

Climate change increased the odds of autumn 2000 UK floods

Natural Environment Research Council

21 February 2011, by Tom Marshall

The odds of the extreme flooding that hit Britain in autumn 2000 were probably about doubled by greenhouse gases emitted by human activities, according to a new study.



The paper, published in *Nature*, involved running a widely-used Met Office climate model thousands of times with slightly different starting conditions, and in finer-than-normal detail, simulating both the actual weather patterns seen over 2000 and those the country would have experienced at that time if atmospheric carbon dioxide had stayed at 1900 levels.

We can never know for sure whether climate change caused any particular weather, but these results show it substantially increased the risk that the autumn 2000 floods – which damaged almost 10,000 properties and led to insured losses worth an estimated £1.3 billion – would happen.

In nine out of ten comparisons between the real climate and the hypothetical emissions-free climate, the presence of twentieth-century greenhouse gas emissions increased the risk of floods in England and Wales by 20 per cent or more. And in two thirds of cases, the increase was 90 per cent or more.

Until now scientists have only been able to suggest in general terms that climate change will bring more episodes of extreme weather, simply because a warmer atmosphere can hold more water. This is the first study to look in detail at how much greenhouse gas emissions increased the risk of flooding over a particular period.

'It's like rolling a die,' explains Dr Pardeep Pall, an atmospheric physicist at the

Climate change increased the odds of autumn 2000 UK floods

Published on Chem.Info (<http://www.chem.info>)

University of Oxford and the paper's lead author. 'You might roll it once and get a six, but it's very difficult to say why this happened, or how likely it was. To start building up a picture of how probable a particular outcome is, you need to roll the dice again and again, and that's what we are effectively doing by running the climate model thousands of times.'

Comparing the range of results from the climate model representing the real world with those from the model they'd tweaked to represent the world with lower greenhouse gas levels allowed the team to understand the effect of each scenario on weather, and in particular on the general likelihood of rainfall.

Loading the dice with greenhouse gases

'This was like comparing the results of lots of rolls of a loaded dice with those of an unloaded dice,' Pall explains. 'First we did the experiment with the "unloaded" climate, and then we went back and did it with the climate "loaded" with greenhouse gas emissions.'

The resulting range of rainfall values was then fed into a model from Risk Management Solutions Ltd, a company that develops risk models for the insurance industry. This model simulates how much water drains off the land and into watercourses, in order to estimate of the risk of flooding.

The team drew on computing power supplied by volunteers all over the world, using the infrastructure of the *climateprediction.net* project, which seeks to use so-called 'distributed computing' to improve predictions of the future climate. This meant they didn't need to pay large amounts for time on a supercomputer.

Pall says the methods his project developed could be applied much more widely, and that he would be keen to see other teams try the methodology using different climate and flooding models, and to look at different weather episodes.

Climateprediction.net has now launched a follow-up project called *weatherathome.net* that will look at trends in the weather over many decades, not just the year 2000, and will focus on particular regions including Europe, northwestern America and southern Africa.

Climate models are only now starting to simulate the atmosphere at fine enough resolutions to allow this kind of regional simulation, and to let researchers link the results with other models to simulate the impact of weather, Pall explains.

One of his co-authors, Dr Peter Stott of the Met Office, is now looking at the possibility of running this kind of 'climate attribution' analysis constantly, like a weather forecast. This would give researchers a sense of how climate change is affecting the weather in near real time.

While working on the project, Pall was supported by a NERC CASE studentship in partnership with Risk Management Solutions Ltd.

Climate change increased the odds of autumn 2000 UK floods

Published on Chem.Info (<http://www.chem.info>)

[SOURCE](#) [1]

Source URL (retrieved on 12/18/2014 - 7:34pm):

<http://www.chem.info/news/2011/02/climate-change-increased-odds-autumn-2000-uk-floods>

Links:

[1] <http://planetearth.nerc.ac.uk/news/story.aspx?id=922>