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Increase in the frequency of heavy rainfall events over the UK in the light of climate change.

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We investigate the attribution of the flooding in Northern England that saw at least 500 homes flooded and over 1000 properties evacuated in flooded areas in 2019. This occurred during the wettest Autumn on record in some areas and also contained some very high daily rainfall totals. In the light of climate change, it is expected that intense rainfall events are to become more intense as a result of increased global average temperatures and the Clausius-Clapeyron relationship, but here we investigate quantitatively how much climate change has increased the risk of such an event to date.

We use results from the 2.2km convective permitting high resolution local UK Climate Projections (UKCP) and observations to show that more intense rainfall events may already be occurring in Autumn in the UK. This work shows using this high resolution UKCP data that a heavy rainfall event exceeding 50mm in one day in Autumn was 33-40% more likely to occur in 2019 than 1985. Further work that looks at the HadGEM3-A simulations shows that these heavy rainfall days are more likely to occur in a climate impacted by human activity than one with just natural climate forcings.