marsh, Adam A. Scaife, Elizabeth J. Kendon, Jamie Hannaford, Alison L. Kay, Mike Lockwood, Christel Prudhomme, Nick S. Reynard, Simon Parry, Jason A. Lowe, James A. Screen, Helen C. Ward, Malcolm Roberts, Peter A. Stott, Vicky A. Bell, Mark Bailey, Alan Jenkins, Tim Legg, Friederike E. L.

Otto, Neil Massey, Nathalie Schaller, Julia Slingo and Myles R. Allen (2014) Potential influences in the United Kingdom's floods of winter 2013/14. *Nature Climate Change*, [DOI: 10.1038/NCLIMATE2314](https://doi.org/10.1038/NCLIMATE2314)

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