



The UKCP18 project builds upon UKCP09 current set of projections to provide the most up-to-date assessment of how the climate of the UK may change over the 21st Century.

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Hadley Centre

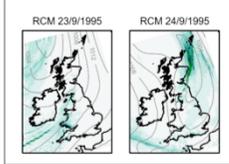
## Philosophy of UKCP18



The best new science



Developed with users



From climate trends to future weather


Working together on  
UK Climate Projections

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### The best new science

The projections are based on the latest developments in climate science and were subject to an independent peer review, from the commencement of the project, to assess the science and methods that underpin UKCP18

### Developed with users

Building on the learning from UKCP09, user groups for government and wider society, along with the peer review panel, have helped to shape UKCP18, co-designing tools and capabilities to better meet user needs. For example, (i) changing the format of the data that is provided to the widely - used Ordnance Survey's coordinate system, (ii) an enhanced user interface that uses the latest web design and (iii) providing datasets that represent UK climate in scenarios of 2 °C and 4 °C of global warming

### From climate trends to future weather

- The installation of the Met Office's new supercomputer has enabled a credible range of climate projections

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Headline result:  
“a greater chance of warmer, wetter winters and hotter, drier summers”

Department for Environment, Food & Rural Affairs  
Department for Business, Energy & Industrial Strategy  
Met Office Hadley Centre  
Environment Agency

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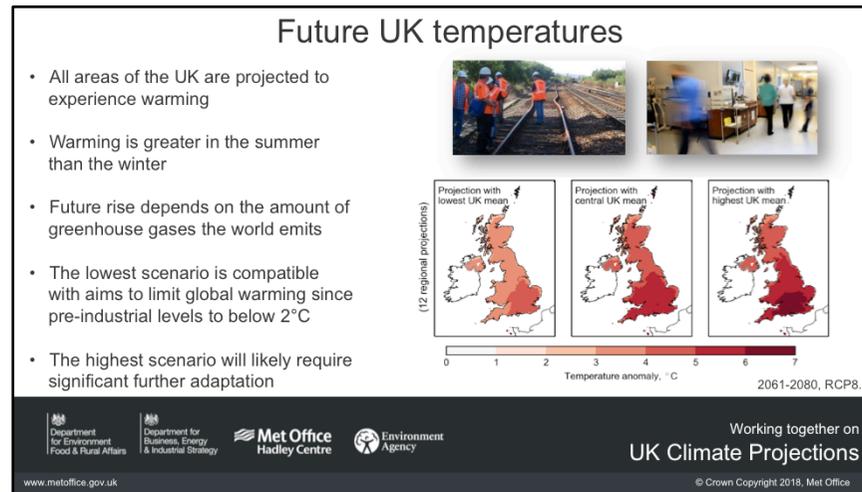
**UKCP18 moves beyond climate trends – building upon the conclusions of UKCP09, these new results translate global climate change statistics into changing seasonal weather characteristics for the UK**

### Observations

- In the most recent State of the UK Climate 2017 report, trends show that the UK climate is continuing to warm and that sea levels continue to rise.
- The longest running instrumental record of temperature in the world, the Central England Temperature dataset, shows that the most recent decade (2008-2017) was around 1 °C warmer than the pre-industrial period (1850-1900). This temperature rise in the UK is consistent with warming that has been observed at a global scale, of around 1 °C since pre-industrial.

### Marine Projections

- A new set of marine projections show that sea level around the UK will continue to rise to 2100 under all emission pathways.

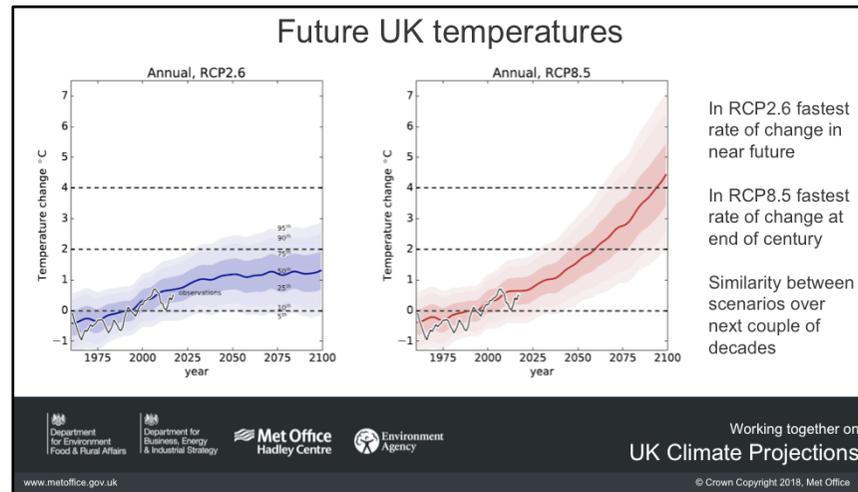


General climate change trends projected over UK land for the 21st century are broadly consistent with earlier projections (UKCP09) showing an increased chance of milder, wetter winters and hotter, drier summers along with an increase in the frequency and intensity of extremes.

By the end of the 21st century, all areas of the UK are projected to be warmer, more so in summer than in winter.

The figure shows regional projections for lowest, central and highest UK mean for the high emissions scenario, RCP8.5, for 2061-2080. They retain spatial coherence and the spatial distribution of the warming for different possible futures, showing that southern England warms more than northern regions of the UK.

When we compare the full range of possible outcomes from UKCP09 and UKCP18 there is a great deal of overlap, although users may want to investigate differences, for example, in the extreme ends of the ranges.

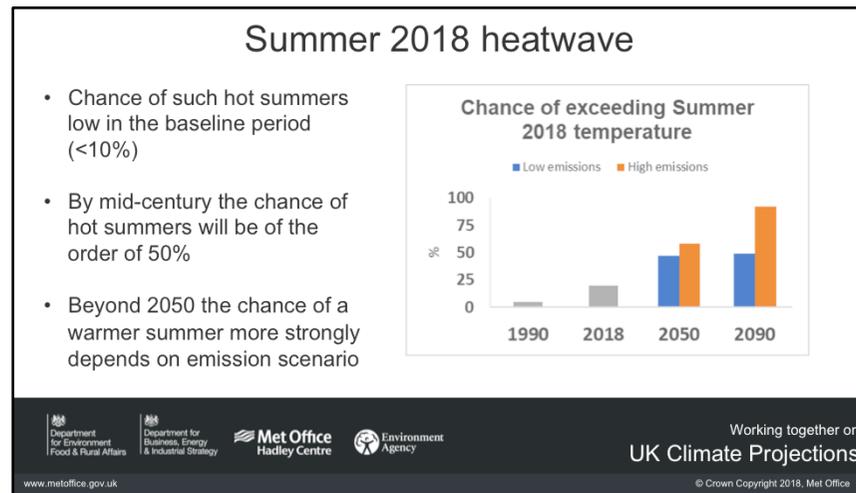


## Probabilistic Projections

In UKCP18, the probabilistic projections provide local low, central and high changes across the UK, corresponding to e.g. 10%, 50% and 90% probability levels.

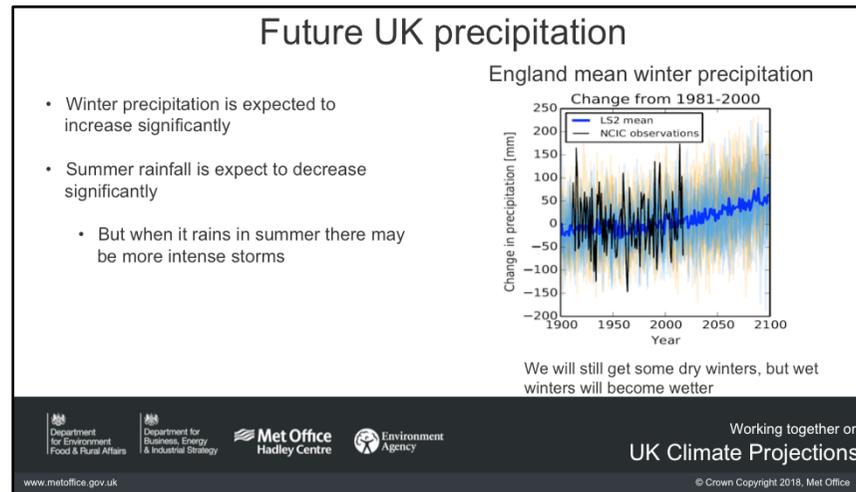
The full set of RCP scenarios are available for the probabilistic projections, allowing us to look at the full range of future emissions scenarios.

We can also look at SRESA1B using the probabilistic projections to compare with UKCP09



Hot summers are expected to become more common. In the recent past (1981-2000) the chance of seeing a summer as hot as 2018 was low (<10%). The chance as already increased due to climate change and is now between 10-20%. With future warming, hot summers by mid-century could become even more common (~50%).

- Summer 2018 was one of the hottest on record for the UK, tied with 1976, 2003 and 2006. UKCP18 shows how the chances of extreme events, like that of summer 2018, may change in the future by amounts that depend on future emissions of greenhouse gases.
- The UK was often under the influence of high pressure, particularly during June and July. This was the UK's warmest summer since 2006, the driest since 2003 and the sunniest since 1995.
- Average UK temperature was 15.8C
- Study of changing risk and attribution to human influence ongoing:
  - Summer 2018 heatwave was at least partly driven by the unusual high pressure over Scandinavia and the pattern of heat in the Atlantic Ocean.



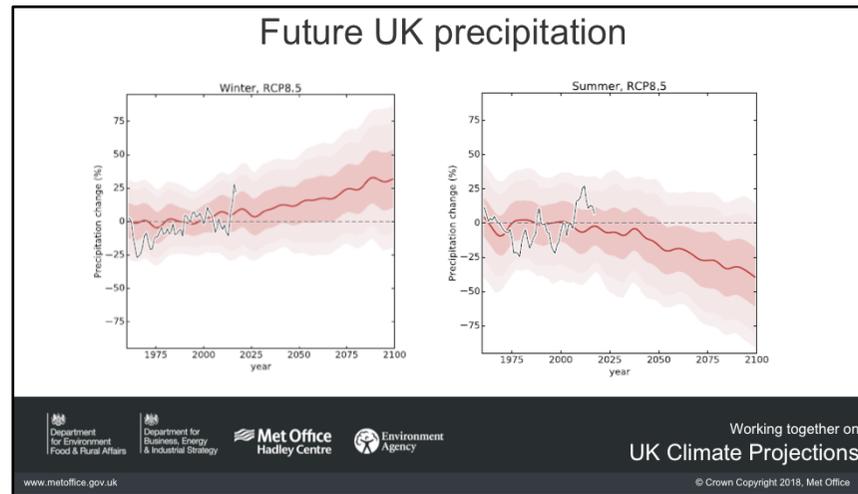
### Observations

Total rainfall from extremely wet days (days exceeding the 99th percentile of the 1961-1990 rainfall) has increased by around 17% in the most recent decade (2008- 2017), for the UK overall. However, changes are largest for Scotland and not significant for most of southern and eastern England.

### Projections

Consistent with earlier projections, UKCP18 shows an increased chance of warmer, wetter winters in the UK

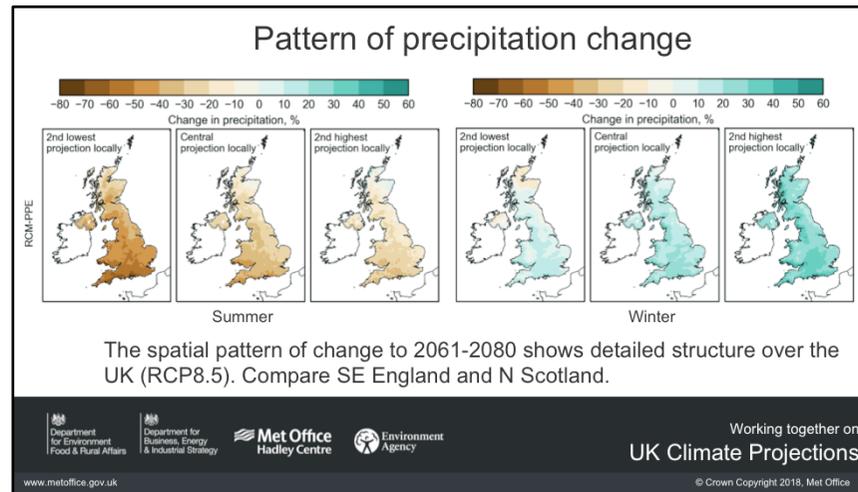
But variability in rainfall is increasing: wet winters will get wetter, but we can still expect to see dry winters. This means that we will need to be resilient to wider range of conditions than we are used to.



### Probabilistic Projections for High Emissions Scenario

Precipitation changes are dependent on season and once again consistent with earlier projections, UKCP18 shows an increased chance of warmer, wetter winters in the UK

Also consistent with the global projections, variability in rainfall is increasing: wet winters will get wetter, but we can still expect to see dry winters. This means that we will need to be resilient to wider range of conditions than we are used to.

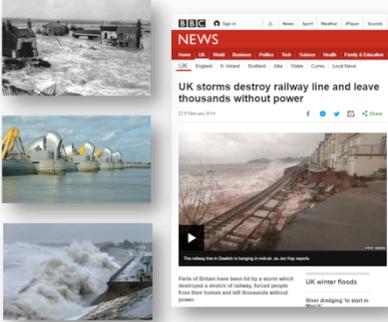


Rainfall patterns across the UK are not uniform and vary on seasonal and regional scales and will continue to vary in the future.

Next summer will see the launch of a further set of results from UKCP18 which will provide very high-resolution projections of rainfall over the UK, fine enough to be able to resolve individual convective storms.

This will allow us to provide more detail around projections of localised heavy rainfall for flood risk assessments.

## UKCP18: sea-level rise



- Sea-level rise will occur for all emission scenarios and at all locations around the UK
- Changes in extreme water levels are mostly driven by changes in mean sea level
  - Best estimate is that surge component won't change, but can't rule out changes
- Sea level will continue to rise beyond year 2100. But the amount is very uncertain
- There may be changes in tidal characteristics and waves






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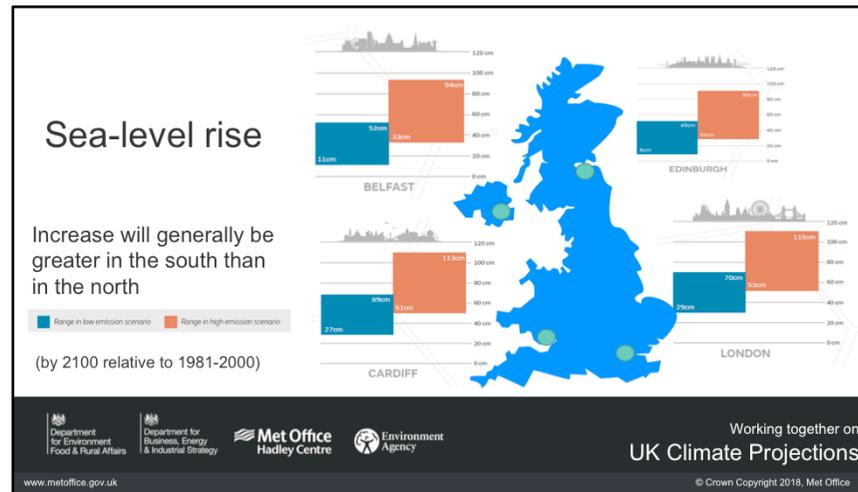
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The pattern of sea level rise is not uniform across the UK. Sea level rise is less in the north and more in the south, this is mainly due to the movement of land, up and down.

We can continue to expect increases to extreme coastal water levels driven mainly by increases in mean sea level rise, although we cannot rule out additional changes in storm surges.

UKCP18 includes exploratory estimates of sea level rise out to 2300, which show continued rise beyond 2100. Sea level rise is a long-term challenge that initial results suggest varies substantially depending on how successful we are at curbing global greenhouse gas emissions in the coming years.



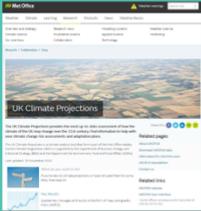
For London, sea level rise by the end of the century (when compared to 1981-2000), for the low emission scenario is very likely to be in the range 0.29 m to 0.70 m. For a high emission scenario, the range is very likely to be 0.53 m to 1.15 m.

For Edinburgh, sea level rise by the end of the century (when compared to 1981-2000), for the low emission scenario is very likely to be in the range 0.08 m to 0.49m. For a high emission scenario this range is very likely to be 0.30 m to 0.90 m.

UKCP18 sea level rise is projected to be higher than in UKCP09, but this increase has already been factored into current adaptation planning. Due to the new treatment of land ice contribution to sea level rise, UKCP18 is higher than UKCP09. For example, the upper end of the range of sea level rise in UKCP18, for the high emission scenario for London, is around 25 cm higher than in UKCP09 at 2100. This is not unexpected and has been factored into adaptation planning.

## Where do I find the new information?

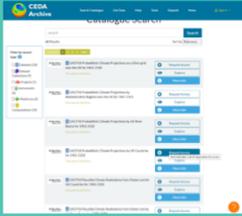
Access the knowledge and data from UKCP18  
via 3 main entry points:



**Website**



**User Interface**



**CEDA Data catalogue**






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UKCP18 products and services have been designed, reviewed and tested by the UKCP18 user groups and have resulted in:

- Web pages to enable quick access information depending on what people want to use it for, as well as being able to visualise the results. Guidance materials describe the different components of the project in detail and explain how to use them.
- A user interface which allows downloading and tailoring maps and graphs, i.e. easier access to the underlying data
- CEDA Archive for those who are familiar with using climate data files (netCDF).



## Information resources and ongoing support



Headline results

User guidance

Customisable products

Data for download

Underpinning science

- 24/7 online support through Weatherdesk
- 2.2km dataset in 2019
- Additional functionality based on user feedback
- Additional supporting analysis



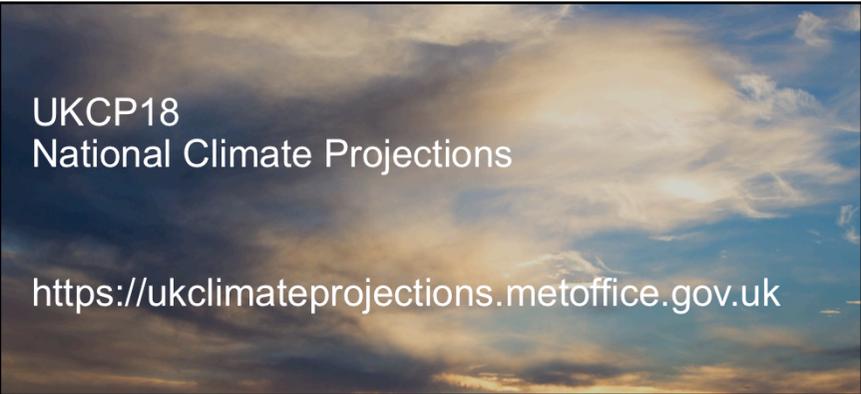
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The UKCP18 information resources support a wide range of tasks from briefing materials through our key findings documents and infographics, those who require more information to inform their sustainability and adaptation plans, to those who require raw data to perform their own climate analysis and/or climate impacts analysis,

The launch of UKCP18 is therefore just the beginning and the work is ongoing. We are providing 24/7 online support and our efforts are now focused on making the high resolution 2.2km dataset in 2019. Feedback is being collated through our interaction with our user groups and webform which will inform how to improve the user interface and products as well as additional analysis that we carry out to support the use of UKCP18.



UKCP18  
National Climate Projections

<https://ukclimateprojections.metoffice.gov.uk>

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