UK: Global warming to bring heavier summer downpours

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Global warming could cause extreme summer downpours to become several times more frequent in the UK by 2100, a new study suggests.

Its authors say this will likely lead to an increased risk of flash flooding, similar to the Boscastle floods of 2004 and the 'Toon Flood' in Newcastle in 2012.

While winter floods tend to be caused by prolonged and persistent spells of rainfall, summer floods tend to be 'flashier', caused by shorter, sharper downpours.

Scientists have already predicted wetter winters into the future, with UK summers expected to become drier overall. But as the atmosphere warms, it will be able to hold more moisture, potentially leading to more

intense summer bursts of rainfall.

Until now, climate models have lacked the detail to reliably predict changes in intense rainfall. To overcome this hurdle, the scientists ran computer simulations at eight times the resolution of existing models - similar to those used to produce the 5-day weather forecast.

It required nine months of processing power on the Met Office supercomputer, one of the most powerful in the world, to run the simulations for just the southern half of the UK.
'The very high resolution model used in this study allows us to examine these changes for the first time,' says Dr Lizzie Kendon from the UK Met Office, who led the study.

'It shows heavier summer downpours in the future, with almost five times more events exceeding 28 millimetres in one hour in the future than in the current climate - changes we might expect theoretically as the world warms.'

The simulations were run for two 13-year periods, one based on the current climate, and the other based on the expected climate around 2100.

Researchers say the results, published in the journal Nature Climate Change, are a first step towards building a more complete picture of how UK rainfall may change as the climate warms. They say the findings will need to be verified by other similarly detailed simulations elsewhere.

'The next steps are to see if these changes are consistent with observed trends in summer rainfall extremes and changes projected by climate models in other parts of the world,' says Prof Hayley Fowler, from Newcastle University, one of the study's co-authors.

'The first stage of this will be to run the same high-resolution simulation over the northern half of the UK.'

The study forms part of CONVEX, a three-and-a-half-year project funded by NERC and the Met Office to improve understanding of the causes and characteristics of extreme rainfall.

More information: Kendon EJ, Roberts NM, Fowler HJ, Roberts MJ, Chan SC, Senior CA, 'Heavier Summer downpours with climate change revealed by weather forecast resolution model', *Nature Climate Change*, 2014. DOI: 10.1038/nclimate2258