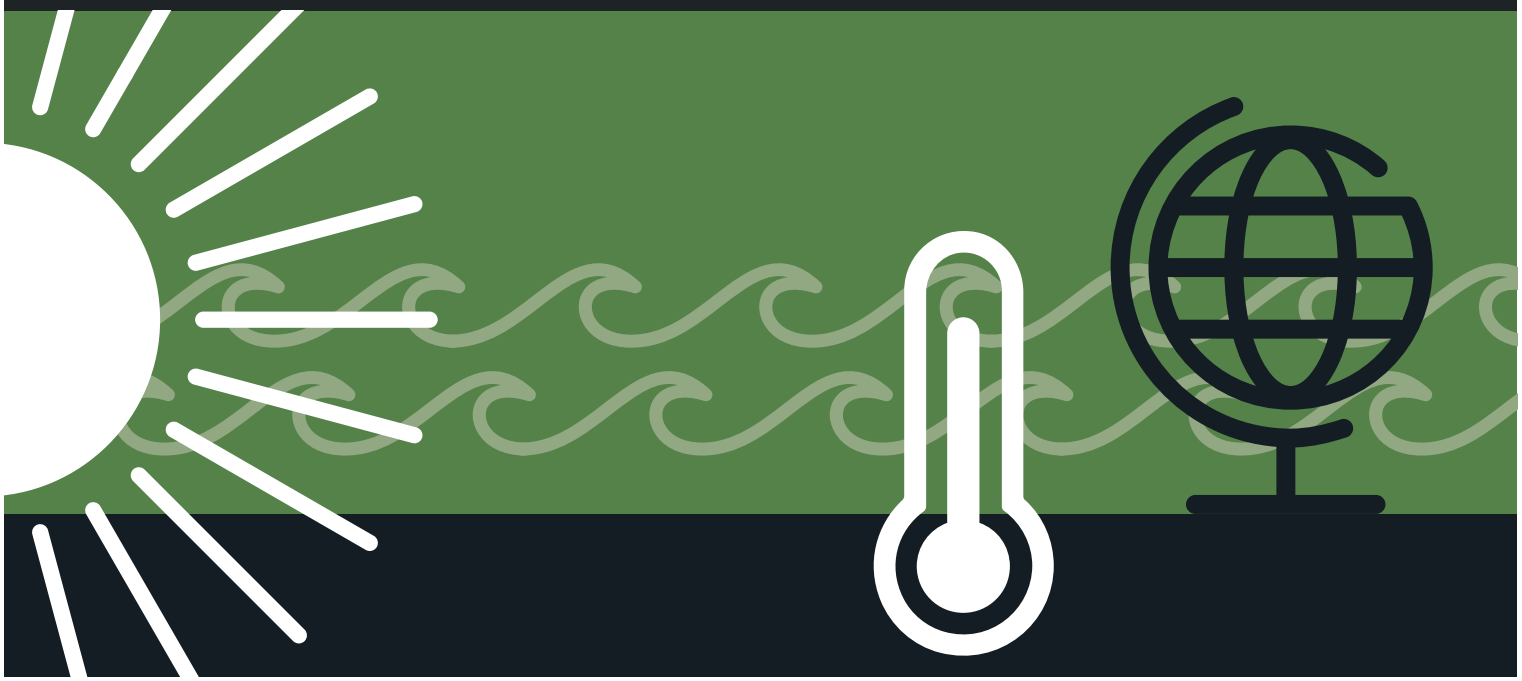

Interpreting climate models

1. If your group is new to climate change, introduce the concept. Explain that climate change is the long-term shift in average weather patterns across the world. Since the mid-1800s, humans have contributed to the release of carbon dioxide and other greenhouse gases into the air. This causes global temperatures to rise, resulting in long-term changes to the climate. If you need more information on climate change, you can have a look at the Met Office website **here**

2. Explain that the Met Office not only predicts and provides forecasts for the weather day to day, but it also uses its supercomputer to make predictions about how our climate might change in the future. These predictions are called climate projections. **Climate projections** are made by combining data about our climate in the past and today with estimates about things like future greenhouse gas emissions and changes in land use. Then, scientists use a supercomputer to solve the complex mathematical equations that are based on well-established physical laws that define the behaviour of the weather and climate.

3. Once you've introduced the concept of predicting the future, show the group this film about the making of a climate forecast for 2050: **Behind the scenes of the July 2050 future forecast - YouTube**

25 minutes

Groupwork

Interpreting climate models presentation slides

Interpreting climate models worksheet

Climate projections maps

Pay particular attention to the section on modelling, if needed, you can spend a few minutes explaining that modelling is using data from the present or the past to understand how human activity is affecting the Earth's climate, and to predict how the climate might evolve

4 Explain to the group that they are going to have a go at interpreting some climate model outputs from a climate model like the one used to create the future forecast in the video. These outputs come from the UK Climate Projections. They will examine some maps of how our climate might change by the end of the 21st century. These maps show:

- Percentage (%) change in summer rainfall
- Percentage (%) change in winter rainfall
- Change (in °C) in the average summer maximum temperature
- Change (in °C) in the average winter minimum temperature

Things to be aware of:

- The changes in rainfall or temperature are the differences in these variables by the end of the 21st century (2088-2099) compared to a baseline of 1981-2010. So for the end of the century, the southern part of England could be up to around 6 °C hotter than it was during the baseline period
- There are four maps for each variable – labelled RCP2.6, RCP4.5, RCP6.0 and RCP8.5. These correspond to different concentrations of greenhouse gases in our atmosphere by the end of the 21st century. RCP2.6 represents a future where we've reduced our greenhouse gas emissions significantly, whereas in RCP8.5 emissions continue to rise throughout the rest of this century. You could call these the 'best case' and 'worst case' scenarios, with RCP4.6 and RCP6.0 sitting in between. But we should always remember that these are just that, scenarios, that help us plan and make decisions, rather than a set path we will follow. Perhaps you only want to direct your young people to look at one or two of these futures, rather than all four
- Each map also says '50th percentile' on it. This is because when we make climate projections, we don't just make one possible future. As it said in the video, we run our models lots of times, tweaking the inputs every so slightly each time. This gives us a range of possible futures. If you look on the website these came from you will see there are also 10th percentile and 90th percentile maps available. This shows the possible spread in futures for that particular variable. But to keep things a little simpler, we've just given you the projection that falls in the middle of the range

5 Share the example with the group to show them how to interpret the data (on slide 2). Explain that these maps represent the changes in rainfall or temperature, and the differences in these variables by the end of the 21st century (2088-2099) compared to a baseline of 1981-2010. Explain that there are 4 scenarios, one map for each scenario. These correspond to different concentrations of greenhouse gases in our atmosphere by the end of the 21st century. Scenario 1 represents a future where emissions continue to rise throughout the rest of this century, while scenario 4 represents a future where we've reduced our greenhouse gas emissions significantly. You could call these the 'best case' and 'worst case' scenarios, with scenario 2 and 3 sitting in between. Bring their attention to scenario 1, and explain that in this scenario, it means that for the end of the century, the southern part of England could be up to around 6 °C hotter than it was during the baseline period.

Explain that although these might be accurate predictions of the future, we should always remember that these are just that, scenarios, that help us plan and make decisions, rather than a set path we will follow.

6 Split the group into teams of three or four and hand out the climate projections maps you wish to examine (on pages 6 to 9), along with the worksheet (on page 5). Once young people have had a look at the maps, ask them to consider following questions and add their answers to the worksheet (on page 5):

- Is there a difference in the climate of the UK by the end of this century depending on which scenario they consider?
- If so, what does this difference look like? (much warmer under the worst case scenario, plus drier in the summer and wetter in the winter)
- What might the impacts of these changes be? (if prompts are needed, encourage them to think about what happens when it rains too much (flooding), or not enough (drought), or when it gets too hot in summer (heatwave) or not cold enough in winter (some plants need a winter chill))
- Which future UK might they like to live in and why? One that is a bit like the worst scenario or one of the other ones where the atmospheric concentrations of greenhouse gases are lower?

7 Ask one member from each group to feedback in the style of a weather forecast presenter

Optional extension

Tell young people that they are going to look at how to mitigate climate change, using the **Climate change adaptation Factsheet for children and young people**. Split the group into small teams, and ask everyone to read the Factsheet, and pick a section they would like to focus on:

- Buildings where we live, work and play
- Flooding and heat
- Challenges for nature
- Challenges for people

Ask them to imagine that they are the team working with the Mayor to mitigate climate change in their local area. What would they do? What actions can they take? If needed, they can do more research using the links provided on the Factsheet.


30 minutes


Groupwork

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Interpreting climate models worksheet

Is there a difference in the climate of the UK by the end of this century depending on which scenario you consider?

☐ Yes / ☐ No

If so, what does this difference look like?

In scenario 1, the climate is the UK would be... whereas in scenario 2, the climate in the UK would be...

What might the impacts of these changes be?
Think about...

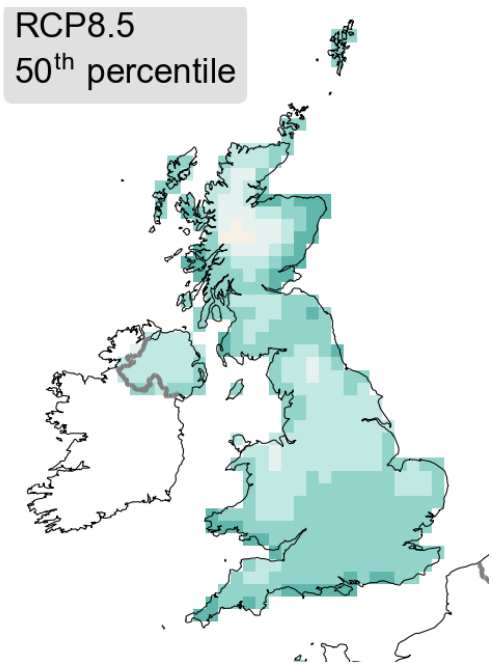
- What happens when it rains too much or not enough?
- What happens when it gets too hot in the summer?
- What happens when it's not cold enough in winter?

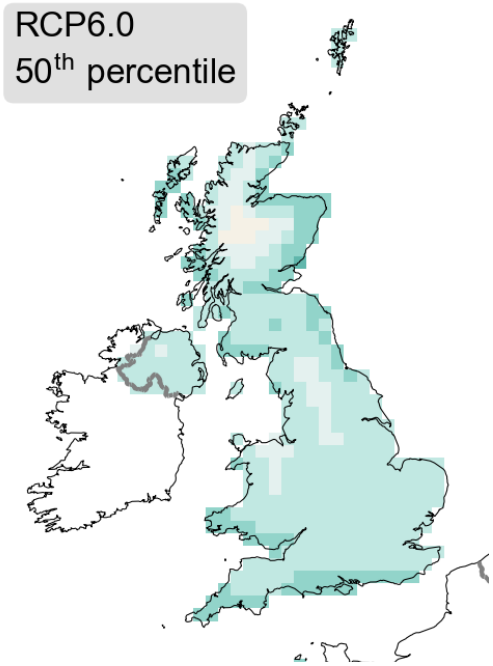
The impacts of these changes might be...

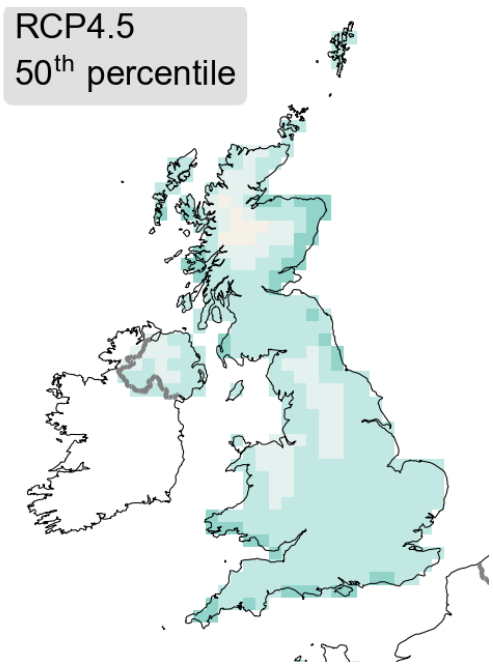
Which future UK would you like to live in and why?

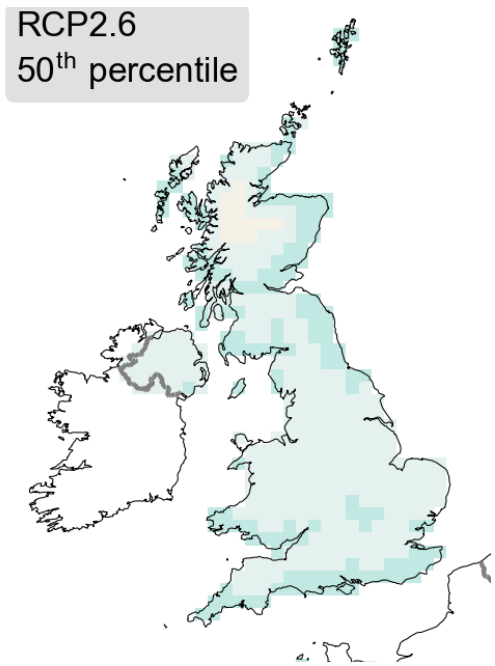
I would like to live in a future UK which looks like scenario... because...

Winter rainfall scenarios







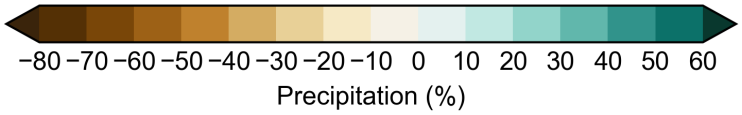


Scenario 1: emissions continue to rise throughout the rest of this century ('worst case scenario')

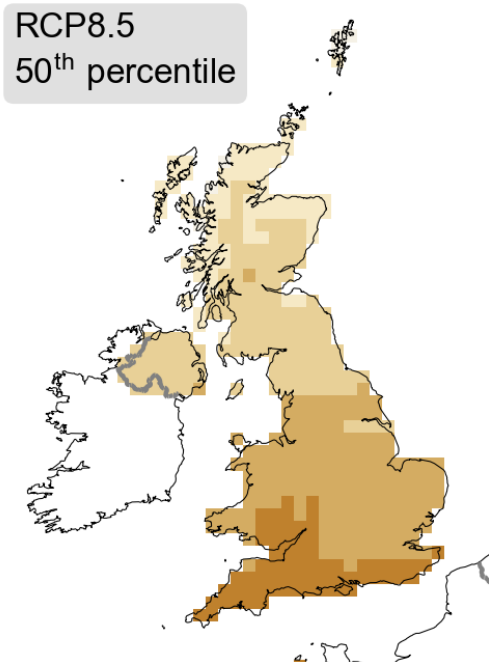
Scenario 2: emissions peak around 2080 then decline through the rest of this century

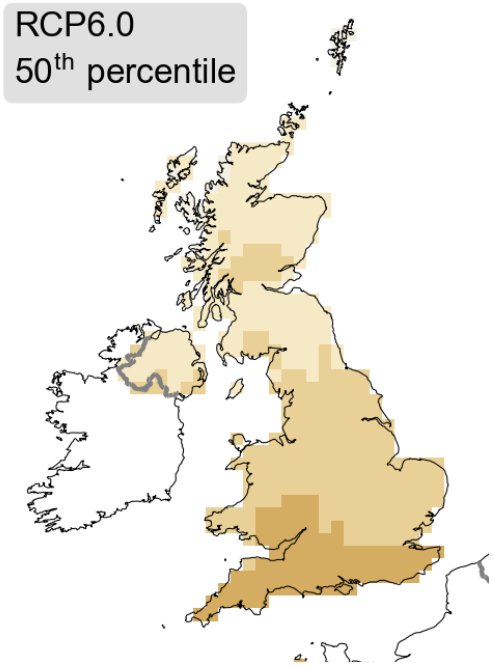
Scenario 3: emissions peak around 2040 then decline through the rest of this century

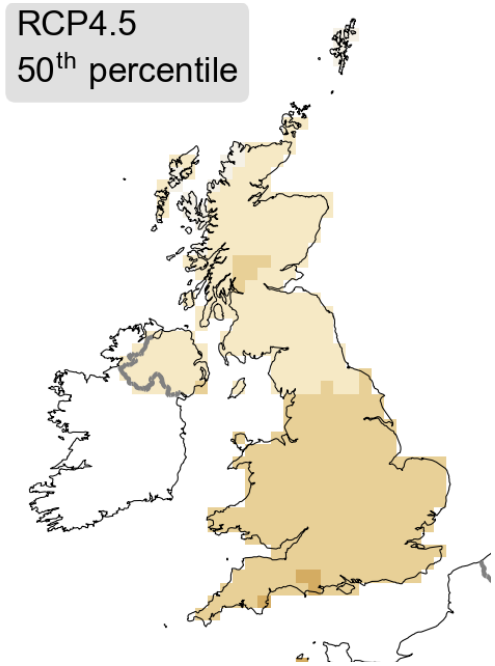
Scenario 4: emissions of CO_2 start declining by 2020 and go to zero by 2100 ('best case scenario')

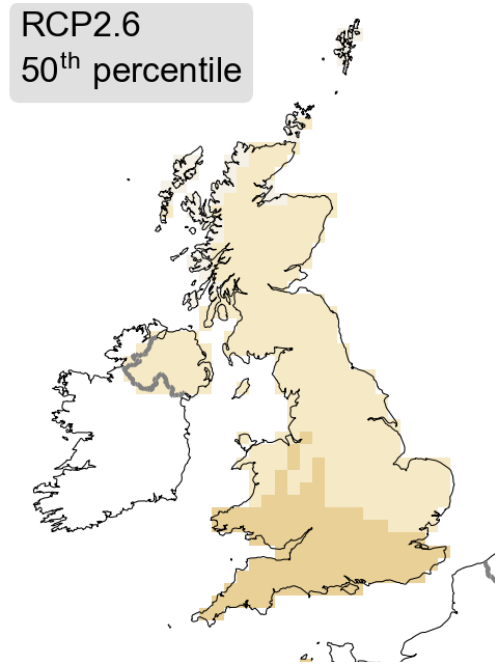


Summer rainfall scenarios









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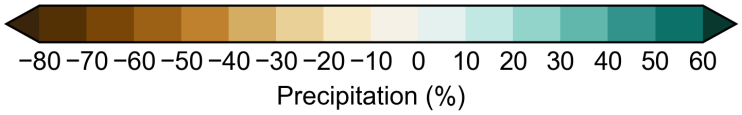
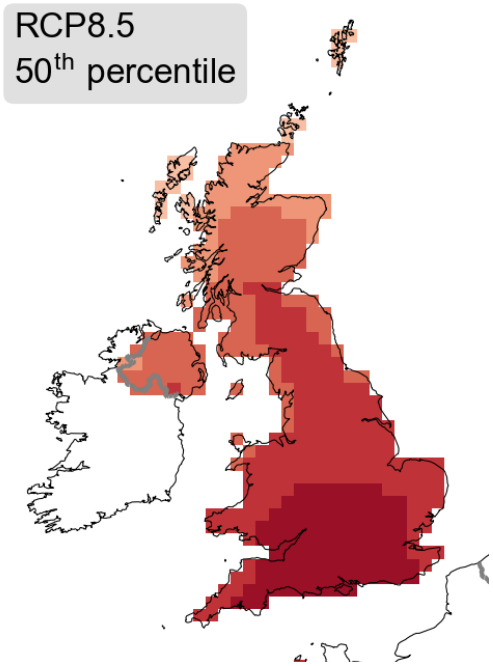


Summer daily maximum temperature scenarios



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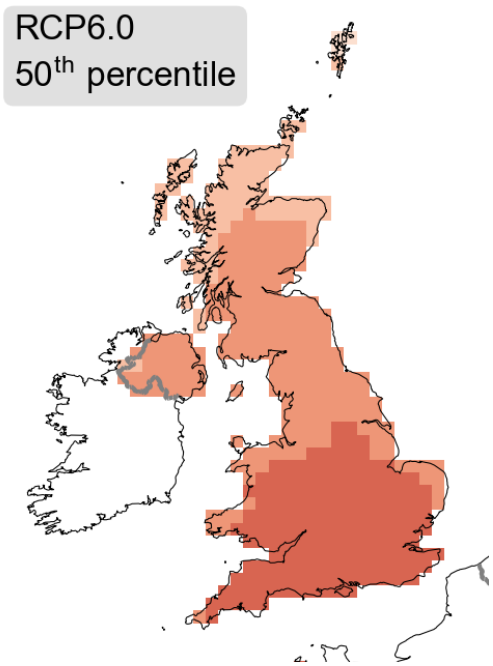
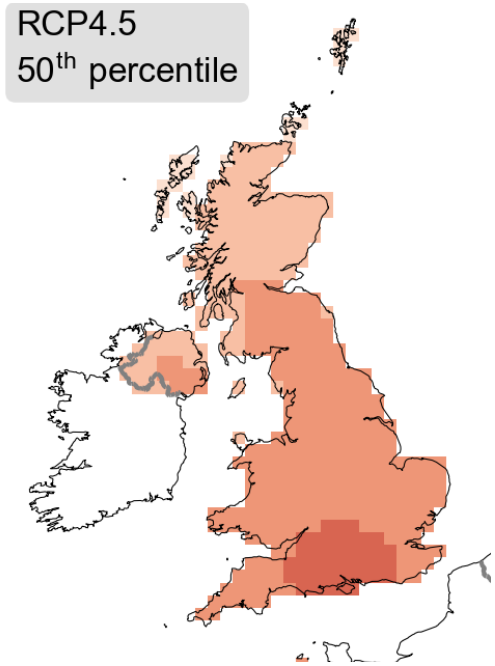
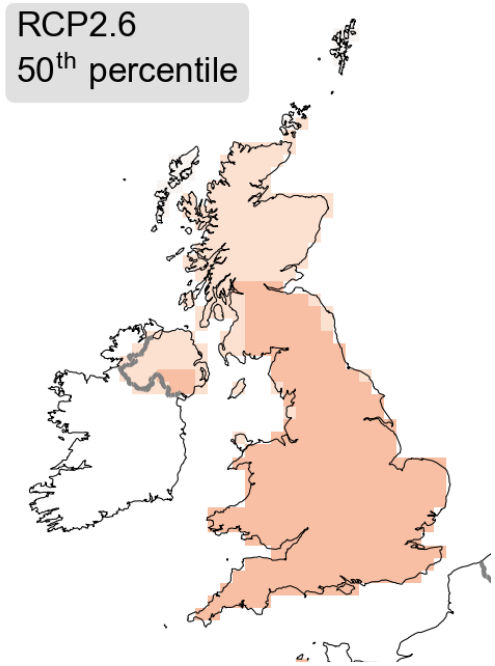


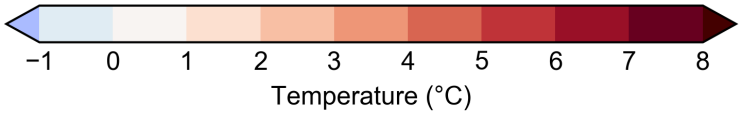
Scenario 2: emissions peak around 2080 then decline through the rest of this century



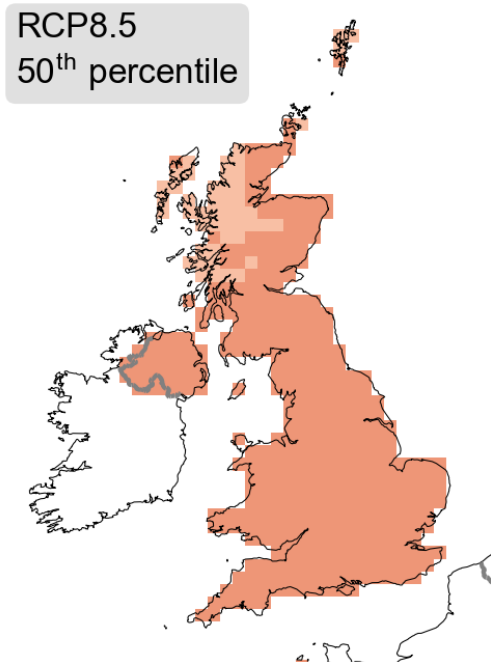
Scenario 3: emissions peak around 2040 then decline through the rest of this century

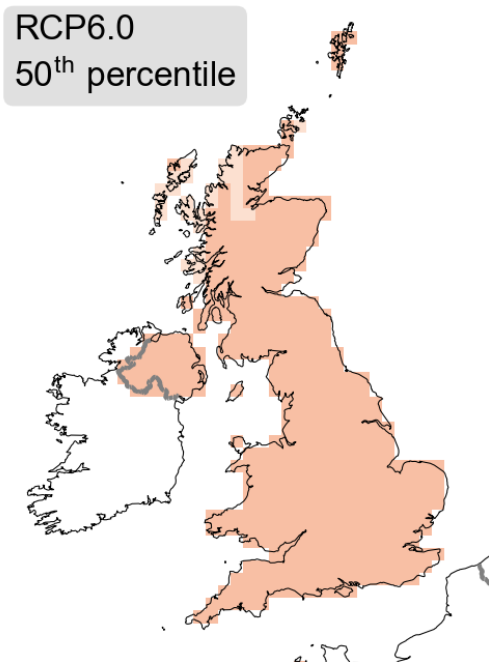


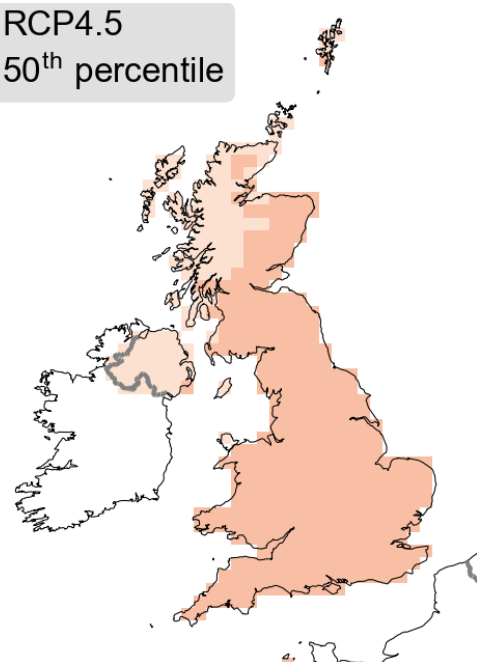
Scenario 4: emissions of CO_2 start declining by 2020 and go to zero by 2100 ('best case scenario')

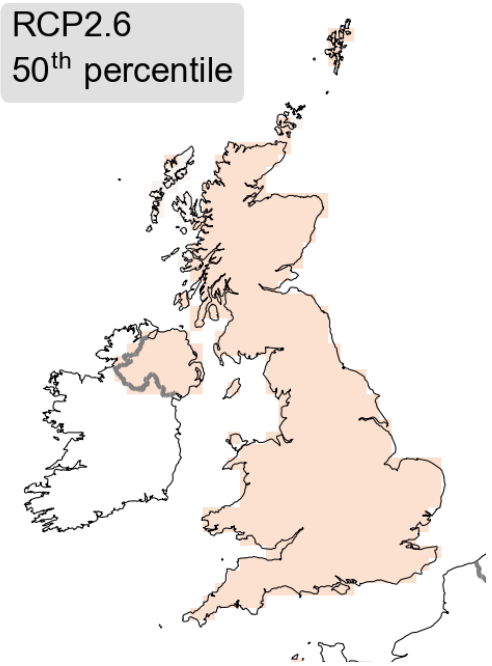


Winter daily minimum temperature scenarios









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