

UK Climate Projections Project

Newsletter - July 2017

Welcome to the latest newsletter from the UKCP18 Joint Project Team. The format of the newsletter has been updated to include regular features focusing on the work of individual scientists within the project and a new user perspective in each edition. We also feature responses to some of your questions, that are intended to clarify the expected outputs from the project. The newsletter will continue to bring you all the latest project news. In this edition:

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This is your newsletter and we'd really welcome your feedback

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Editorial from Ian Boyd Chief Scientific Adviser at the Department of Environment, Food and Rural Affairs



Once upon a time the question was is climate change real? Now the question is what do we do about it?

Science has to make a shift towards providing practical tools to help us take difficult decisions on how to avoid the dangerous impacts of climate change and to build resilience to the changes that are already inevitable. This is why the UKCP18 project team has invested a significant amount of effort in listening to users of climate information to understand what practical tools and advice they are going to need to support adaptation research and planning in the years ahead.

I would like to take this opportunity to personally thank the membership of our two user groups who have travelled the length and breadth of the UK to meet us and help produce a better set of projections. You are an invaluable part of the UKCP18 project and while we may not be able to satisfy everything you want – after all, you are a demanding lot – we know that the outputs will be better for your involvement. For example we now know what kind of climate variables you use and the kinds of guidance and support you need in applying the UKCP18 data.

We are now in an exciting phase of the project: building how we deliver the new projections. We'll be looking to the user groups to review and test the project outputs as they are developed, and a small number of demonstration projects are underway to show how they can be used in practice. We will continue to seek your advice to make sure UKCP18 is not only scientifically sound, but useful and usable.

Meet the scientist

David Sexton (Met Office), Manager of the global realisations component of the land projections

Plausible and diverse global climate storylines

My team is making up to 20 simulations using a computer model. This is the Met Office's latest model and simulates the entire globe, including the atmosphere, the oceans, sea ice, and the surface of the land. The model has been developed to provide our best representation to date of the climate and weather extremes. How the real climate evolves in coming decades will depend on the emissions of greenhouse gases and how the climate system responds to these gases, as well as variations that occur naturally.

The climate response to greenhouse gases is uncertain, and our simulations explore this uncertainty by varying numbers, called parameters, in the climate model that control important atmospheric and land surface processes.



Each variant of the model is generated by altering the values of 47 key parameters within plausible ranges defined by the expert model developers themselves. Not all parameter combinations allow the model to reproduce recent climates that are consistent with observations of the real world but we have worked to find 20 very different model variants that achieve this. These simulations will form our best estimate of the future range of changes in the worldwide patterns of temperature, moisture and atmospheric circulation that in turn alter the frequency and intensity of the extreme hot, cold, wet or dry seasons that impact society. Our global model simulations will also be used to drive a model of the UK with more spatial detail.

The global simulations will run from the start of the 20th Century up to present day and then continue towards the end of the 21st Century, covering a world that follows a scenario with high greenhouse gas emissions, which users tell us is useful for resilience testing of future plans and adaptations. The model simulations are running at a year each day. The most exciting part of this project for me is to watch how the projections develop on a daily basis, giving us a real sense of the relative impacts of natural variations and manmade climate change.

Demonstration projects

Back in February the project User Groups were asked to consider whether specific use cases could be developed with the aim of demonstrating to the user community the application of UKCP18 outputs to climate risk assessment. The experience of the demonstration projects will also be used to inform the development of user guidance material and identify products, in addition to climate data, that may be required to support decision-making.

Six projects have been selected and small groups of users are now taking these ideas forward with the aim of reporting back during the autumn.

1. Yorkshire Climate Change Risk Assessment – co-production of climate change risk analyses in relation to three themes most relevant to project partners: water resource management, future flood risk assessment and natural flood management. Led by Suraje Dessai, University of Leeds
2. Application of UKCP18 outputs for water resources planning and drought risk assessment for the UK water industry. Led by Chris Counsell, HR Wallingford
3. Use of high resolution climate projections for sub-daily rainfall within national scale pluvial flood hazard maps. Led by Fiona McLay, SEPA
4. Risk assessment of tree species suitability to climate change using Ecological Site Classification. Led by Michal Petr, Forest Research
5. Effect of UKCP18 data on models of climate and weather information for the analysis of building thermal and energy performance at design stage. Led by Anastasia Mylona, CIBSE
6. Coastal Sensitivity to Climate Change Projections, looking at coastal erosion. Led by Mike Walkden, WSP Parsons Brinckerhoff

Look out for more information on each of the demonstration projects in future newsletters.

The user view



Using UKCP09 to integrate climate change across a range of land management interests

Dr Olly Watts, Senior Sustainable Development Policy Officer, RSPB, offers his perspective on using UK climate projections.

Nature – the animals and plants which provide the setting and powerhouse for our own lives - is beset by a range of impacts from climate change. A climate signal has been widespread across nature in the UK for some 30 years now, and I work to develop the strategies and actions that will enable our natural world to cope with climate change.

The RSPB's scientists and ecologists use the UKCP09 projections in computer modelling for both individual species and our nature reserves. Alongside this, I'm interested in qualitative approaches for assessing climate change impacts for a much wider range of audiences.

One such audience is the partnerships that come together to improve conditions for nature across whole landscapes – the RSPB's Futurescapes programme. Our workshops bring people together, with interested parties as diverse as farmers, foresters, water and coastal managers, the Ministry of Defence, representatives from heritage, tourist and recreational interests from each Futurescape project to work alongside nature conservation staff. They spend the day learning about the future climate of the area, assessing direct and indirect impacts and discussing adaptation measures for the priority impacts they've identified.

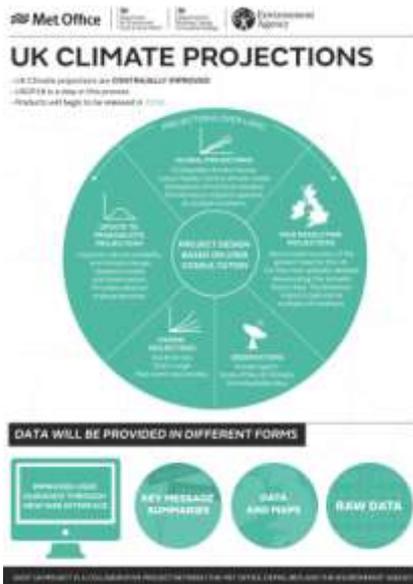
Gaining an understanding about the local future climate is crucial to gaining a successful outcome from these workshops. We achieve this by framing climate change within the likely range of future conditions, using the 10% and 90% probability levels for changes in temperature and precipitation from the UKCP09 projections. We also frame the future in terms of 2°C and 4°C average global temperature increase. The 2°C world provides a pertinent planning timescale, 20 to 25 years, and is the main focus for the workshop. The 4°C world indicates a more distant future state that can help to inform relevant action now and highlight the need to avoid this world.

Two interesting things have emerged from these workshops. First, people are often shocked when they discover the extent to which climate is expected to change in their area, and in a timeframe that's highly relevant to their lives. And second, how difficult most people find reading and interpreting the climate projection maps that many of us use as second nature.

The discussions that follow from this qualitative use of the UKCP09 projections, guided by a clear sequence of logical questions, have been universally positive, without exception. It's been encouraging to see how the different interests in each landscape area seek ways to adapt together, from sharing a common understanding of the climate problem to gaining insights into its impacts on the various aspects that combine to form a living, working landscape. As such, our climate workshops have helped build the landscape partnership itself and produce clear adaptation strategies for incorporating into the management plans of the RSPB's Futurescapes.

So what's useful from this for UKCP18? It's helped me become fervently aware that, alongside the requirements of the scientific community, we need to present climate change in the UK in ways that can be easily picked up in everyday life. There's a significant and widespread knowledge gap about climate change, across professional, business and community audiences, which we must fix. Achieving this will contribute to much more effective adaptation, taken in advance of serious impacts rather than as a response to them. And we'll also help to win support for the massive shift in our energy generation and use that's required to contain climate change to levels that will allow healthy natural environments and human societies to persist.

Project News



UKCP18 Infographics and technical Project Overview

The Joint Project team has been working with Users to develop some high level communications material that can be used to bring user communities up to date with the main themes and outputs of the project.

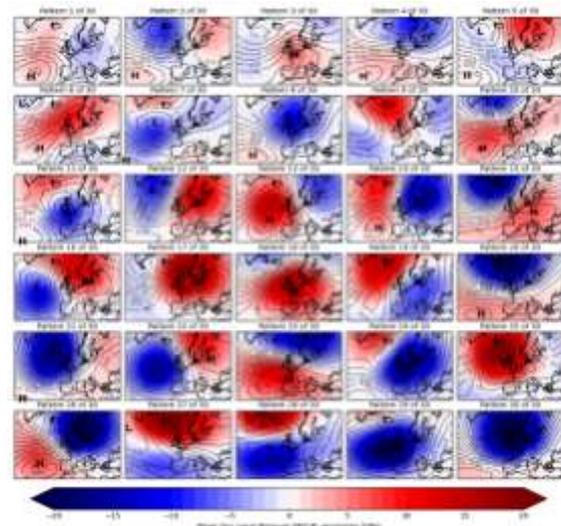
These can be accessed through the link below.



User Groups

The Non-Government and Government User Groups have both met twice since the last issue of the newsletter. Items that have been discussed in these workshops have included the high resolution projections based on convection-permitting climate modelling, the marine projections, derived products, probabilistic projections and options for visualising outputs from the modelling that bridge the gap between model parameters and customer impacts (for example, weather patterns as shown here).

The University of Birmingham hosted the Non-Government User Group in February and in May the group visited Scotland with a meeting at the Royal Botanic Gardens Edinburgh. The Project Team took the opportunity to lead an additional session to raise awareness of UKCP18 amongst a wider group of Scottish stakeholders, with help from Ragne Low (ClimateXChange) and Joseph Hagg (Adaptation Scotland). As well as an excellent turnout for the event and some challenging questions from the floor, we were



The 30 weather patterns used to categorise UK weather, based on the mean sea level pressure pattern. These patterns can be used to indicate average conditions, for example, pattern 18 shows high pressure located over the UK which would indicate broadly settled conditions, whilst pattern 30 shows low pressure over the UK, indicating very unsettled conditions.

bleamed with fantastic weather that followed on from a record-breaking dry April in the Scottish capital.



The next meeting of the Non-Government User Group takes place at the Met Office in Exeter on 31 October 2017. The next Government User Group will also be scheduled for the autumn.

Thematic workshop



A series of webinars have been held over the past few months to bring together subject-matter specialists to discuss the outputs of UKCP18 in relation to their fields. The first two of these sessions focused on the marine environment and the health sector. The latter of these benefitted from input from two users within the sector, Dr Clive Heaviside of Public Health England and Prof James Goodwin of AgeUK, who provided their perspectives on the use of the climate information. Following on from the User Groups, a webinar on convection-permitting climate modelling provided the opportunity for a wider group of users to engage in discussion around the high resolution component on the projections.

Your questions

In each newsletter we will aim to answer questions that have been raised by the Project User Groups.

Q: Will baseline data be available?

A: Observed and model baselines will be available for all use (research and commercial) under the licence of the project.

Q: How much of the former Weather Generator products will be available?

A: Whilst UKCP18 will continue to present future climate variables as probability distributions (pdfs) to express the uncertainty that is inherent in modelling the climate system, there will no longer be a Weather Generator as such. The high resolution

projections from the convection-permitting climate modelling will help inform the sort of hourly-scale requirement that was previously met by the Weather Generator and ensure that users understand the range of futures that are possible. The global projections will provide daily data for a 20-member ensemble.

Q: Will the science reporting indicate the skill of the model and say something about confidence in the projections? Will information on model strengths and weaknesses be provided?

A: Yes. We will be reporting not only the future changes in climate but also how well the new global and regional climate models perform against historical observations. The results of this model evaluation will be available through the suite of UKCP18 products, i.e. guidance, peer-reviewed science reports and peer-reviewed journal papers.

Q: Will data released be bias corrected?

A: Bias correction is undertaken by lots of users in different ways for different purposes, for example, to provide future flows predictions in hydrology. Large numbers of assumptions are made and many users will wish to undertake their own bias correction, so our plans are to provide worked examples to be made available through the website.



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