



Flooding in York. "A warmer world means more intense rainfall."

Is climate change causing more UK floods?

Nick Reynard, the Centre for Ecology & Hydrology's (CEH) science area lead for natural hazards, reports.

Recently, the UK has experienced some particularly extreme flooding. The 2007 inland flooding affected over 55,000 homes and businesses and was the worst we'd seen in 60 years. The winter of 2013-14 was the wettest winter on record for the UK, and between November 2015 and January 2016 we had the most ever rain for that period, causing some of the most extreme and severe floods in 100 years. December 2015 was the wettest and, on average, the warmest on record in the UK, in records going back to 1910.

The UK has become significantly warmer over the last few decades and we know that this is because of emissions from human activities. We also know that a warmer world means more intense rainfall because, put simply, a warmer atmosphere can hold more moisture.

But from there it gets complicated. Increases in the amount of rainfall and its intensity do not always lead to an equivalent increase in flooding. That makes this question extremely difficult to answer because looking back over decades' worth of data on rainfall and river flow, we can't neatly correlate increased rainfall with increased flooding. One reason for that is one area may be able to cope better with rainfall increases than another: perhaps because of its soil, its steepness or its size.

Our data does show that, aside from climate change, the UK has always experienced clusters of flooding events in certain periods. But it also shows that warmer temperatures might be making these periods more likely and more severe.

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We undertook extensive work with colleagues at Oxford University to see whether we could detect man-made climate change behind recent events. We looked at the 2000 and 2014 floods in several river catchments across Britain. For most of these we could detect that climate change had made this flooding more likely. Although it was clear in most cases, in some areas it wasn't. So we plan to look at other recent flood events to find out why certain parts of a river respond differently from others.

At CEH we're developing new ways of simulating how a complex range of factors influence flooding. We have over 40 years' experience in developing a range of data products, tools and computer models for estimating flood frequency across river networks. Our solutions already underpin effective flood protection of houses, businesses and critical infrastructure such as transport networks, bridges, energy and water supply systems. As both climate and hydrological science evolves over the next few years, perhaps we will be able to provide a more definitive answer on this soon.

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Attribution of Autumn/Winter 2000 flood risk in England to anthropogenic climate change: A catchment-based study.

DOI: 10.1016/j.jhydrol.2011.06.006

Human influence on climate in the 2014 Southern England winter floods and their impacts

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