Climate change increases extreme rainfall and the chance of floods

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Climate experts warn that, without urgent action, climate change will continue to cause an increase in the intensity of extreme rainfall that can lead to severe flooding.

An international research team have concluded that increases in extreme

rainfall and associated flooding are projected to continue as global temperatures continue to rise. Efforts to limit warming to +1.5C will help limit changes in extreme rainfall, though some societal adaptations will still be required.

Sharing their findings in a new *ScienceBrief Review*, published today (7 June), scientists from Newcastle University, the University of East Anglia (UEA), the Tyndall Centre for Climate Change Research and Instituto Nacional de Pesquisas Espaciais (INPE), São Paulo, Brazil, analysed over 170 peer-reviewed scientific papers. They found that in small and in urban catchments in many parts of the world extreme rainfall has increased the chance of floods occurring and their magnitude, severely impacting local populations and infrastructure. In larger, rural catchments floods depend on many different factors and flooding is less directly linked with extreme rainfall events.

Their analysis also suggests that increases in daily extreme rainfall rates have been observed globally and on continental scales through the 20th and early 21st centuries, and that global warming is driving increases in short-duration rainfall extremes in some regions. The study shows that human activity has an impact on increases in extreme daily rainfall, increasing the likelihood of some significant events.

The findings show that the risk of flash flooding on urban areas has likely increased in recent decades, due to the expanding impermeable landscape increasing surface runoff, and increased extreme rainfall, while increases are projected to continue.

Study lead, Dr. Stephen Blenkinsop, of Newcastle University's School of Engineering, said: "Global warming means the atmosphere can hold more moisture and could also change the way storms behave. More intense rainfall extremes coupled with changes in other factors could increase the frequency and severity of flooding in many regions.

"Even if action is taken to limit the extent of global warming we will need to improve our understanding of how extreme rainfall and flooding will change in the future in order to adapt our cities and other communities to more frequent or more extreme events."

Adam Smith, from School of Environmental Sciences, University of East Anglia, added: "this is an active area of research and our review highlights that the science is becoming increasingly clear on how climate change influences extreme rainfall and how that combines with other factors to increase the chance of floods in many places."

More information: The *ScienceBrief Review* 'Climate change increases extreme rainfall and the chance of floods' is published today as part of a collection on Critical Issues in Climate Change Science, prepared for the COP26 climate conference to be held in Glasgow (2021). DOI: 10.5281/zenodo.4779119

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