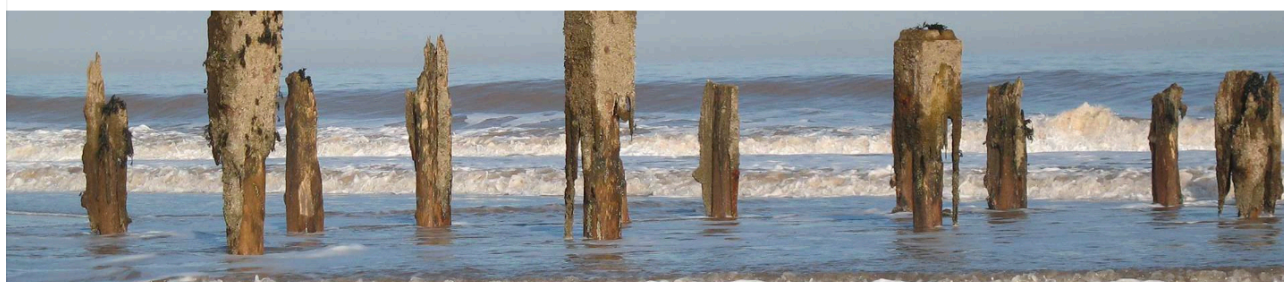
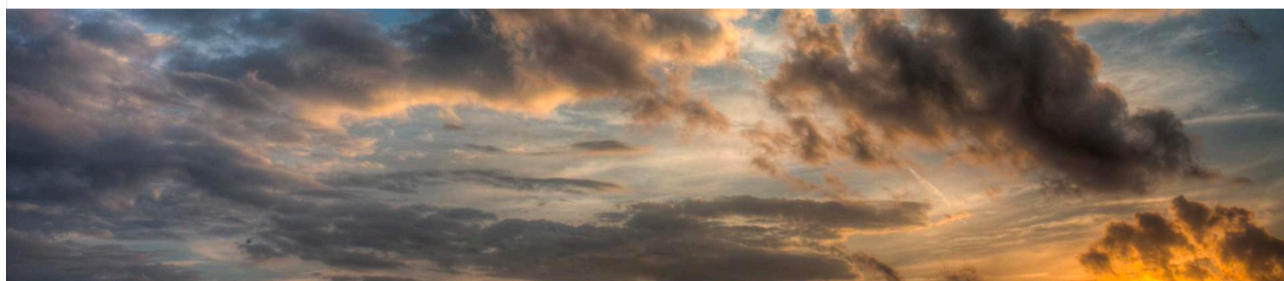




# UK Climate Projections 2018: Introductory self-guided routes



# Getting Started

No-one can know exactly what will happen in the future, but we must plan ahead and be ready to deal with the effects that our changing climate will bring.

The UK Climate Projections (UKCP18), have been created by some of the UK's leading climate scientists in a project funded by BEIS and Defra, to look at what the future climate of the UK might be like.

Having access to good information increases your ability to assess the risks faced by your organisation, consider a range of options and make sensible choices.

All the information from the UK Climate Projections (UKCP18) is available free of charge via the UKCP18 website.

For more tools and information to you adapt to climate change go to the resources page of the UK Climate Projections Programme Website.

To access the projections you will need to go through a simple registration process. You will need to do this to be able to complete the following exercises. To do this, go to the user interface web page:

<https://ukclimateprojections-ui.metoffice.gov.uk/ui/home>

Click on **PRODUCTS**.

Click on **SIGN UP**

You will then be able to set up your account, and you can use these details for future work.

## Structured routes through the UKCP18 User Interface

The following exercises will provide you with an opportunity to begin using the User Interface (UI), and to learn how to use the commonly used products. Whilst there are a lot more outputs and data sources that you can access through the UI, the ones you will be looking at are the ones that you are most likely to use. The others are much more technical and will be covered in later exercises.

Within the routes described, the text in bold represents the different selections you have to make in building your request. For each of the choices, select the option written next to it.

To complete these exercises you will need to log in to your UKCP18 user interface account.

Follow this link >> <https://ukclimateprojections-ui.metoffice.gov.uk/ui/home>

Click on **PRODUCTS**

Click on **LOGIN**

Enter your email and password, click **SUBMIT**

You can start your new request from a number of different places in the PRODUCT SELECTION page of the user interface, by selecting:

- Collection
- Scenario
- Output
- Climate Change Type

If you want to look at the jobs you have created using the UI then click on the tab called MY JOBS. This will list all the requests you have made which is why we recommend you giving each job request a title so that you can easily locate them again.

---

## Exercise 1

In this exercise you will explore how to produce a map of the UK showing the likely change in average annual temperatures in the 2050s under a low emissions scenario.

- **To begin:**

- Click on the **Products** tab at the top to start a new request
- In the **output** area select **Maps**

This will filter out only the **MAPS** you can access in UKCP18

- **Next:**

- Click **Submit a request** in the top area marked *Maps: Anomalies for probabilistic projections (25km) over UK, 1961-2100*

Below the text detailing Description, Guidance, Options, Warning you will see a series of boxes that allows you to refine the criteria you are interested in. You may need to scroll down to find the list when working on a small screen.

- **Select the following options:**

- Data Source:
  - **Probabilistic Projections for the UK** is pre-selected for you as you can only produce maps using this data source.
- Variable:
  - **Mean air temperature anomaly at 1.5m (°C)**
- Baseline Period:
  - **1961-1990**
- Scenario:
  - **RCP2.6**
- Spatial selection type:
  - **All countries**
- Temporal average:
  - **Annual**
- Time slice duration:
  - **30 years**
- Time slice:
  - **2040-2069 (2050s)**
- Data format:
  - **CSV**
- Job Label:
  - **Exercise 1**
- Plot title:
  - **Leave blank**

- Image format:
  - **png**
- Image size:
  - **1200x800**
- Font size:
  - **Medium (Recommended)**
- **Next**
  - Click **Submit**

You will see a new page with a green banner saying: *Information about your asynchronous job*

Below which you will see a message saying: *Your job is currently running*

A new page will appear with a green banner saying: *Outputs from: Maps: Anomalies for probabilistic projections (25km) over UK, 1961-2100*. As seen below:

**Outputs from: Maps: Anomalies for probabilistic projections (25km) over UK, 1961-2100**

---

Outputs

Job Details

ASCII

XML Response

## Outputs

### Image Preview

click on image to expand

### Downloads

The output from the job is available as

- a [zip file](#) (inc underlying data) (0.16 MB) Download

Alternatively the individual files can be downloaded

#### Underlying data files

- Underlying data: [three\\_maps\\_2021-11-15T14-39-32.csv](#) (0.01 MB)

#### Other files

- Image: [three\\_maps\\_2021-11-15T14-39-27.png](#) (0.16 MB)
- Input files: [input\\_paths.txt](#) (0.01 MB)
- Licence: [data\\_licence.txt](#) (0.01 MB)
- Selection: [request.txt](#) (0.01 MB)

Browse [source data](#) in the CEDA Archive

Edit inputs

Here you have the options to:

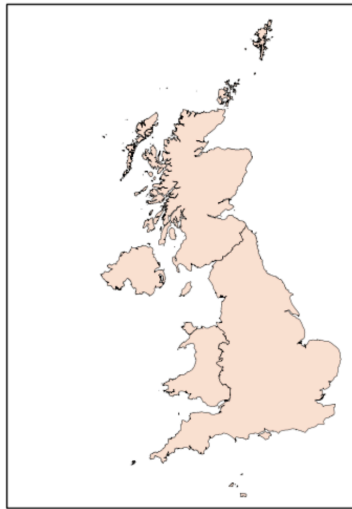
- Preview the image of the maps by clicking on the image
- or
- Download the data as:
  - A zip file containing a spreadsheet of the data, an image file, text files with the supporting information
  - or
  - individual files by clicking on the links in each bullet point (highlighted blue)

Annual average Mean air temperature anomaly at 1.5m (°C) for years 2040 up to and including 2068, in All countries, using baseline 1961-1990, and scenario RCP 2.6

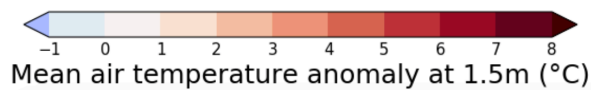
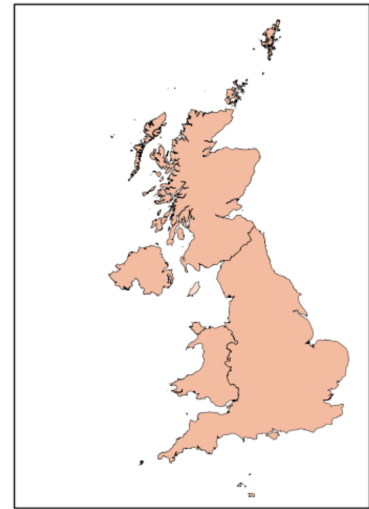
10th Percentile



50th Percentile



90th Percentile



Mean air temperature anomaly at 1.5m (°C)

Funded by BEIS and Defra

### Interpreting the graphic output:

The image has a number of important areas that are worth highlighting in order to use the information correctly.

The information at the top of the graphic is the Meta Data and provides information on what the shows regarding climate variable, time period, region, baseline period and emissions scenario. When presenting the maps it is important that you include this information so the user knows exactly the choices you made were.

The 3 maps represent the range of likely values that you could expect to experience under the conditions outlined in the meta data. The likely range is always from 10% - 90%.

The colour ramp at the bottom of the page shows the temperature range.

In this case we can say that the temperature is likely to be more than 0°C warmer but less than 3°C warmer, or the warming is likely to be between 0 and 3°C by the 2050s.

The 50th percentile graph is the central estimate meaning it is as likely as not to be more or less than between 1-2°C.

---

## Exercise 2

The next two exercises will guide you through building a request with the UI but starting from the other two points: by selecting a collection and by selecting a climate change type.

You will notice that as you start from different points in the UI, that the options appear in a different order and because you are making different selections, that your choices will also change as a result.

Once again, make the appropriate selections from options below in **bold**.

In this exercise you will create a plume plot showing likely changes in the rate of average summer precipitation (rainfall) in the Humber river basin between 1990-2040 under a high emissions scenario.

- **To begin:**
  - Click on the **Products** tab at the tab to start a new request
  - In the Collection area select **Land projections: probabilistic (25km)**
- **Next:**
  - Click **Submit a request** in the area marked *Plot: Plume of time series anomalies for probabilistic projections (25km) over UK, 1961-2100*
- **Select the following options:**
  - Data Source:
    - **Probabilistic Projections for the UK** is pre-selected for you as you can only produce plume plots using this data source.

Variable:

**Precipitation rate anomaly (%)**

Baseline period:

**There is only 1 option (1981-2000)**

Scenario:

**RCP8.5**

- Area:
  - Selection method:
    - **River basin**
  - River basin:
    - **Humber**

Scale units:

**metric**

Temporal average:

- **Seasonal: summer (Jun-Jul-Aug)**

Start and end of time series:

- To adjust the start and end of the time series, **hover your cursor over the year on the left (default 1961), click and hold to slide the left arrow to 1990.**
- Then
  - **Click and hold the cursor over the year on the right (default as 2100) to slide the right arrow to 2040**

Data format:  
**CSV**

Job label:  
**Exercise 2**

Plot title:  
**leave blank**

Image format:  
**png**

Font size:  
**Medium (recommended)**

Colour mode:  
**Colour**

Make sure the box marked *Show percentile labels on the plot* is ticked.

Next:

- Click **Submit**

Again, you will see a new page with a green banner saying: *Information about your asynchronous job*

Below which you will see a message saying: *Your job is currently running*

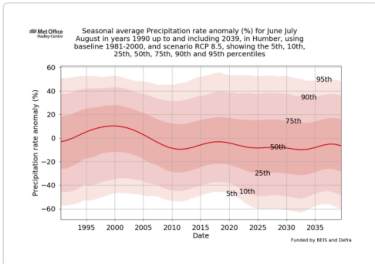
A new page will appear with a green banner saying: *Outputs from: Plot: Plume of time series anomalies for probabilistic projections (25km) over UK, 1961-2100*. As seen below:

**Outputs from: Plot: Plume of time series anomalies for probabilistic projections (25km) over UK, 1961-2100**

Outputs [Job Details](#) [ASCII](#) [XML Response](#)

## Outputs

### Image Preview



click on image to expand

### Downloads

The output from the job is available as

- a [zip file](#) (inc underlying data) (0.12 MB) [Download](#)

Alternatively the individual files can be downloaded

#### Underlying data files

- Underlying data: [plume\\_plot\\_2021-11-15T15-44-20.csv](#) (0.01 MB)

#### Other files

- Image: [plume\\_plot\\_2021-11-15T15-44-08.png](#) (0.12 MB)
- Input files: [input\\_paths.txt](#) (0.01 MB)
- Licence: [data\\_licence.txt](#) (0.01 MB)
- Selection: [request.txt](#) (0.01 MB)

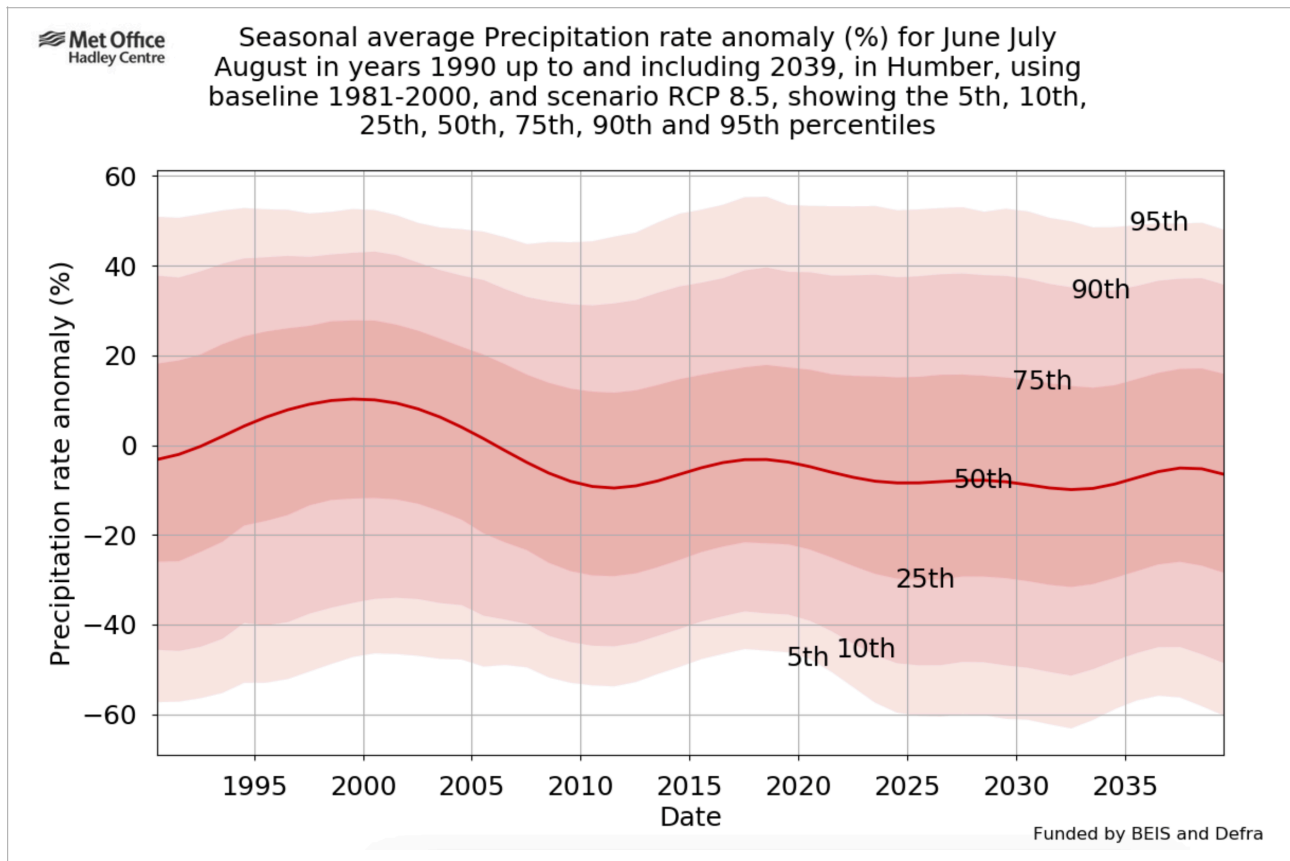
Browse [source data](#) in the CEDA Archive

[Edit inputs](#)

Again, here you have the options to:



- Preview the image of the maps by clicking on the image
- or
- Download the data as:
  - A zip file containing a spreadsheet of the data, an image file, text files with the supporting information
  - or
  - individual files by clicking on the links in each bullet point (highlighted blue)



### Interpreting the graphic output:

The image has a number of important areas that are worth highlighting in order to use the information correctly.

As with the previous exercise, the information at the top of the graphic is the Meta Data and provides information on what the shows regarding climate variable, time period, region, baseline period and emissions scenario. Remember, when presenting the maps it is important that you include this information so the user knows exactly the choices you made were.

The graphic produced in this exercise shows the changes in average summer precipitation between 1995 and 2040 under a high emissions scenario for the humber river basin. As with the first exercise, the likely range is still between 10-90%, however, in this plot you can also identify the less likely 'tails' of the distribution of values (5th and 95% percentile). Precipitation is always much harder to model, and its trends under a changing climate more likely to fluctuate. Using the year 2035 as an example we can see that it is as likely to be wetter as it is to be drier, between 45% less rainfall and 40% more rainfall.

---

## Exercise 3

In this exercise you will create a plume plot showing the likely summer air temperatures extremes in Carlisle between 2021-2100 under a 'medium' emissions scenario. The extreme temperatures are based on a return period of 1:100-years that can be considered rare.

- **To begin:**
  - Click on the **Products** tab at the tab to start a new request
  - In the climate change type area select **Absolute values**
- **Next:**
  - Click **Submit a request** in the area marked *Plot: Plume of time series of probabilistic projections of climate extremes (25km) over UK, 1961-2100*
- **Select the following options:**
  - Data Source:
    - **Probabilistic Projections for the UK** is pre-selected for you as you can only produce plume plots using this data source.
  - Variable:
    - **Maximum air temperature at 1.5m (°C)**
  - Scenario
    - **RCP 6.0**
  - Return period:
    - **100 years**
  - Area:
    - Select the **25km grid square that covers Carlisle** by clicking on the map (you can zoom in using the + and - at the top left of the map)
  - Scale units:
    - **metric**
  - Season
    - **Seasonal: summer (Jun-Jul-Aug)**
  - Start and end of time series:
    - To adjust the start and end of the time series, **hover your cursor over the year on the left (default 1961), click and hold to slide the left arrow to 2021.**
  - Then
    - **Click and hold the cursor over the year on the right (default as 2100) to slide the right arrow to 2100**
  - Data format:
    - **CSV**
  - Job label:
    - **Exercise 3**
  - Plot title:
    - **leave blank**
  - Image format:

- **png**
- Image size:
  - **1200x800**
- Font size:
  - **Medium (recommended)**
- Colour mode:
  - **Colour**

Make sure the box marked *Show percentile labels on the plot* is ticked.

Next:

- Click **Submit**

Again, you will see a new page with a green banner saying: *Information about your asynchronous job*

Below which you will see a message saying: *Your job is currently running*

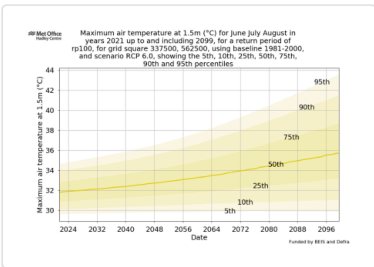
A new page will appear with a green banner saying: *Outputs from: Plot: Plume of time series of probabilistic projections of climate extremes (25km) over UK, 1961-2100* As seen below:

Outputs from: Plot: Plume of time series of probabilistic projections of climate extremes (25km) over UK, 1961-2100

Outputs
Job Details
ASCII
XML Response

## Outputs

### Image Preview



click on image to expand

### Downloads

The output from the job is available as

- a [zip file](#) (inc underlying data) (0.12 MB) Download

Alternatively the individual files can be downloaded

#### Underlying data files

- Underlying data: [plume\\_plot\\_2021-11-15T17-10-48.csv](#) (0.01 MB)

#### Other files

- Image: [plume\\_plot\\_2021-11-15T17-10-12.png](#) (0.12 MB)
- Input files: [input\\_paths.txt](#) (0.01 MB)
- Licence: [data\\_licence.txt](#) (0.01 MB)
- Selection: [request.txt](#) (0.01 MB)

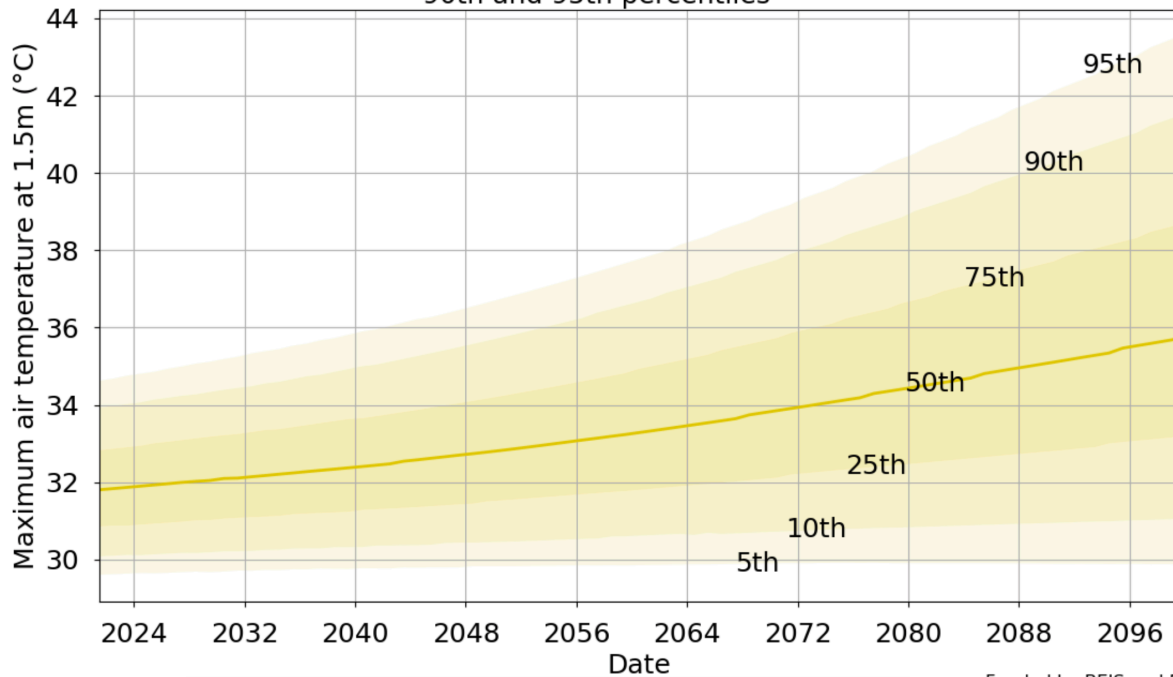
Browse [source data](#) in the CEDA Archive

Edit inputs

Again, here you have the options to:

- Preview the image of the maps by clicking on the image
- or
- Download the data as:
  - A zip file containing a spreadsheet of the data, an image file, text files with the supporting information
  - or
  - individual files by clicking on the links in each bullet point (highlighted blue)

Maximum air temperature at 1.5m (°C) for June July August in years 2021 up to and including 2099, for a return period of rp100, for grid square 337500, 562500, using baseline 1981-2000, and scenario RCP 6.0, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



Funded by BEIS and Defra

### Interpreting the graphic output:

As with the previous exercise, the information at the top of the graphic is the Meta Data and provides information on what the shows regarding climate variable, time period, region, baseline period and emissions scenario. Remember, when presenting the maps it is important that you include this information so the user knows exactly the choices you made were.

Exercises 1 and 2 showed the likely change in the climate variable, that is how much more or less hotter/wetter it might be. Exercise 3 plotted the absolute values during a period of time. This can be useful if you know the threshold of something for example, when it becomes too hot for a certain type of tree to grow.

As with the plume plot in exercise 2, we have the 10-90% likely range of values along with the less likely values at 5% and 95%. If, for example, an oak tree cannot tolerate temperatures above 36°C then we know that by 2050 extreme conditions could be reached when they will be affected in this scenario.

---

## Exercise 4

In this exercise you will create a cumulative distribution function for the change in averaged winter cloud cover under a high and low emission scenario over Exeter in the 2040s.

- **To begin:**
  - Click on the **Products** tab at the tab to start a new request
  - Click **Submit a request** in the area marked *Plot: PDF/CDF for probabilistic projections (25km) over UK, 1961-2100*
- **Select the following options:**
  - Data Source:
    - **Probabilistic Projections for the UK** is pre-selected for you as you can only produce plume plots using this data source.
  - Variable:
    - **Total cloud anomaly (%)**
  - Baseline period:
    - **1961-1990**
  - Plot type:
    - **Cumulative Distribution Function (CDF)**
  - Scenario:
    - **RCP 2.6**
    - **RCP 8.5**
  - Area:
    - Select **the 25km grid square that covers Exeter** by clicking on the map (you can zoom in using the + and - at the top left of the map)
  - Scale units:
    - **metric**
  - Temporal average:
    - **Seasonal: winter (Dec-Jan-Feb)**
  - Time slice duration:
    - **30 years**
  - Time slice:
    - **2030-2059 (2040s)**
  - Data format:
    - **CSV**
  - Job label:
    - **Exercise 4**
  - Plot title:
    - **leave blank**
  - Image format:
    - **png**

- Image size:
  - 1200x800
- Font size:
  - **Medium (recommended)**
- Legend position
  - **Top-Left**

Next:

- Click **Submit**

Again, you will see a new page with a green banner saying: *Information about your asynchronous job*

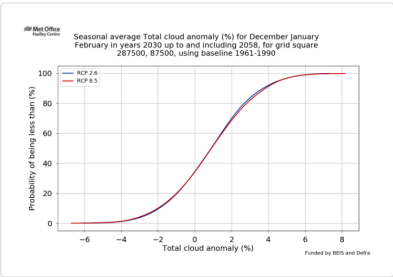
Outputs from: Plot: PDF/CDF for probabilistic projections (25km) over UK, 1961-2100

Outputs

[Job Details](#)
[ASCII](#)
[XML Response](#)

## Outputs

### Image Preview



click on image to expand

### Downloads

The output from the job is available as

- a [zip file](#) (inc underlying data) (0.09 MB) [Download](#)

Alternatively the individual files can be downloaded

#### Underlying data files

- Underlying data: [cdf\\_plot\\_2021-11-22T16-33-53.csv](#) (0.01 MB)

#### Other files

- Image: [cdf\\_plot\\_2021-11-22T16-33-50.png](#) (0.10 MB)
- Input files: [input\\_paths.txt](#) (0.01 MB)
- Licence: [data\\_licence.txt](#) (0.01 MB)
- Selection: [request.txt](#) (0.01 MB)

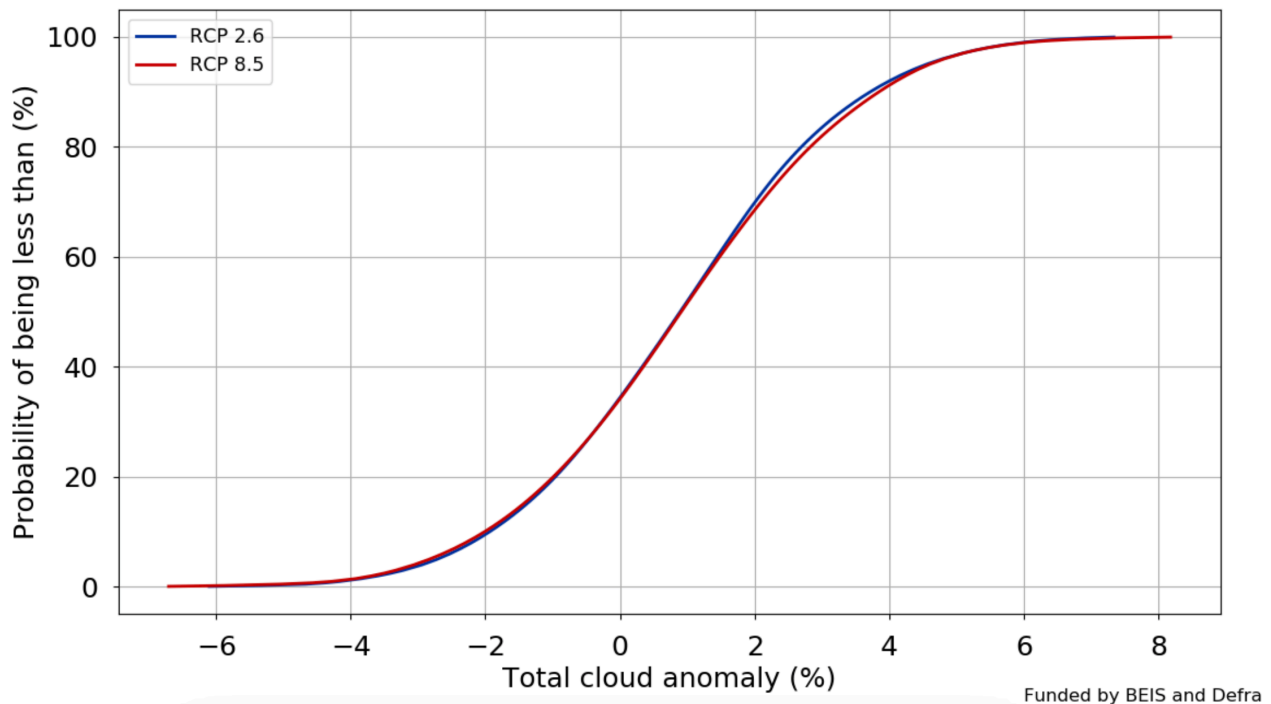
Browse [source data](#) in the CEDA Archive

[Edit inputs](#)

Again, here you have the options to:

- *Preview the image of the maps by clicking on the image*
- or
- *Download the data as:*
  - *A zip file containing a spreadsheet of the data, an image file, text files with the supporting information*
  - *or*
  - *individual files by clicking on the links in each bullet point (highlighted blue)*

Seasonal average Total cloud anomaly (%) for December January  
February in years 2030 up to and including 2058, for grid square  
287500, 87500, using baseline 1961-1990



#### Interpreting the graphic output:

As with the previous exercise, the information at the top of the graphic is the Meta Data and provides information on what the shows regarding climate variable, time period, region, baseline period and emissions scenario. Remember, when presenting the maps it is important that you include this information so the user knows exactly the choices you made were.

In this plot we can compare the difference between a high emissions scenario (RCP 8.5) and a low emissions scenario (RCP2.6). This can be useful when considering long-term projects where the emissions pathway could still change according to agreed GHG cuts.

Unlike the previous maps and graphs, a cumulative distribution function (CDF) gives you the full range of values from 0-100% (of being equal to, or less than, a certain value). In the example above, under a high emissions scenario (red line) there is a 100% probability that there will be a change in cloud cover equal to, or less than 8% in the 2040s over Exeter.