

Climate change future for Reading: update on the science

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Thanks to: James Murphy, David Sexton, Lizzie Kendon, Glen Harris, Matt Palmer, Fai Fung and the wider UKCP team!

Extreme weather is already having an impact on UK society

Impacts of extreme weather and climate change permeate through society affecting lives and livelihoods



UK Flooding Events 2007



UK Heatwave 2018

Changes in extremes from 1961-90 to 2008-17

Higher maximum temperatures

The average hottest day of the year has increased by 0.8 °C



2008-2017 average: **26.8 °C**
1981-2010 average: 26.7 °C
1961-1990 average: **26.0 °C**

Longer warm spells

Warm spells have more than doubled in length – increasing from 5.3 days in 1961-90 to 13.2 days in 2008-2017



Higher minimum temperatures

The average coldest day of the year has become 1.7 °C milder



2008-2017 average: **-6.8 °C**
1981-2010 average: -7.6 °C
1961-1990 average: **-8.5 °C**

Fewer very cold days

The number of days where max temps don't rise above 0 °C has been decreasing

1961-1990 average: 4.8 days
1981-2010 average: 3.6 days
2008-2017 average: 3.2 days

Shorter dry spells

Overall, the longest dry spells have decreased by 2.5 days on average



More rain on wettest days

Total rainfall from extremely wet days* has increased by about 17%



1961-1990
average: 64.0mm



2008-2017
average: 75.0mm

*days exceeding the 99th percentile of 1961-90 rainfall

Observations for the globe and the UK show changes in weather and climate

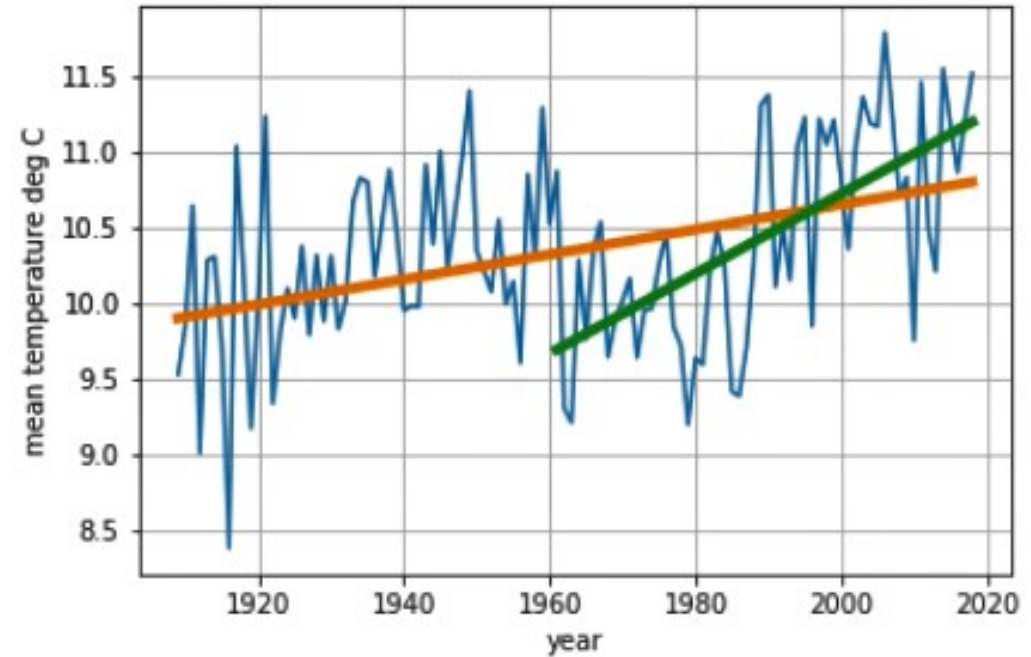
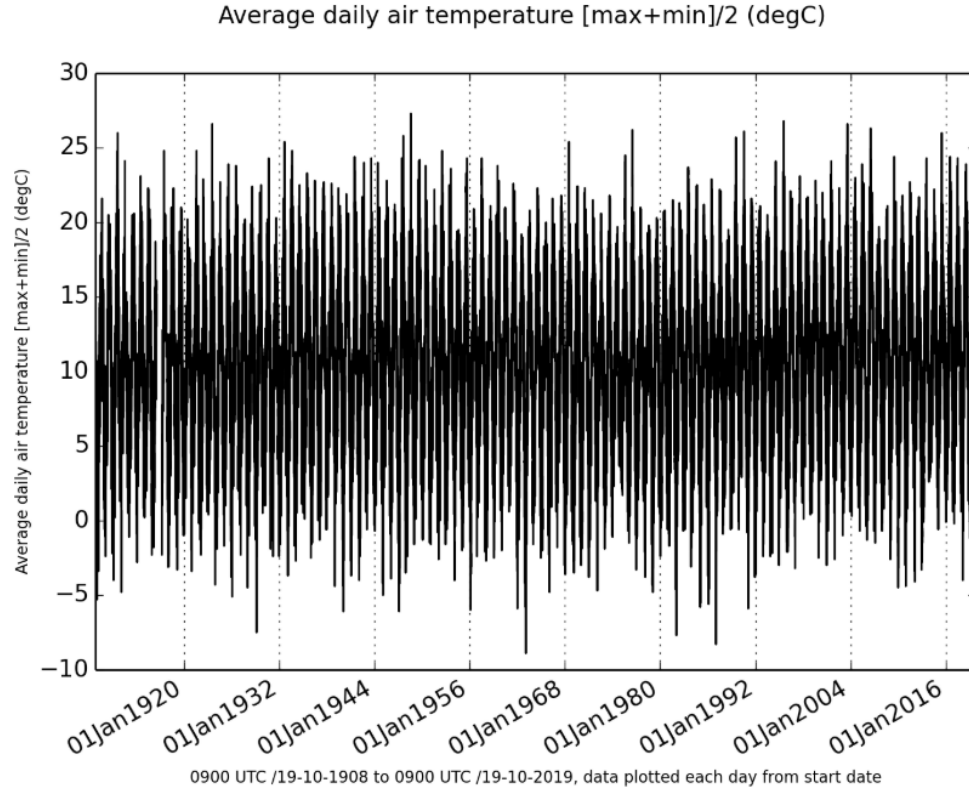
- Changes in extremes of climate and weather are being observed
- Warming amounts differ from the global average and by season
- Rainfall is also changing, in total terms and intensity in heavy events
- Sea level has risen around entire UK coastline

*For detailed definitions about how these metrics are calculated please refer to the extremes supplement report



@metoffice /themetoffice /metoffice

Looking at the weather record for Reading



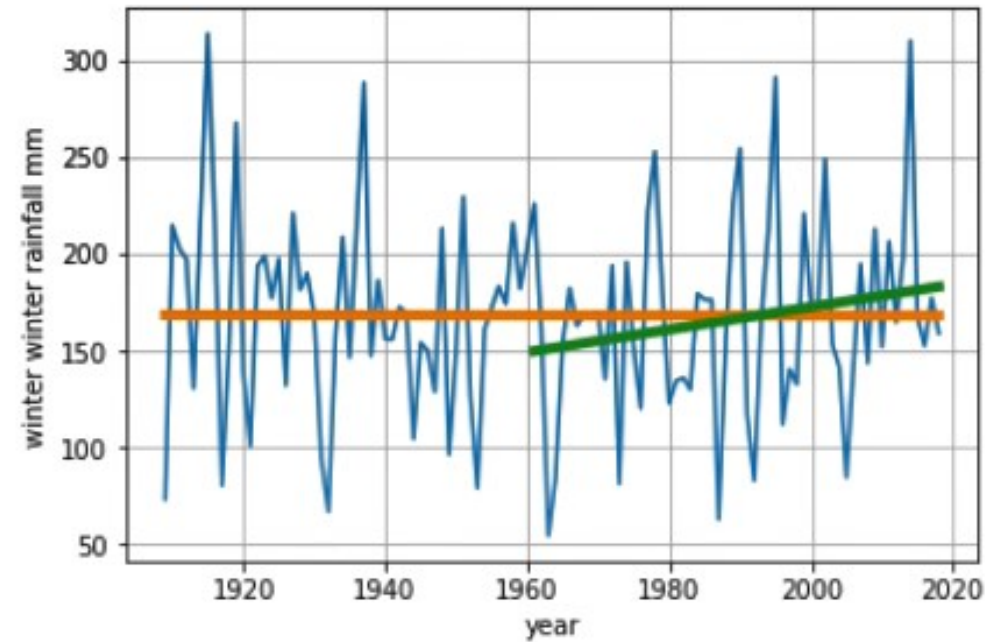
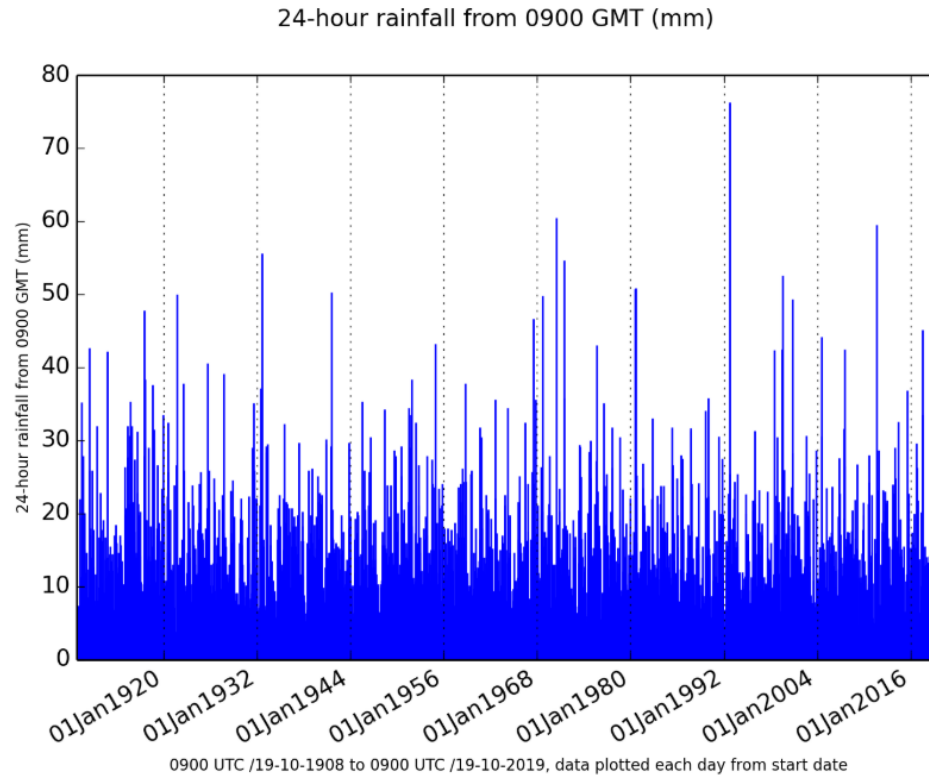
Since 1961, 0.26°C per decade

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Looking at the weather record for Reading



Since 1961, 5.8mm per decade

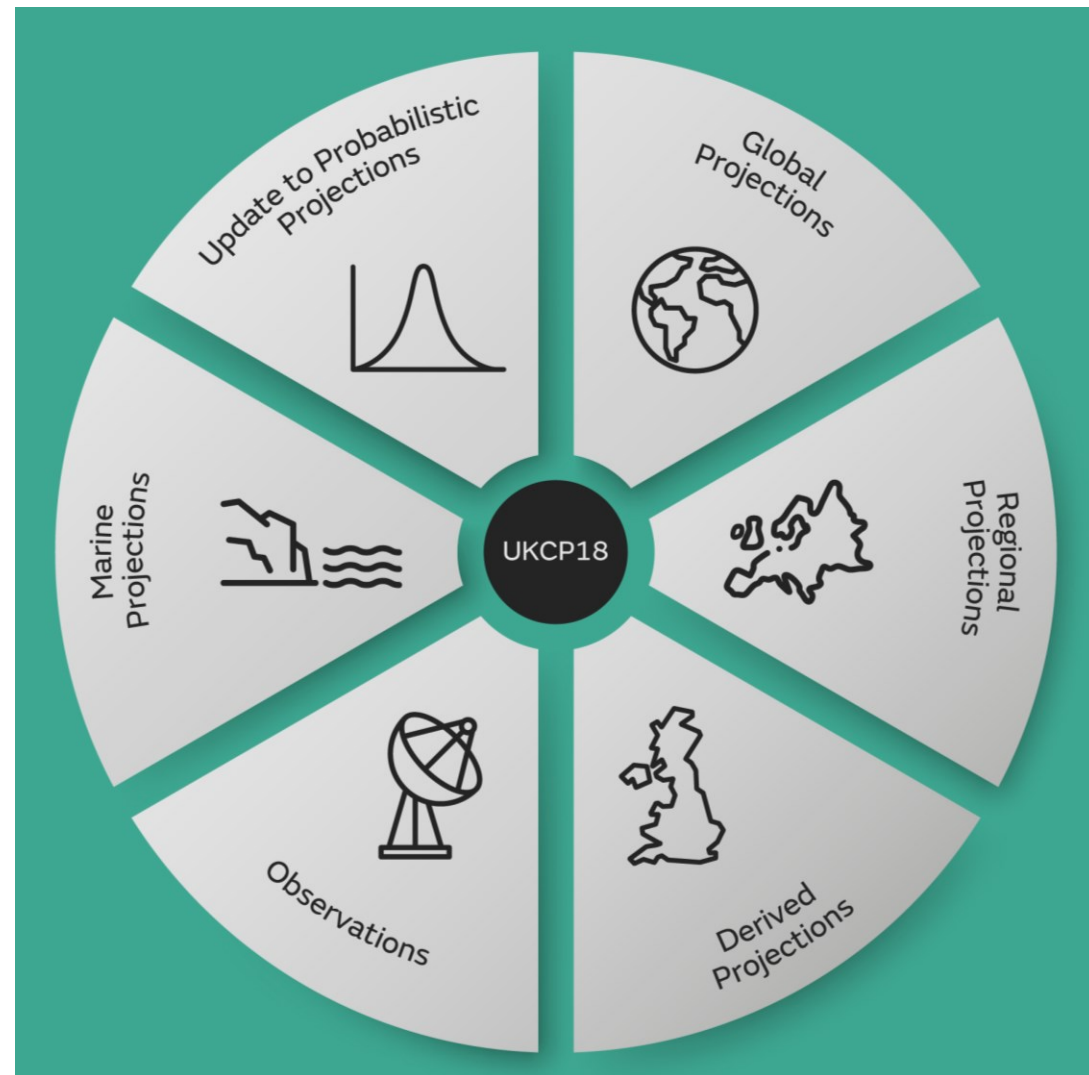
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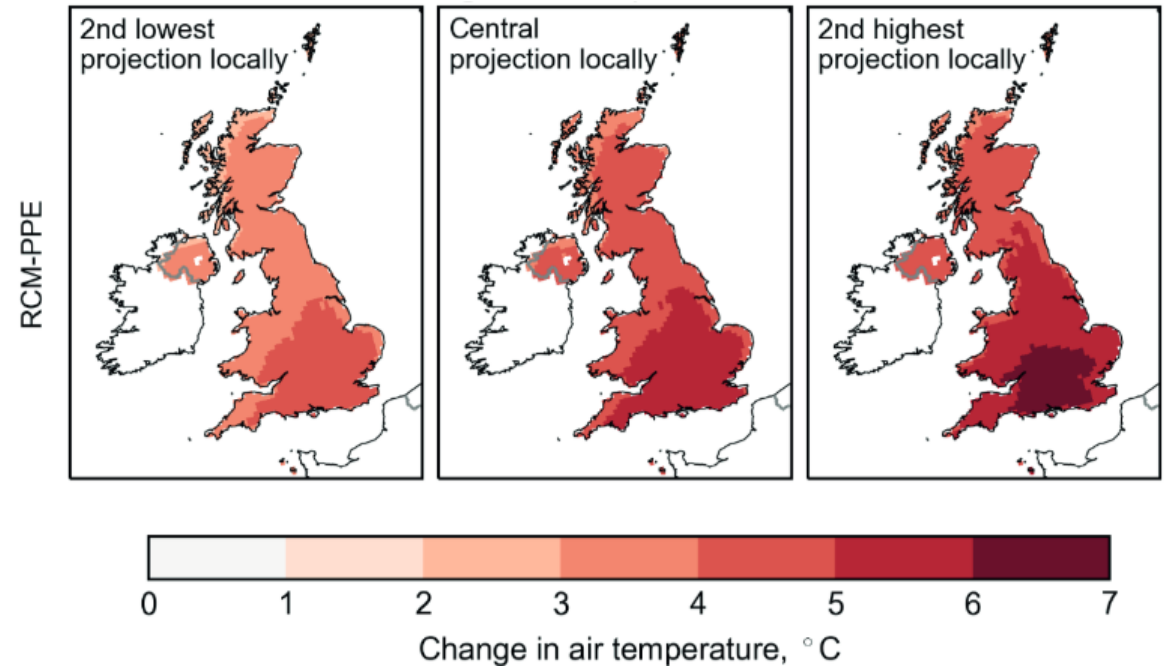
What about the future?

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



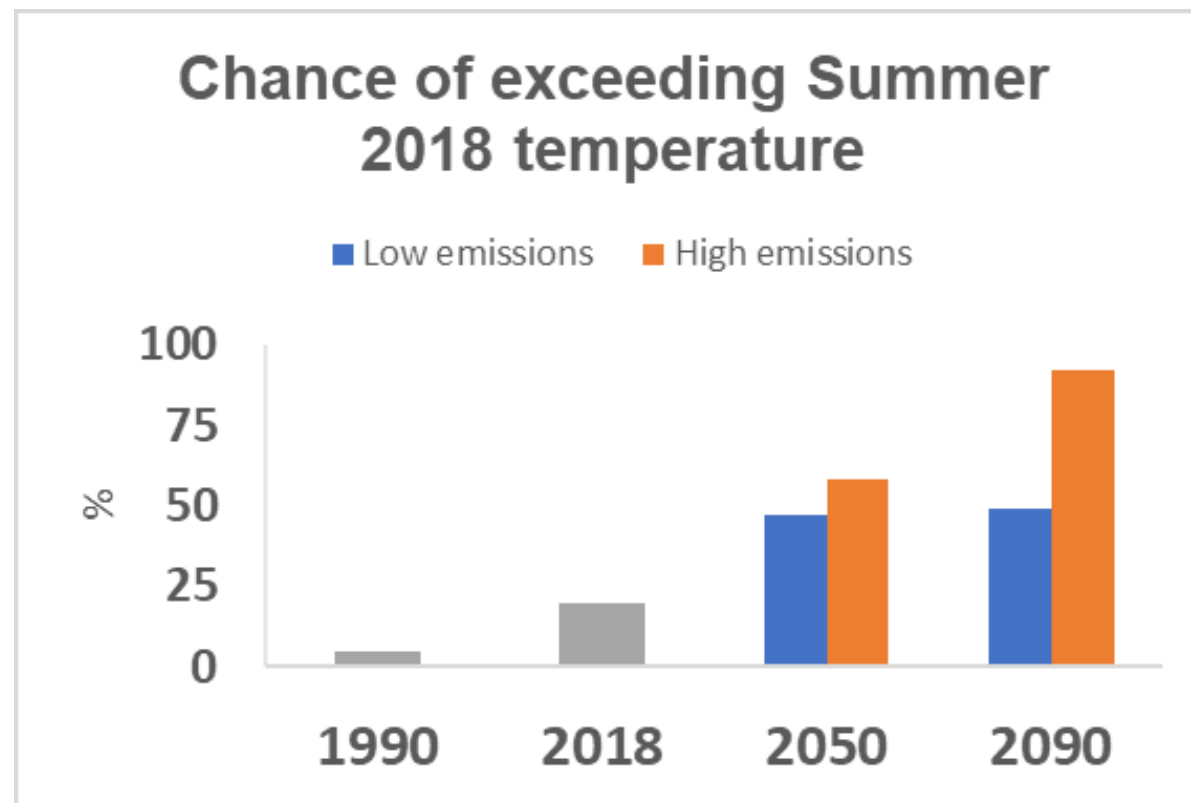
Future UK temperatures

- All areas of the UK are projected to experience warming
- Warming is greater in the summer than the winter
- Future rise depends on the amount of greenhouse gases the world emits
- The lowest scenario is compatible with aims to limit global warming since pre-industrial levels to below 2°C
- The highest scenario will likely require significant further adaptation

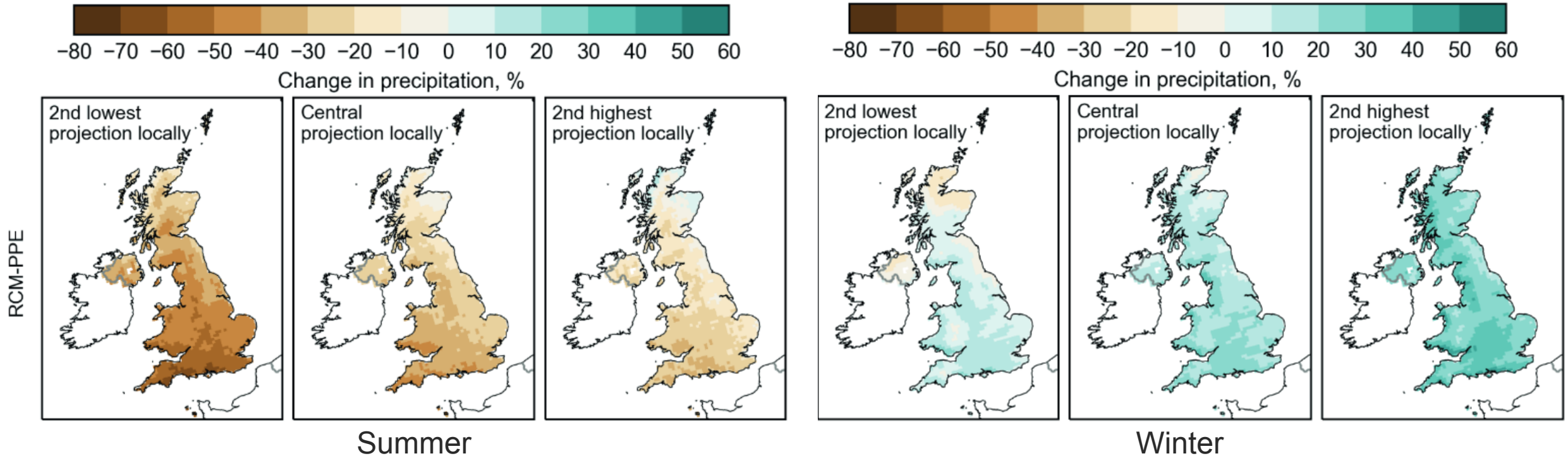


Summer 2018 heatwave

- Chance of such hot summers low in the baseline period (<10%)
- By mid-century the chance of hot summers will be of the order of 50%
- Beyond 2050 the chance of a warmer summer more strongly depends on emission scenario

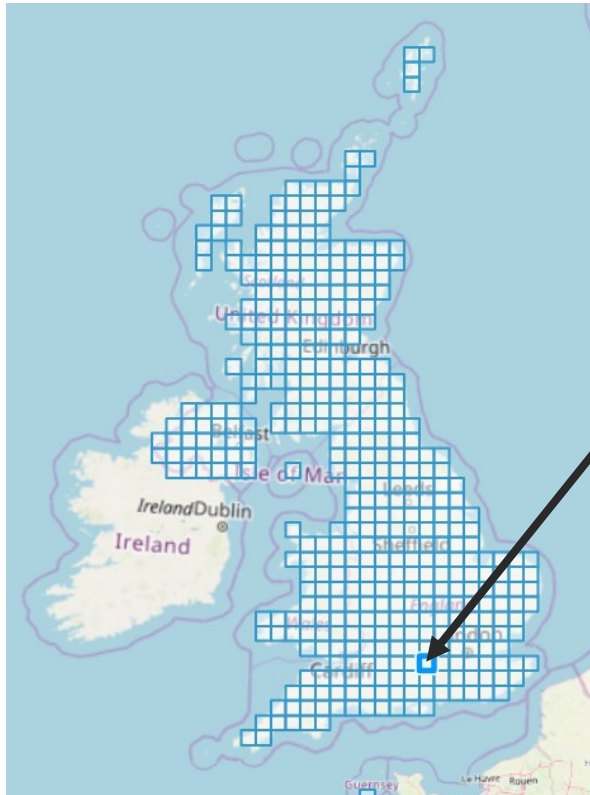


Future UK precipitation change



The spatial pattern of change to 2061-2080 shows detailed structure over the UK (RCP8.5). Compare SE England and N Scotland.

What changes do we project for Reading?



User interface allows selections of South East Region, or particular 25km locations within the region

select product select inputs generating product product

Product Selection

Filters [Clear all](#)

17 products selected

Collection

- ☐ Land projections: global (60km) (3)
- ☐ Land projections: probabilistic (25km) (5)
- ☐ Land projections: regional (12km) (3)
- ☐ Marine projections (6)

Scenario

- ☐ RCP 2.6 (11)
- ☐ RCP 4.5 (11)
- ☐ RCP 6.0 (5)
- ☐ RCP 8.5 (17)
- ☐ SRES A1B (5)

Output

- ☐ Data only (5)
- ☐ Graphs (9)
- ☐ Maps (3)

Climate Change Type

- ☐ Absolute values (2)
- ☐ Anomaly values (17)

Products

The list of products displayed below can be filtered by selecting values for the various categories shown in the column to the left. Click on the links below to view further information or submit a request for a given product.

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

[View details](#) [Process XML](#) [Submit a request](#)

Keywords: Graphs, Anomaly values, RCP 2.6, RCP 4.5, RCP 6.0, RCP 8.5, SRES A1B, Land projections: probabilistic (25km)

Generates a plot of the Probability Density Function (PDF) or Cumulative Distribution Function (CDF) for a future change in one variable for one or more emissions scenarios. Results are available for anomalies for a given temporal average, time and location (on a 25km grid or a regional average).

Plot: Joint probabilities for probabilistic projections (25km) over UK, 1961-2100

[View details](#) [Process XML](#) [Submit a request](#)

Keywords: Graphs, Anomaly values, RCP 2.6, RCP 4.5, RCP 6.0, RCP 8.5, SRES A1B, Land projections: probabilistic (25km)

Generates a plot of Joint Probability of future change in two selected variables for one emissions scenario. Results are available for anomalies for a given emissions scenario, temporal average, time, location (on a 25km or regional average).

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

[View details](#) [Process XML](#) [Submit a request](#)

Keywords: Maps, Anomaly values, RCP 2.6, RCP 4.5, RCP 6.0, RCP 8.5, SRES A1B, Land projections: probabilistic (25km)

Generates maps of 10th, 50th and 90th percentiles of future changes over the UK for one variable from the probabilistic projections. Results are available for anomalies for a given scenario, temporal average, time and the 25km grid or regional averages.

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

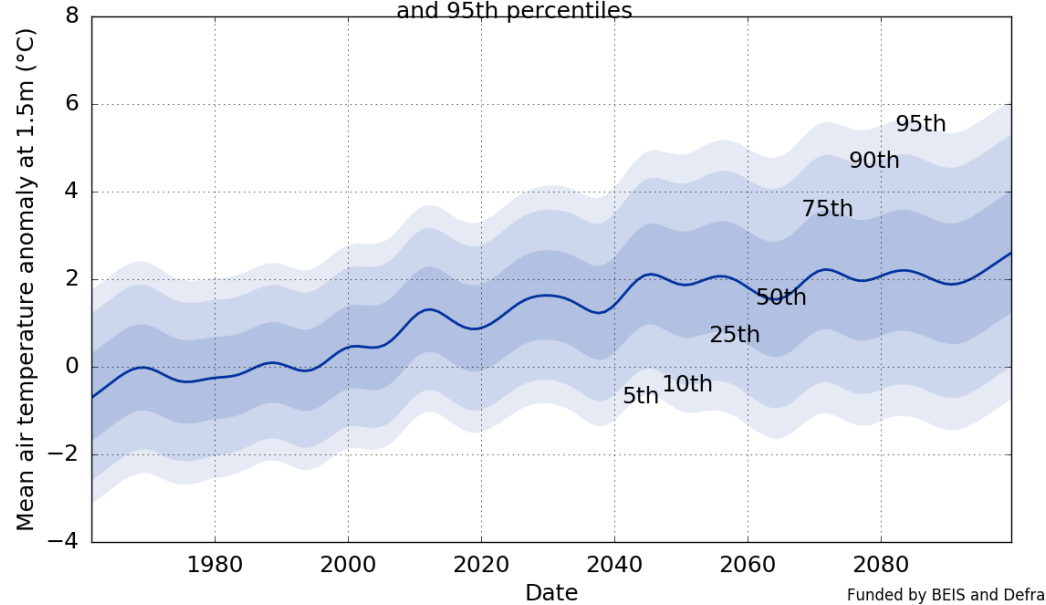
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What temperature changes do we project for Reading?

Low emissions (RCP2.6)

Met Office
Hadley Centre

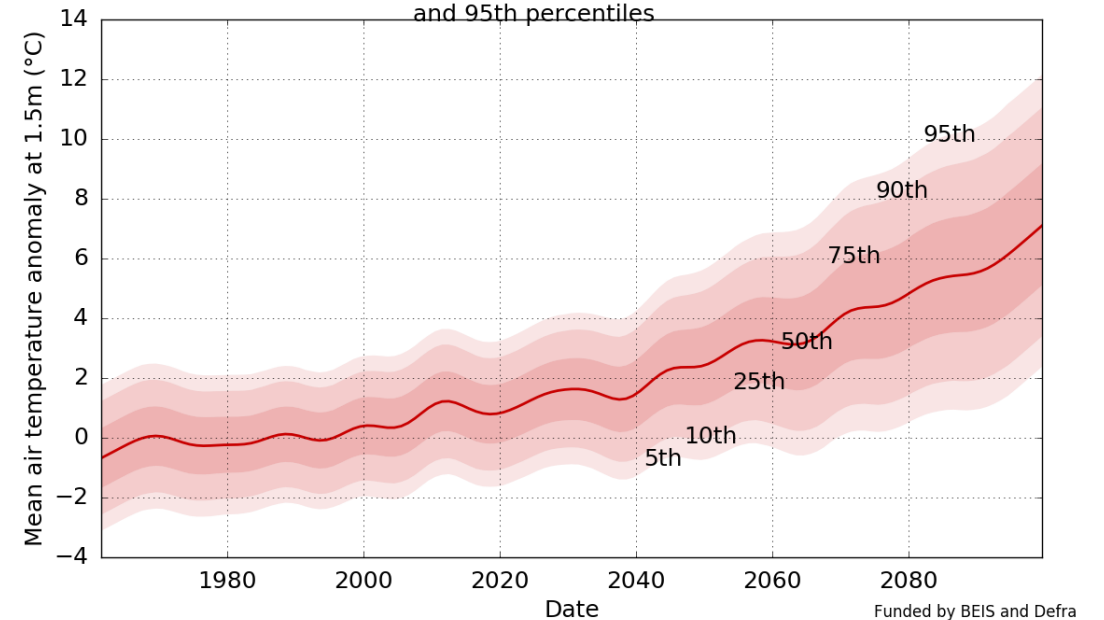
Seasonal average Mean air temperature anomaly at 1.5m (°C) for June July August in years 1961 up to and including 2099, for grid square 462500, 162500, using baseline 1981-2000, and scenario RCP 2.6, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



High emissions (RCP8.5)

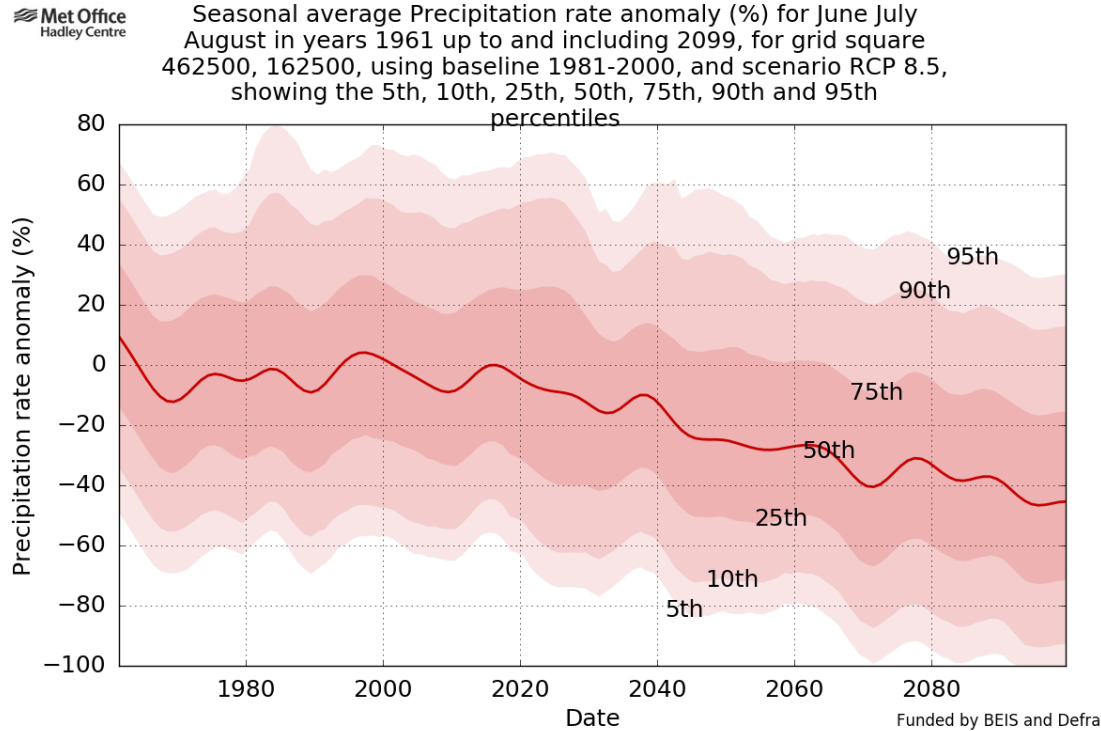
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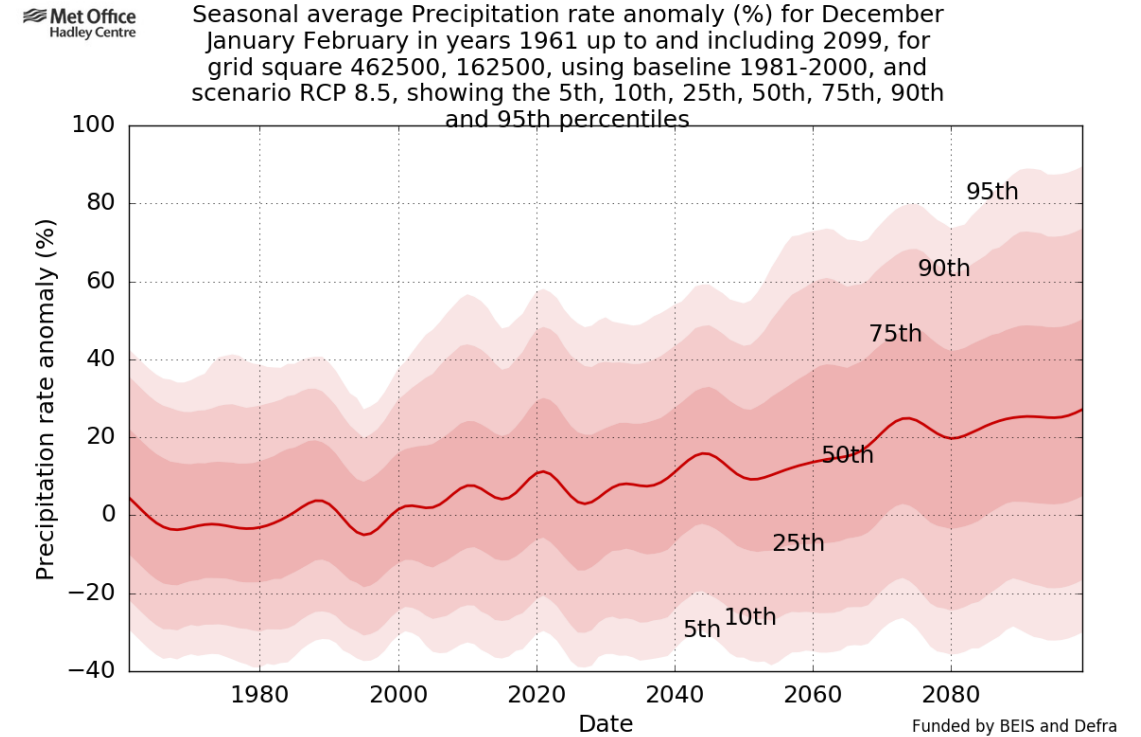


What precipitation changes do we project for Reading?

Summer reductions



Winter increases



High emissions (RCP8.5)

What climate changes might we need to adapt to in Reading?

Infrastructure disruption ?

Hotter extreme temperatures

More rainfall in winter season

A greater range of rainfall amounts

Potential for flash flooding increases

BUT

Reduced snow amount



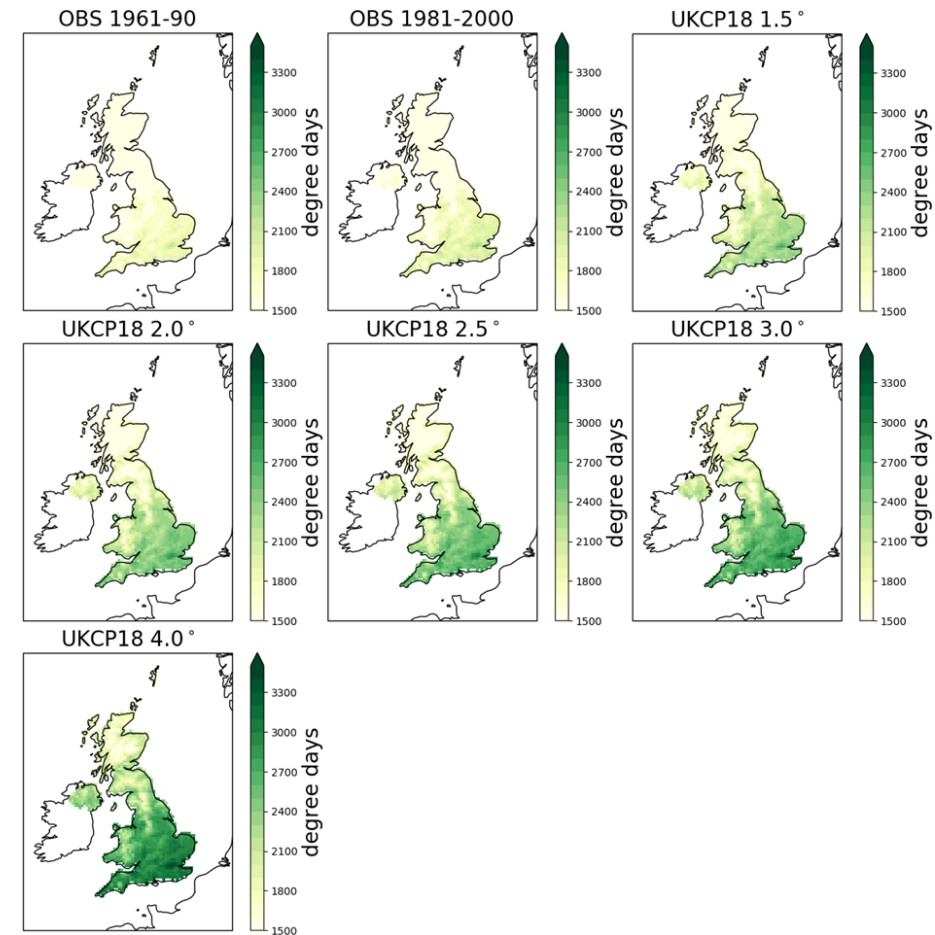
What climate trends might we need to consider for Reading?

Agriculture, land and water availability in Berkshire?

Length of growing season will increase
Number of frost days will decrease

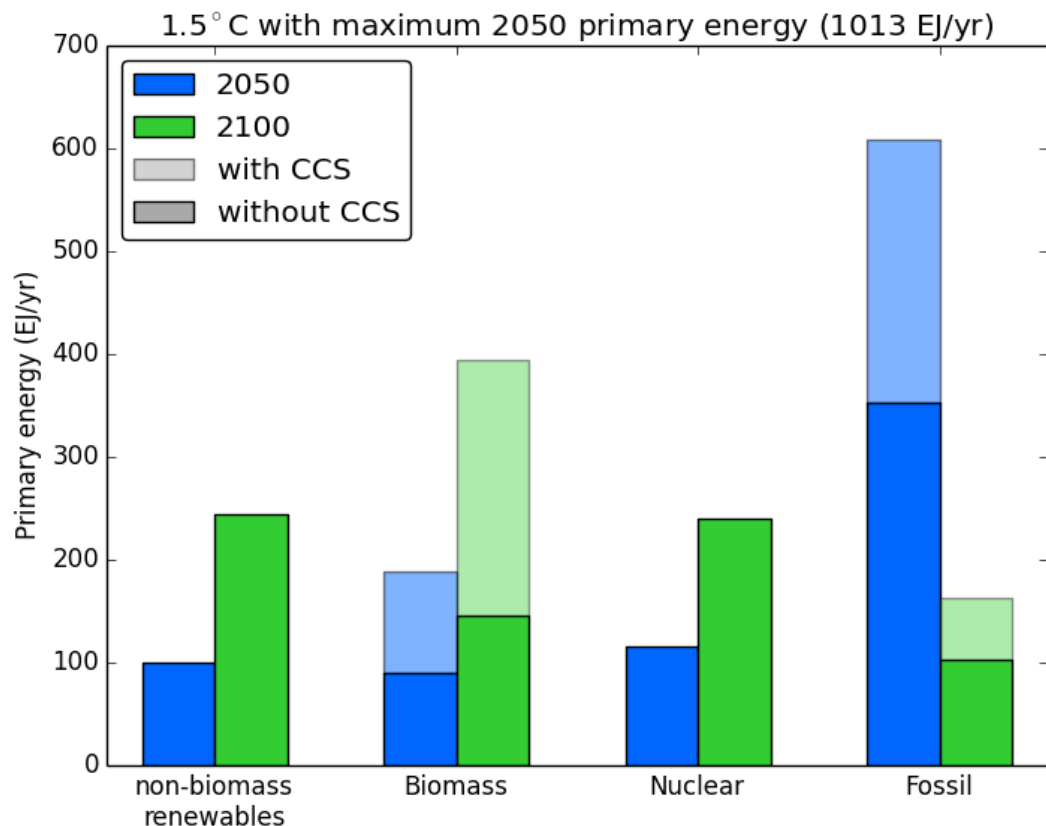
BUT

Considerably lower summer rainfall
Soil moisture will be lower
Access to crops potentially disrupted by extremes of rainfall. Impact of higher temperature?



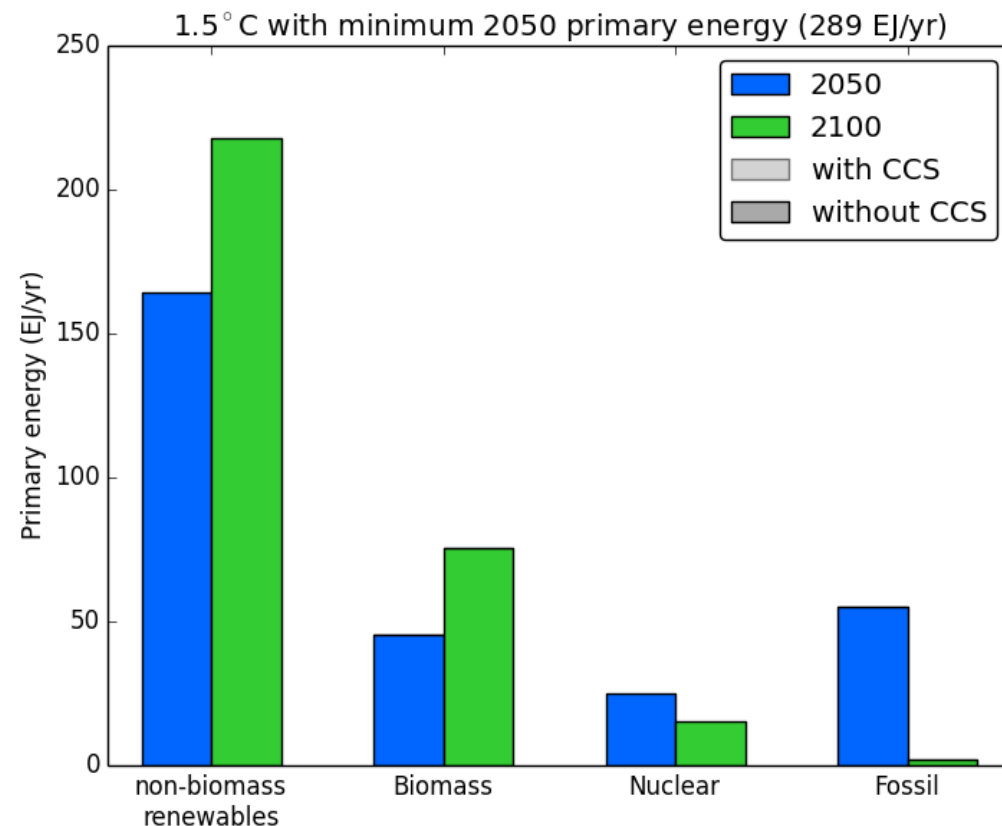
Which 1.5°C world to you want?

Higher energy demand



higher primary energy use, high reliance on CCS

Lower energy demand



lower primary energy use, less reliance on CCS



Thank you