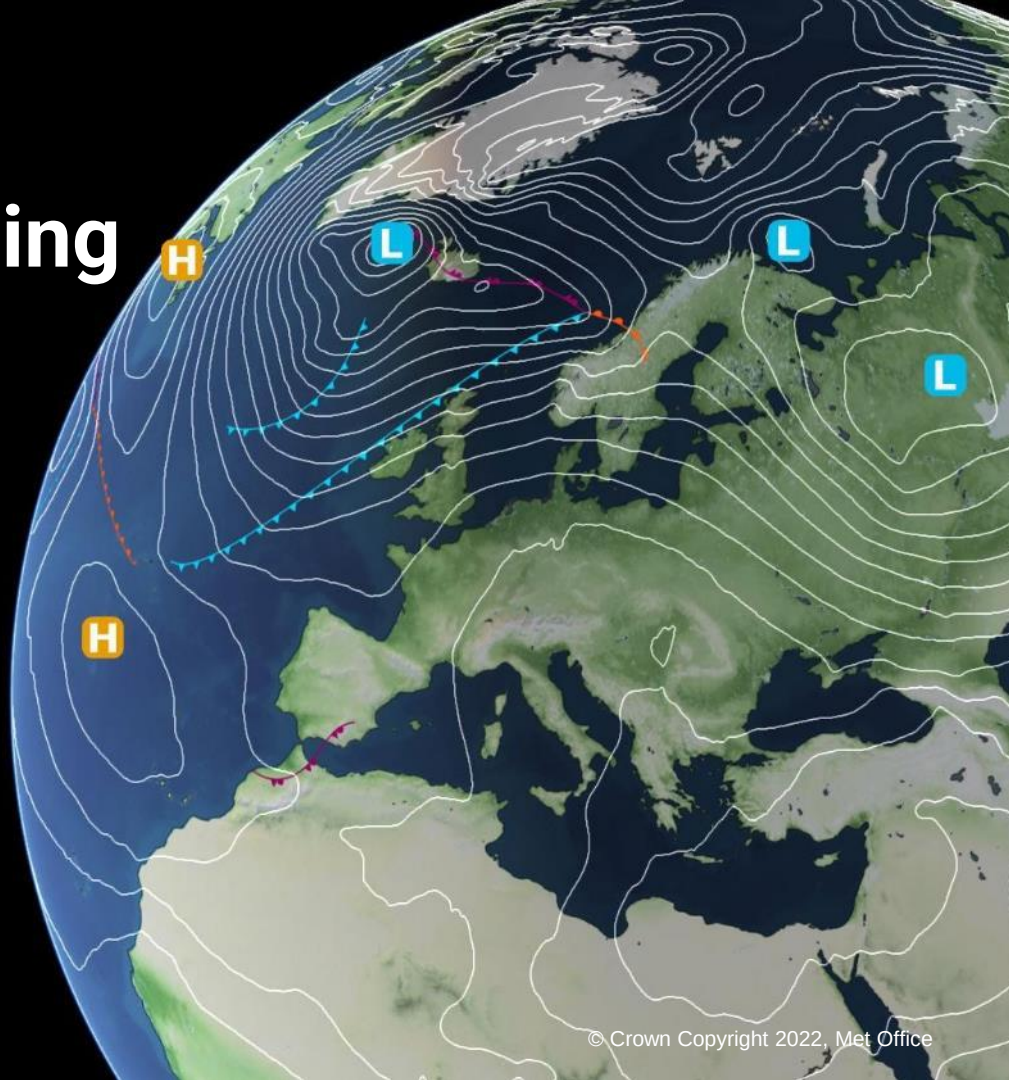
SWF in London - adapting for a changing climate

Mark Rogers, Met Office Advisor



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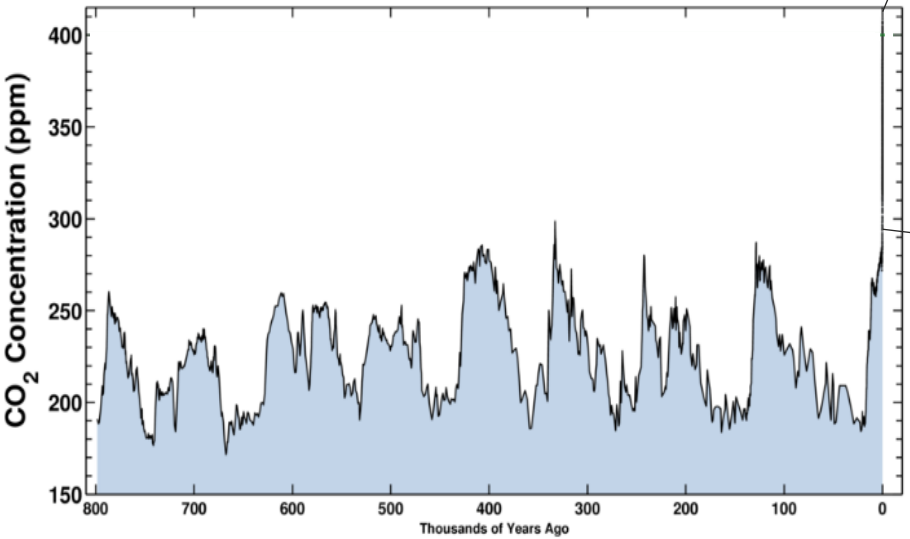
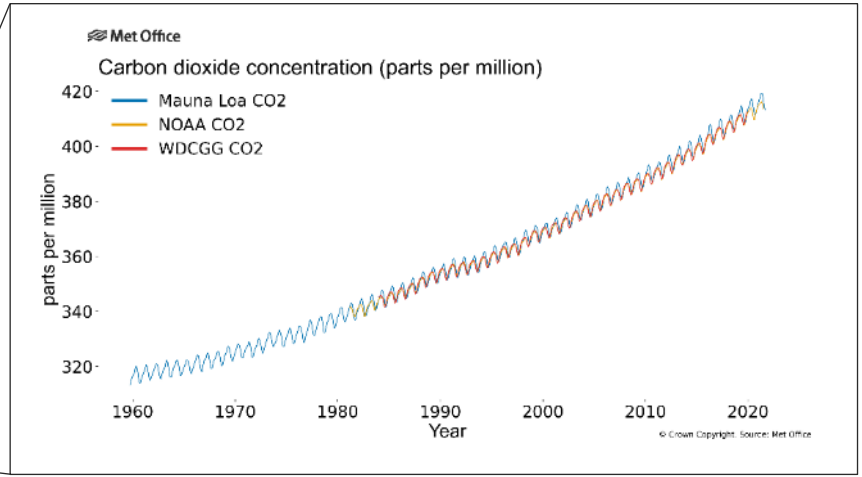
Climate Observations

Current levels of atmospheric CO_2 are unprecedented in 2 million years or more





Since the Industrial Revolution in the 18th century, the concentration of CO_2 in the atmosphere has risen by more than 45%, to over 400 parts per million (ppm).

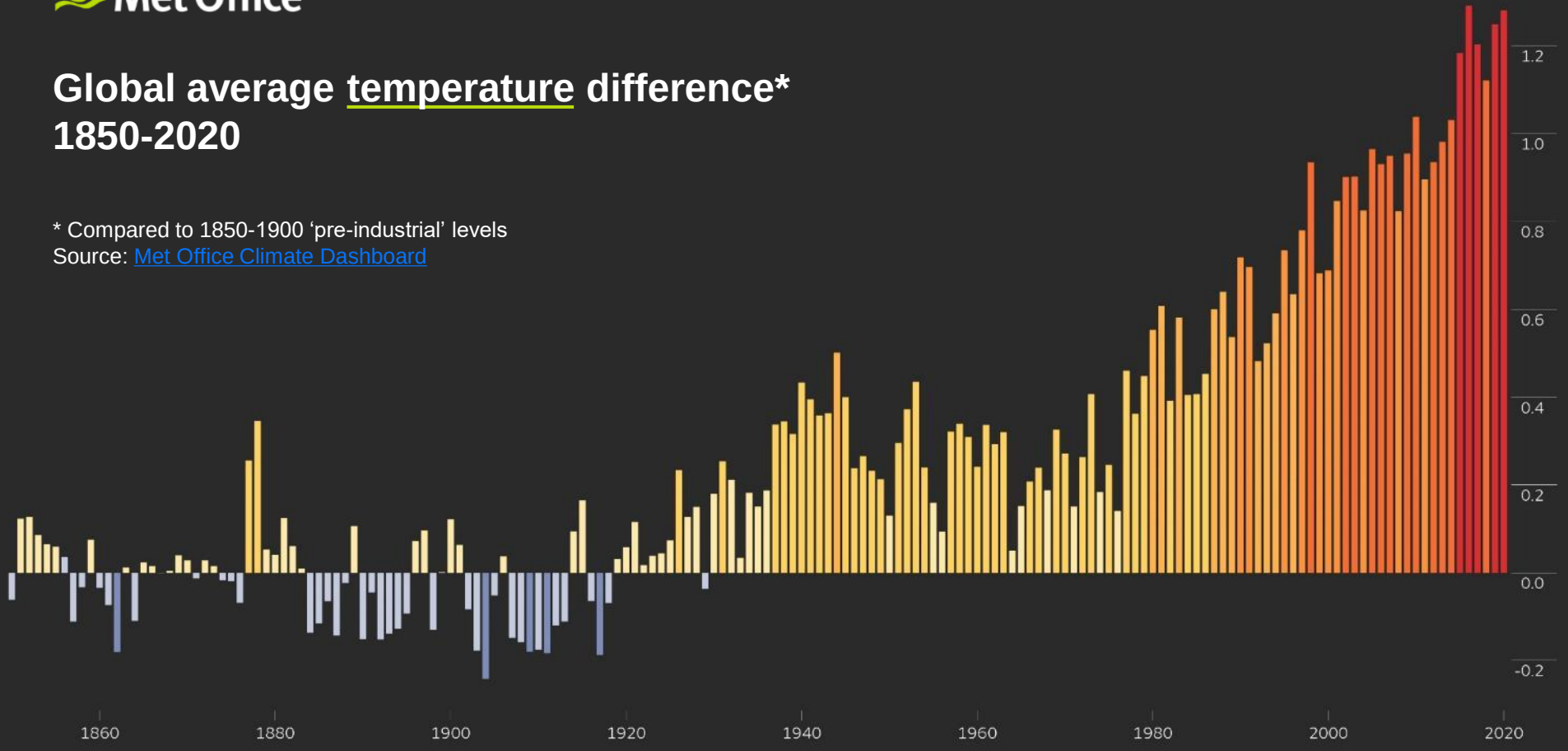
Records of Earth's climate, preserved in air bubbles trapped in Antarctic ice, show that the current level of CO_2 is higher than at any time in at least the last 2 million years.

Source: https://scripps.ucsd.edu/programs/keelingcurve/

Met Office

Global average temperature difference* 1850-2020

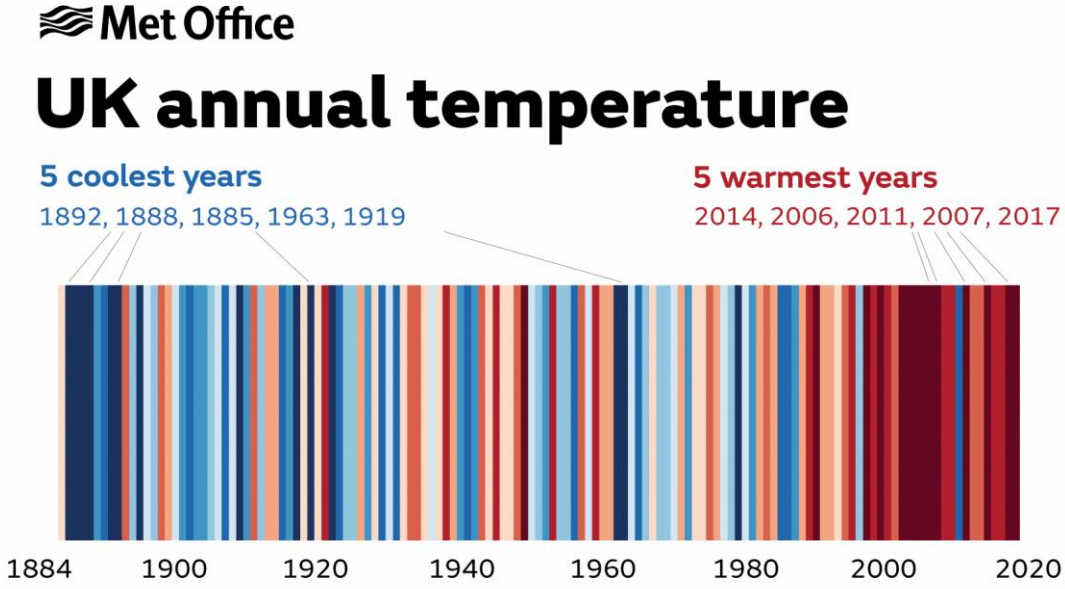
* Compared to 1850-1900 ‘pre-industrial’ levels
Source: Met Office Climate Dashboard



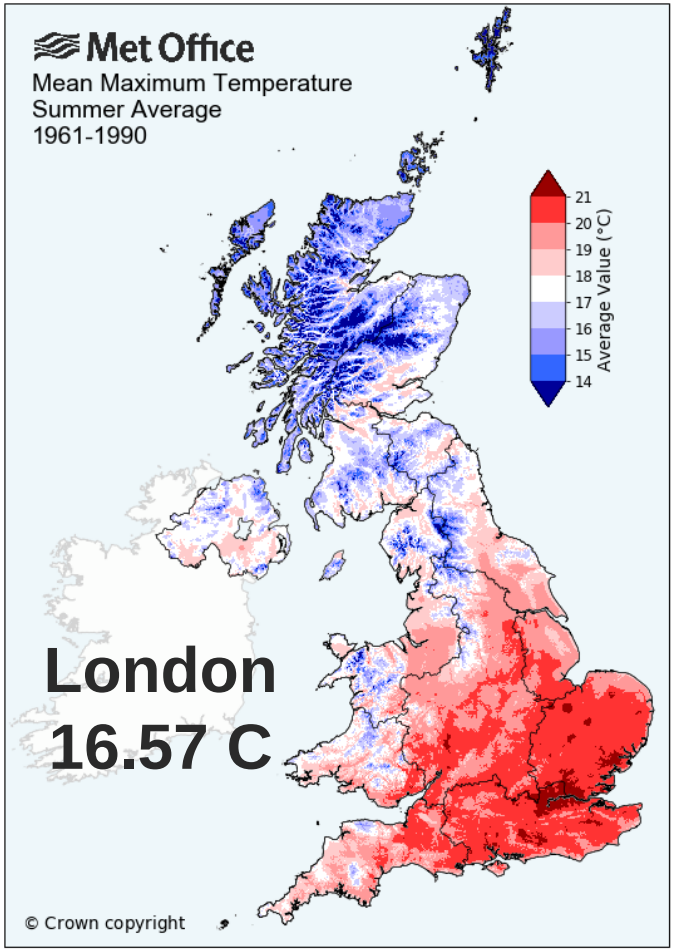
What is the difference between climate variability and change?

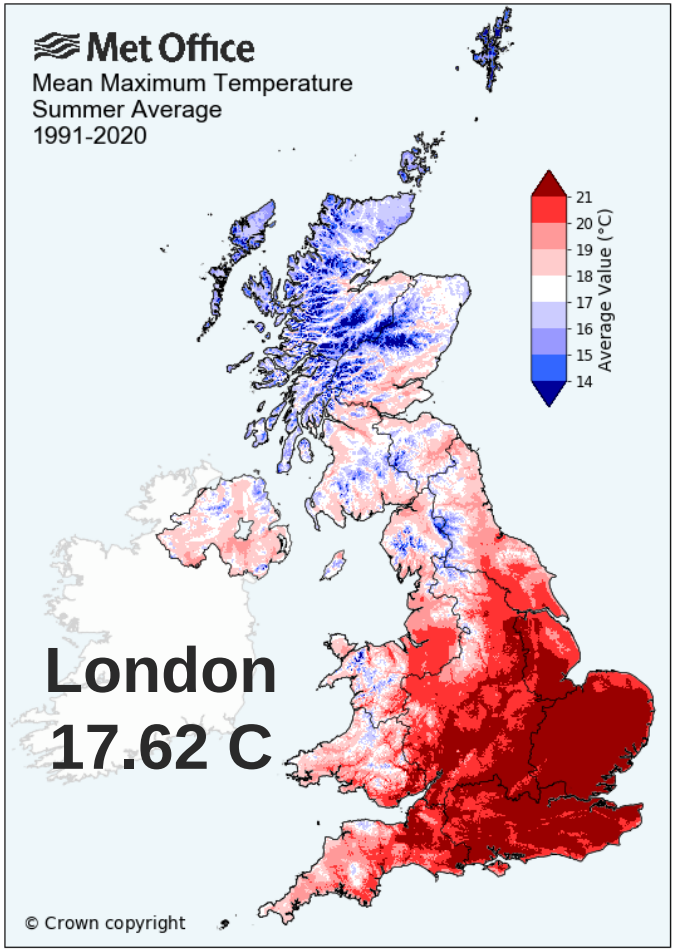
Climate variability looks at changes that occur within smaller timeframes e.g. months, seasons or a year – variations in the mean state, beyond individual weather events

Climate change refers to a large-scale, long-term shift in the planet's weather patterns and average temperatures – a significant change in the mean state.



Observed Changes – Summer Temperatures





Met Office
Hadley Centre

UK Climate Projections 2018 (UKCP18)

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

UKCP18: Climate change over land

How will the seasons change?

Summers

HOTTER

DRIER

Winters

MILDER

WETTER

Year-to-year variations mean we'll still see some cold dry winters and cool wet summers, but they will become less likely.

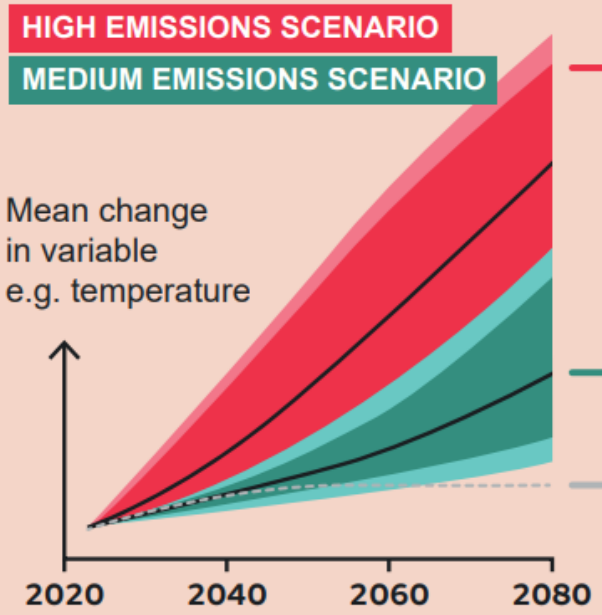
Projections for average annual warming over the UK give a range of 1°C to 4°C for the lowest and highest emission scenarios.

How will extremes change?

Maximum temperature of a summer's day could increase by as much as 10°C in some places

Rainfall is expected to be more intense, increasing the risk of flash flooding

Future Summer changes



RCP 8.5
90TH PERCENTILE
90% chance of being less than this result.

RCP 4.5
50TH PERCENTILE
50% chance of being less than this result.

RCP 2.6
RCP2.6 is not the focus of this City Pack, because, although the world aims to limit warming with emission reductions like those or even greater than RCP2.6, it is good practice to consider the risks if this is not achieved.

The projections are provided as a 'range':

- The first number in the range, is the median (50th percentile) result from RCP 4.5 (MEDIUM emission scenario).
- The second number in the range is from RCP 8.5 (HIGH emission scenario) and shows a more extreme result (90th percentile, except for summer rainfall rate which uses the 10th percentile, representing drought conditions).

Future Summer changes

	2030s	2050s	2080s	
Summer Average Air Temperature (°C)	+1.1 to +2.3	+1.9 to +3.9	+3.0 to +7.3	↑
Summer Maximum Air Temperature (°C)	+1.2 to +2.8	+2.0 to +4.6	+3.4 to +8.5	↑
Summer Precipitation Rate (%)	-4 to -29	-12 to -44	-20 to -63	↓

Hot summers are expected to become more common. By 2050, every other summer may be as hot as the record breaking summer of 2018.

Although the trend is for drier summers in the future, there may be increases in the intensity of heavy summer rainfall events.

https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/spf/london-city-pack_august-2022.pdf

Future Winter Changes

	2030s	2050s	2080s	
Winter Average Air Temperature (°C)	+0.8 to +1.7	+1.3 to +2.8	+1.8 to +4.9	↑
Winter Minimum Air Temperature (°C)	+0.8 to +1.9	+1.3 to +3.1	+2.0 to +5.5	↑
Winter Precipitation Rate (%)	+7 to +20	+9 to +28	+14 to +49	↑

Increased risk of winter river and groundwater flooding

Decrease in hazards from cold weather although cold spells are still likely

https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/spf/london-city-pack_august-2022.pdf

Changes in Rainfall

Local (2.2km) suggests significant increases in hourly precipitation extremes.

Future increases in extreme hourly rainfall intensity

The rainfall associated with an event that occurs typically once every 2 years increases by 25%, by 2070s.

Changes in the type of rainfall

By 2070s, projections suggest that…

… rain in winter will come from frontal rain events of higher intensity

… rain in summer will come from short lived high intensity showers.

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Adaptation

Adaption is essential to address the locked-in effects of climate change

Adaption is needed to manage risks from:

On-going impacts

Those we are already experiencing

Committed impacts

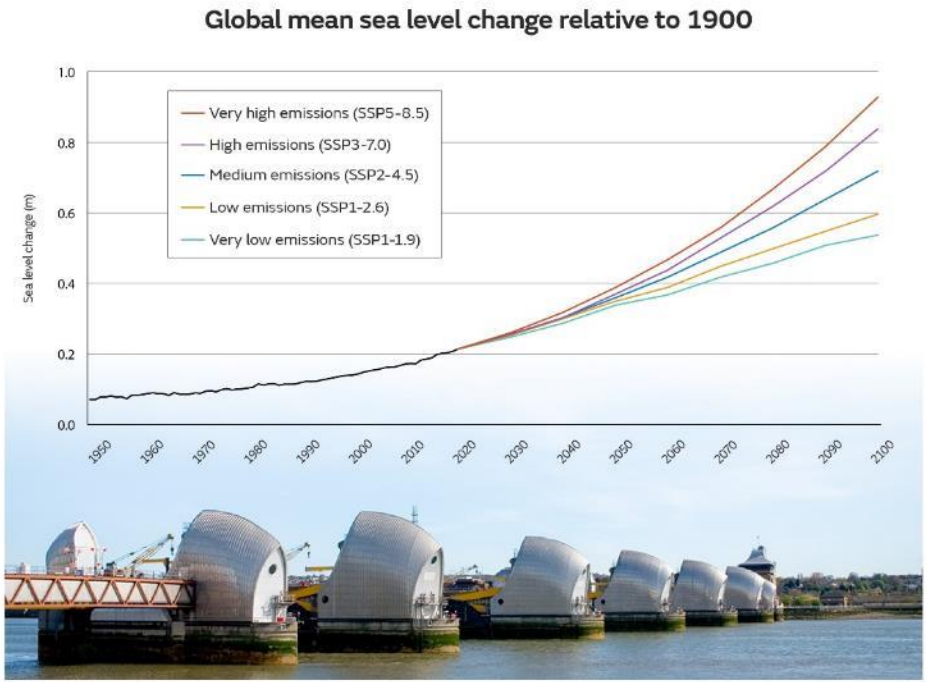
Those that would occur even if emissions stopped today

Future warming

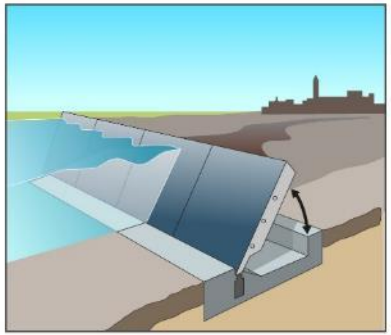
Planning for all possible outcomes including long-term, worst-case scenarios

It is not possible to eliminate all climate risks and the faster emissions are reduced, the less likely that limits to adaption are reached.

Adapting to climate change is essential

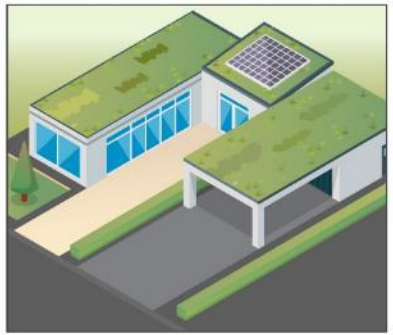


Other examples of adaptation



Flood protection

Reinforced rail network



Sustainable buildings

Water management

Met Office

Using UKCP

How to find the information you need

New to climate projections?

See Using climate projections for risk assessment on UKCP18 website

Looking for headline messages?

See Key results on UKCP18 website

Carrying out detailed analysis?

Select strand(s) of land projections based on task from UKCP User Interface/CEDA Archive

Increasing level of technical expertise

LONDON CLIMATE PACK

INTRODUCTION

This City Pack provides high level, non-technical summaries of climate change projections for an individual city or town. It uses scientific research to provide robust climate information to help decision makers plan for the future, enabling cities and towns to become more resilient to climate change.

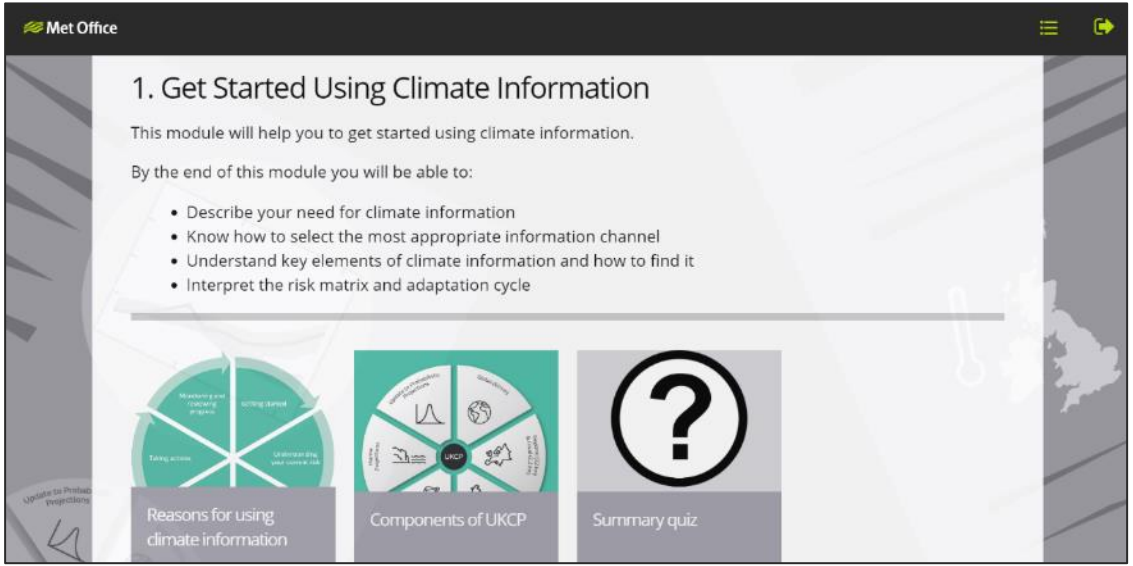
Urban areas experience unique challenges from climate change. For example, urban environments contain surfaces which don't soak up and store rainfall, such as tarmac and paving, which might increase flood risk. Urban areas are also affected by the urban heat island effect, which results in higher urban temperatures compared with surrounding rural areas.

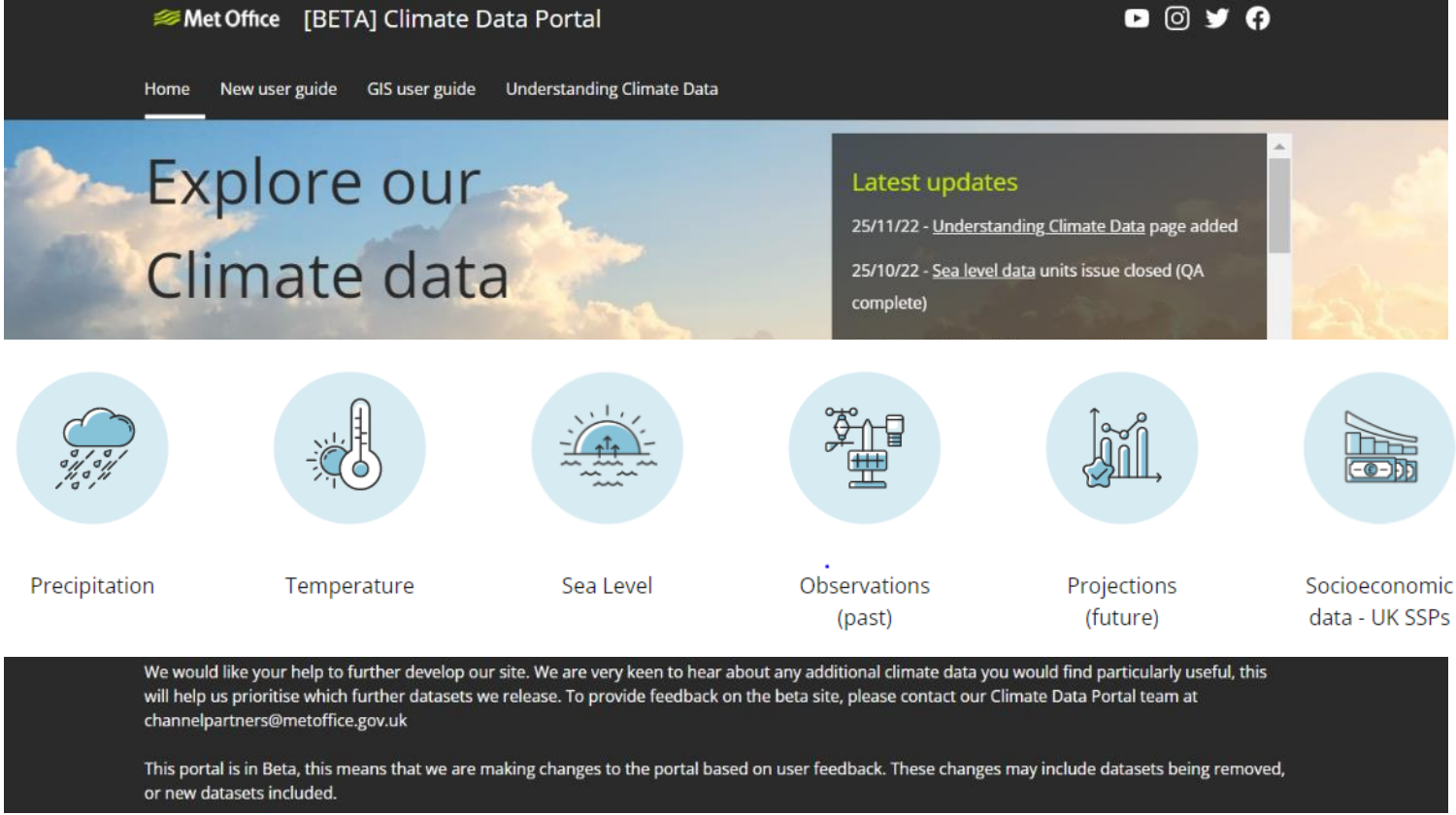
https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/spf/london-city-pack_august-2022.pdf

What will climate change look like near me?

https://www.bbc.co.uk/news/resources/idt-d6338d9f-8789-4bc2-b6d7-3691c0e7d138

E-learning - Please contact us here on the Met Office website and we'll get you started, please put "UKCP e-learning registration" as the subject





https://climate-themetoffice.hub.arcgis.com/