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UK Climate Projections 2018 (UKCP18): progress towards more information on future weather

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UK Climate Projections 2018 (UKCP18) included land and marine projections and were published in 2018 to replace UKCP09. The land projections had three components, and all were designed to provide more information on future weather compared to UKCP09. The first component updated the UKCP09 probabilistic projections by including newer CMIP5 data and focussing on seasonal means from individual years rather than 30-year averages. The probabilistic projections represent the wider uncertainty. The second two components (global and regional projections) both had the aim of providing plausible examples of future climate, but at different resolutions.

The global projections were a combination of 13 CMIP5 models and a 15-member perturbed parameter ensemble (PPE) of coupled simulations for 1900-2100 using CMIP5 RCP8.5 from 2005 onwards. The PPE was provided at 60km atmosphere, quarter degree ocean and the large-scale conditions from twelve of the members were used to drive the regional model at both 12km and 2.2km resolution. These plausible examples are more useful for providing information about weather in a future climate to support a storyline approach for decision making.

The talk will present examples of new ways to use UKCP18 compared to UKCP09. We will show how the global projections can be used to understand that the recent record winter daily maximum temperature in the UK in 2019 had a large contribution from internal variability and what this means for breaking the record in a warming climate. We also use an example from China to demonstrate one way to exploit information at different time scales, looking at how a circulation index, which is predictable and related to tropical cyclone landfall, changes in a future climate.

Finally, we show that while the enhanced resolution of the global and regional projections has improved our capability to provide climate information linked to the better representation of circulation, they lack diversity in some of the key drivers of future climate. Therefore, a key way forward will be to find an appropriate balance between the need for better diversity (e.g. multiple ensembles such as CMIP or PPEs) and the need for an appropriate resolution to retain this new capability.