



Assessing our current risk to extreme weather and climate events

A research technique using seasonal and decadal simulations has been shown to deliver useful results on estimation of extreme climate events not only for China but for many regions around the world. Extreme weather and climate events are, by definition, rare, which means we have relatively few observations, especially in light of our changing climate. This means it is difficult to estimate the current chances of extreme weather and climate events.

To overcome this, the CSSP China project pioneered a technique using the Met Office supercomputer to generate thousands of possible weather scenarios to create a large number of virtual observations, one hundred times larger than current climate observations. The new method for estimating Unprecedented Simulated Extremes using Ensembles (UNSEEN) emphasises the role of internal climate variability in generating climate extremes.

This is the first time that our model simulations have been used in this way – and the results are striking. For example, it reveals there is currently about a 10% chance of an unprecedented heat wave in Southeast China each summer. Applying UNSEEN to food security shows that the chance of the maize crop in China and the United States failing simultaneously as a result of extreme heat and dry conditions is higher than previously thought, which would have a major impact on the global food market. This method is versatile and can be used to understand present risks from extreme weather and climate in any region around the world.

UNSEEN also provided evidence in support of the UK's National Flood Resilience Review (NFRR) which was set up in response to the two wettest winters on record in 2013/14 and 2015/16. UNSEEN showed there is currently a 7% risk of record monthly rainfall in south-east England in any given winter. When other regions of England and Wales are also considered, this increases to a 34% chance per year.