

Appendix 4.5

Climate Change Data

1 CLIMATE CHANGE DATA

- 4.1 The following figures display the probabilistic change in selected climatic variables for grid reference 471344 east and 173981 north in the 2070-2099 period (i.e. to represent greater changes in climate towards the end of the proposed development's assumed 50-year operational lifetime) relative to a 1961 to 1990 climatic baseline.
- 4.2 The below projections have been made using three 'Representative Concentration Pathways': RCP2.6, RCP6.0 and RCP8.5. These represent a range of possible assumptions about the economic, social and physical changes to our environment that will influence climate change. Therefore, each represent a global mean surface temperature averaged over 2081-2100 compared to the preindustrial period (average between 1850-1900) for the RCP pathways as outlined in the table below.

Table 1: The increase in global mean surface temperature averaged over 2081-2100 compared to the preindustrial period (average between 1850-1900) for the RCP pathways.

RPC	Change in temperature (°C) by 2081-2100
RCP2.6	1.6 (0.9-2.3)
RCP6.0	2.8 (2.0-3.7)
RCP8.5	4.3 (3.2-5.4)

- 4.3 Other than wind speed (see paragraph 4.7), all the below predictions have been made between approximately the 10th and 90th percentiles, relative to a 1961-1990 baseline. For example, if at the 90th percentile a +20% change in rainfall is indicated, 90% of the projections undertaken by UK Climate Projections resulted in an increase in rainfall less than +20%. Using a range between 10th and 90th percentiles is therefore more robust as it allows for variation in the climate change projections. Again, other than wind speed (see paragraph 4.7), all the below predictions have employed the RCP6.0 scenario as a median option, with RCP2.6 and RCP8.5 providing context in Figures 1 to 8.
- 4.4 The average summer temperature is likely to increase by around +1.5°C to +6.5°C (Figure 1), with the average maximum temperature in summer increasing by approximately +1.5°C and +7.5°C (Figure 2). In winter, an average temperature increase of around +1°C to 4°C are likely (Figure 3). The maximum winter temperature is also likely to increase by approximately +1°C to 4°C (Figure 4), while the coolest temperature is likely to be up to around 0.75°C to +4.75°C warmer than in the baseline (Figure 5).
- 4.5 On an annual average basis, the likely range of change in precipitation is approximately -5% to +7.5%, with a bias in probability towards the precipitation increase (Figure 6). Daily mean summer precipitation may change by approximately -55% to +8% (Figure 7). In winter, increases in precipitation are more likely: up to -2% to +38% change in the winter mean (Figure 7).

- 4.6 An increase of up to +7% to +28% in annual mean relative humidity is predicted, taking the annual average relative humidity to around 79.5–82.5% (Figure 8).
- 4.7 Wind speed projections are provided with different parameter to other climatic data. Only the high emission scenario (RPC 8.5), which returns the greatest changes relative to 1981–2000 levels, is available from UKCP18. Wind speed data is presented for 12 possible outcomes, or “members”, as presented in Figure 9 to 11. Summary maps provided in Figure 9 suggest that for the south east region in the 2060-2079 period, the change in average annual wind speed plausibly ranges from -1 m.s^{-1} to $+1 \text{ m.s}^{-1}$, with more members indicating the lower end of that range. The change in average wind speed in winter plausibly ranges from -1 m.s^{-1} to 1 m.s^{-1} , with more members indicating the higher end of that range (Figure 10). The change in average wind speed in summer plausibly ranges from -1 m.s^{-1} to 0 m.s^{-1} (Figure 11).
- 4.8 In addition to these projections of climatic parameters, the probability of extreme weather events is also expected to increase, which may include greater likelihood of:
- Summer drought conditions;
 - Winter storm conditions (i.e. high winds, precipitation); and
 - Other extreme rainfall events (e.g. summer thunderstorm).

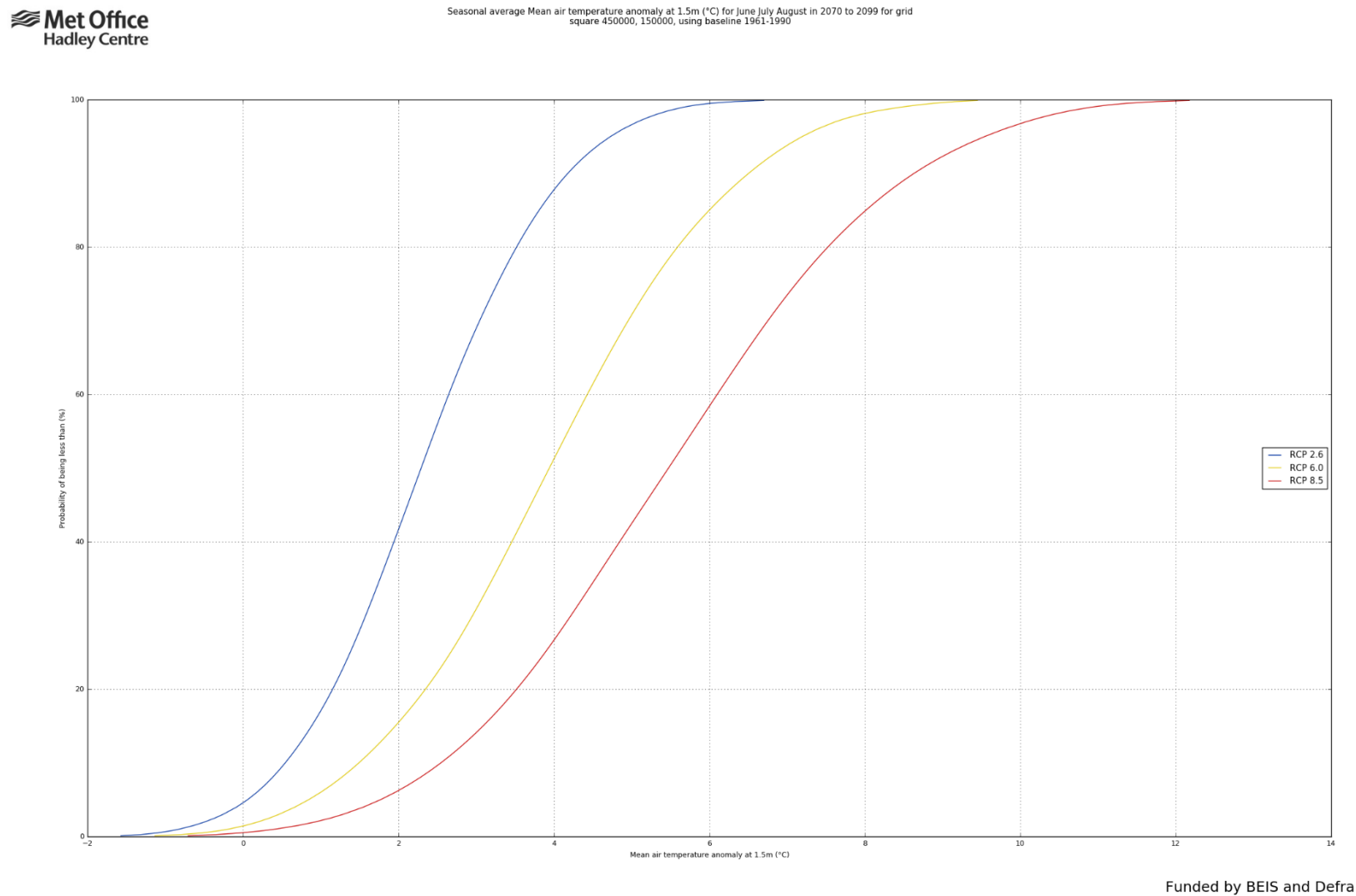
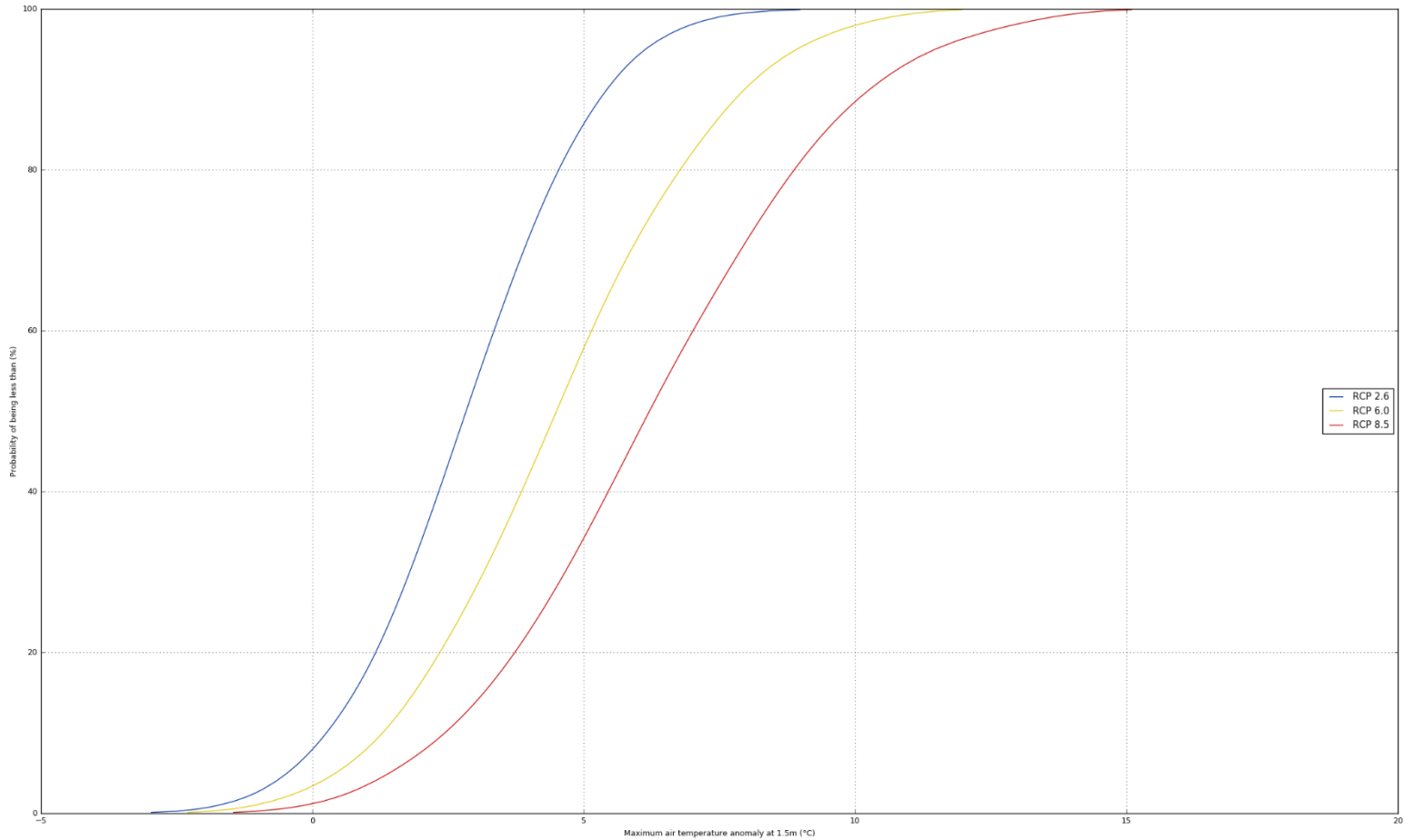


Figure 1: Summer mean temperature.



Seasonal average Maximum air temperature anomaly at 1.5m (°C) for June July August in 2070 to 2099 for grid square 450000, 150000, using baseline 1961-1990

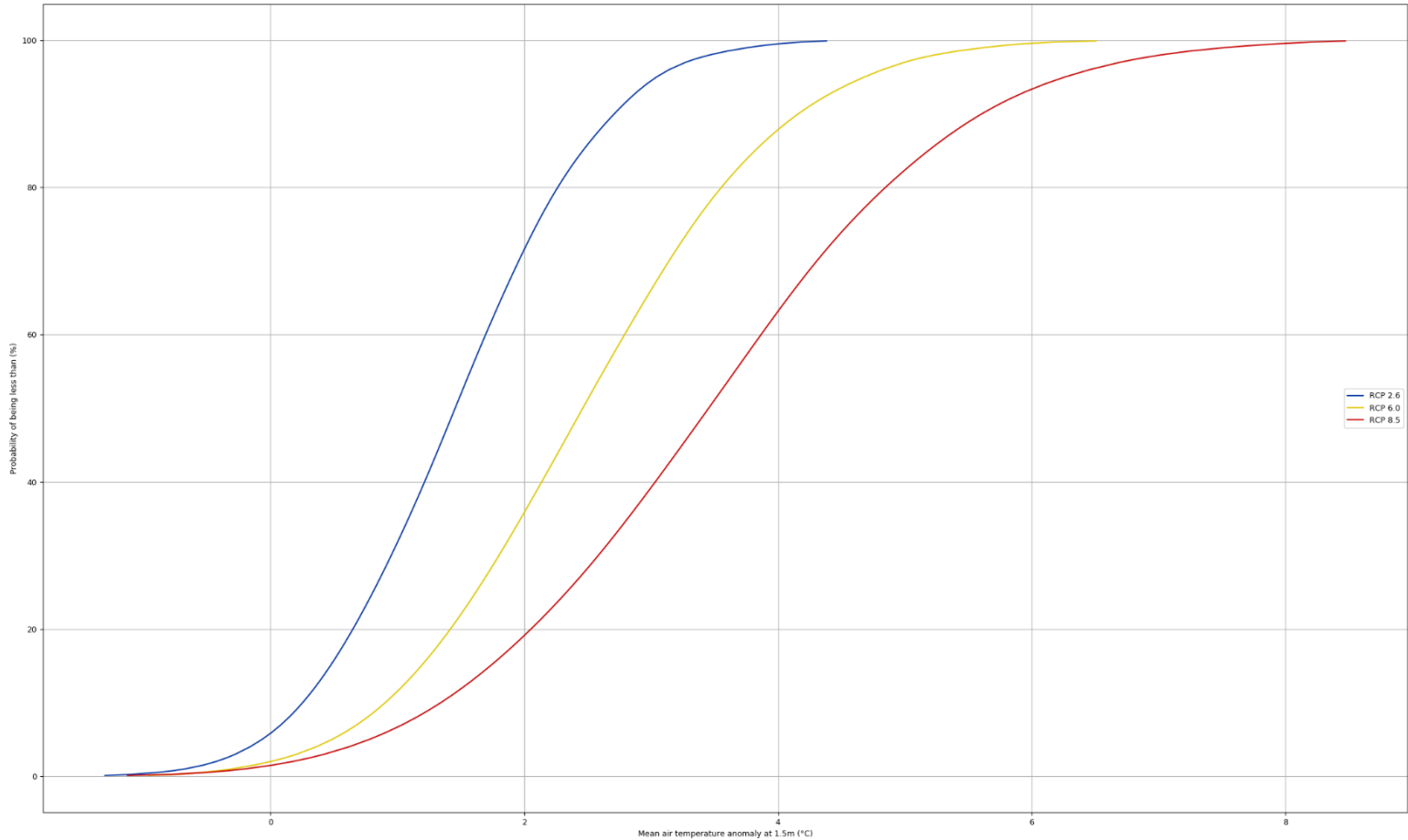


Funded by BEIS and Defra

Figure 2: Summer maximum temperature.



Seasonal average Mean air temperature anomaly at 1.5m (°C) for December January February in 2070 to 2099 for grid square 450000, 150000, using baseline 1961-1990



Funded by BEIS and Defra

Figure 3: Winter mean temperature.

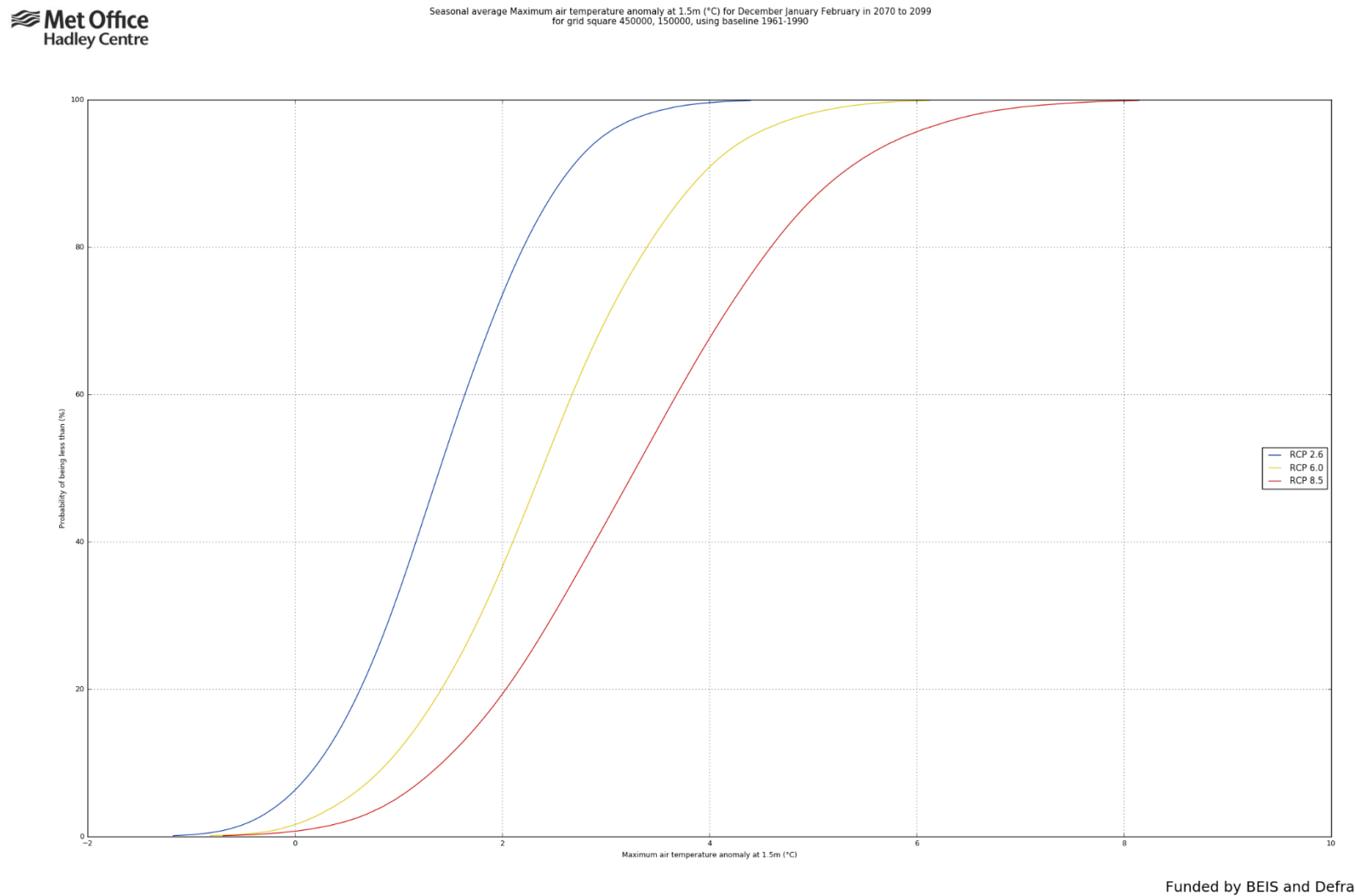
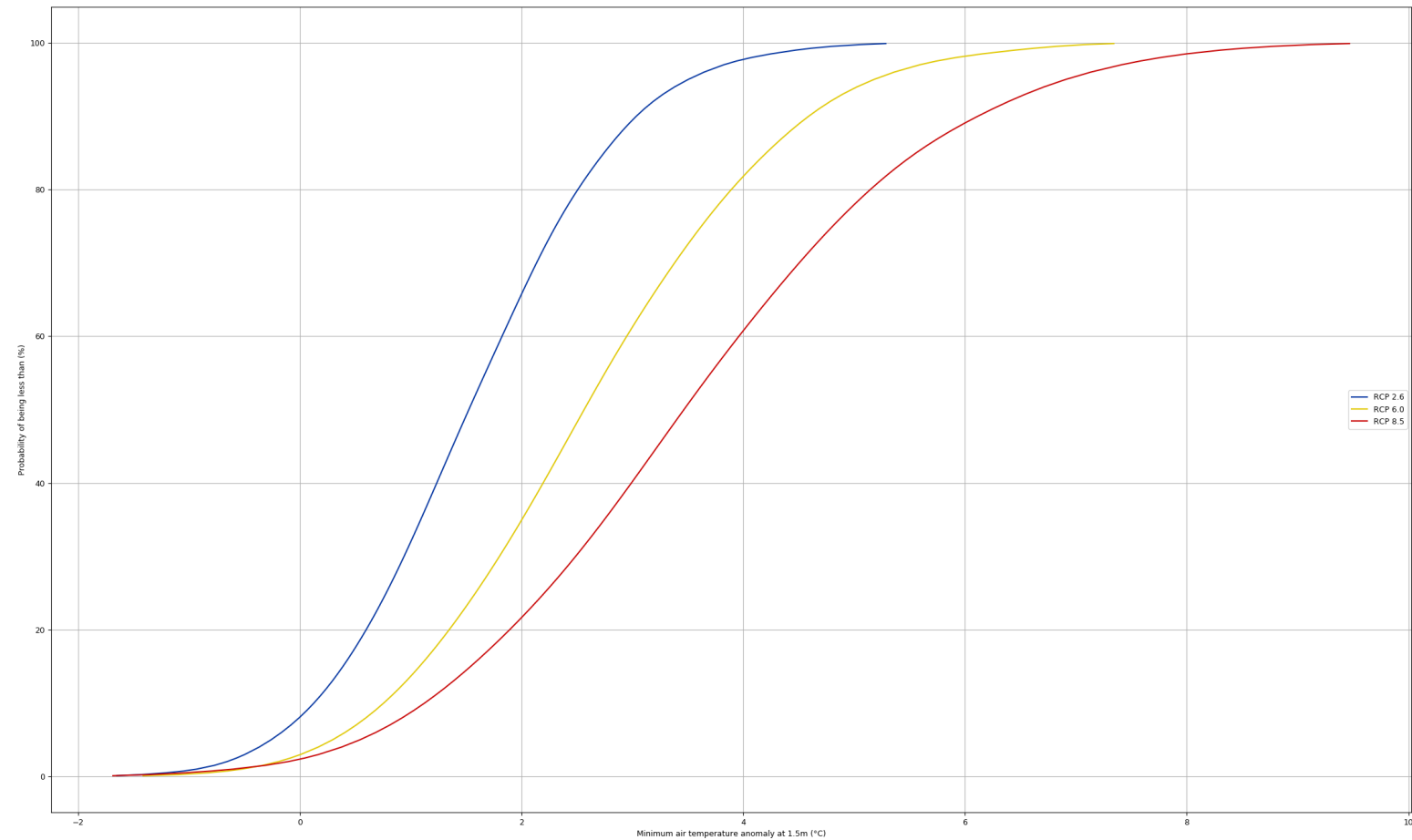


Figure 4: Winter maximum temperature.



Seasonal average Minimum air temperature anomaly at 1.5m (°C) for December January February in 2070 to 2099
for grid square 450000, 150000, using baseline 1961-1990



Funded by BEIS and Defra

Figure 5: Winter minimum temperature.

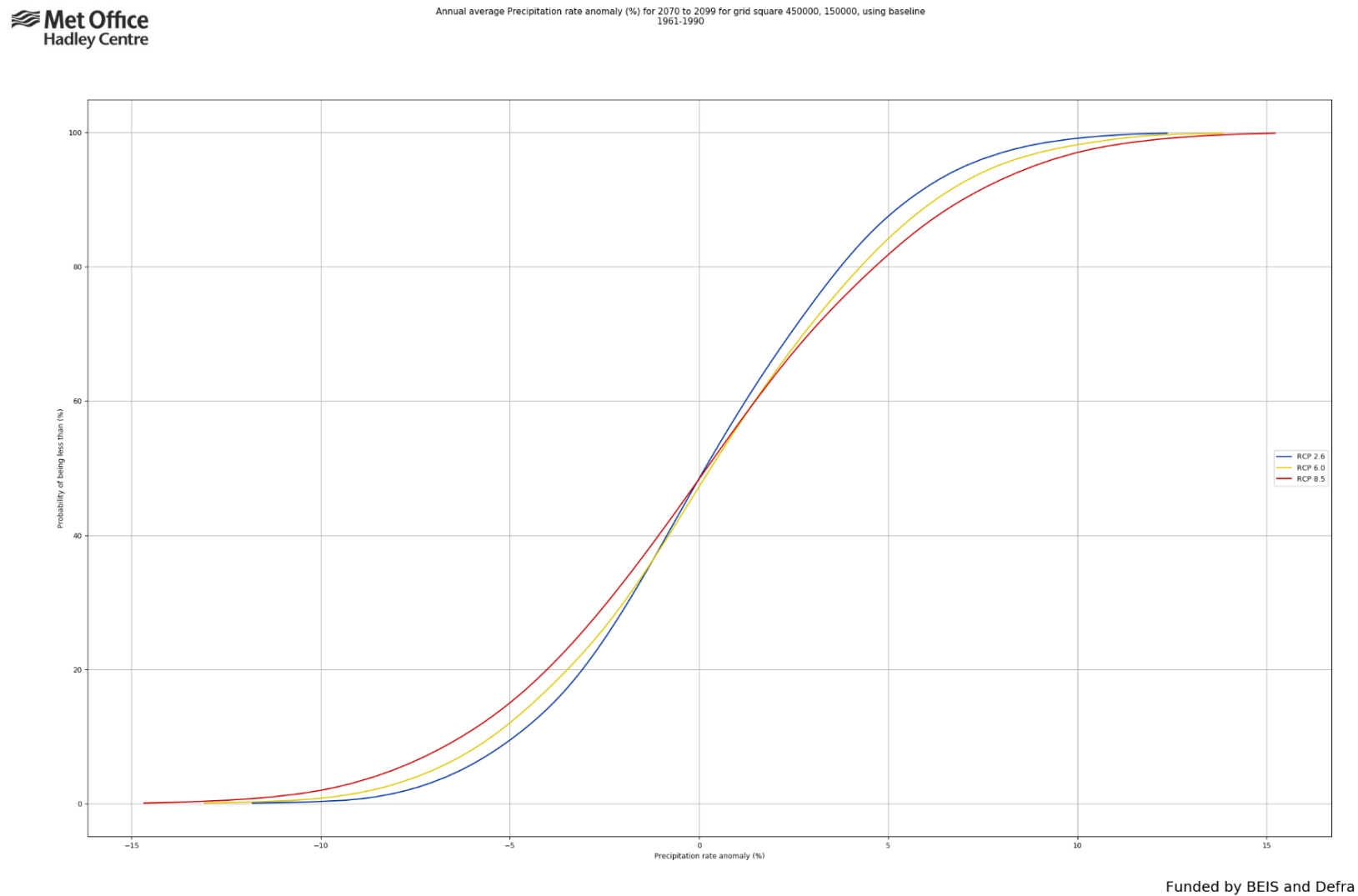


Figure 6: Annual Precipitation Rate.

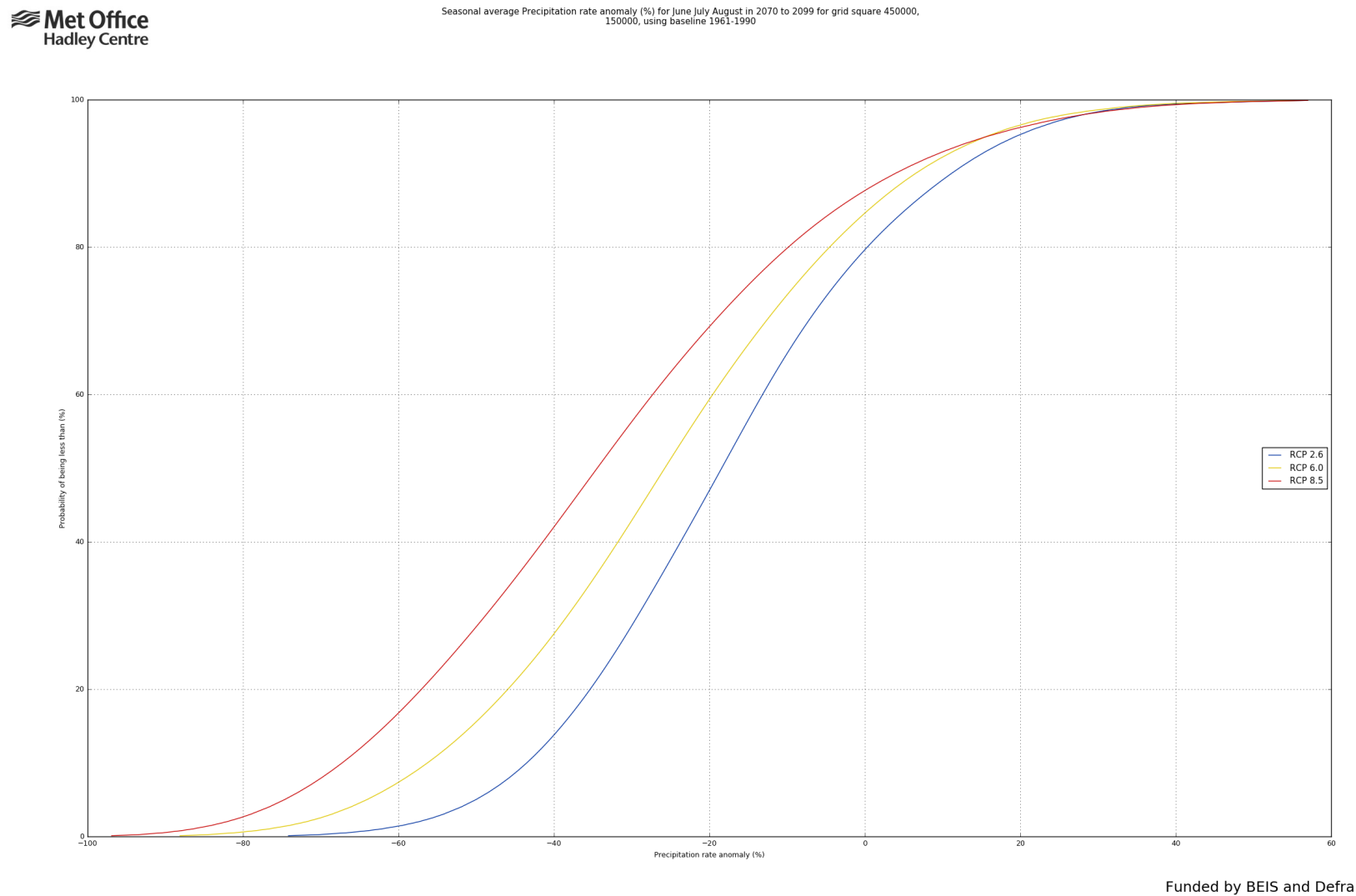
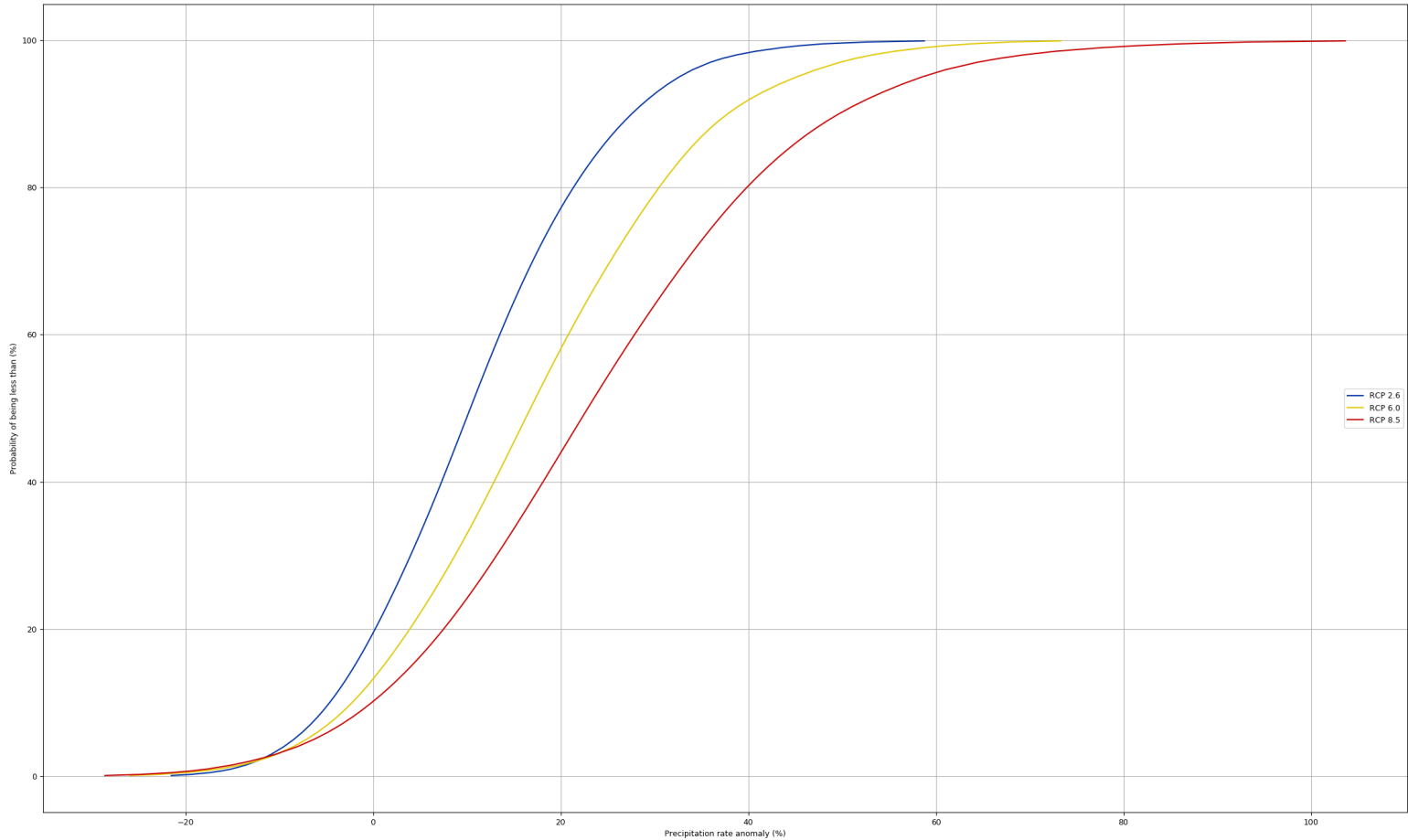


Figure 7: Summer Precipitation Rate.



Seasonal average Precipitation rate anomaly (%) for December January February in 2070 to 2099 for grid square 450000, 150000, using baseline 1961-1990



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Figure 7: Winter Precipitation Rate.

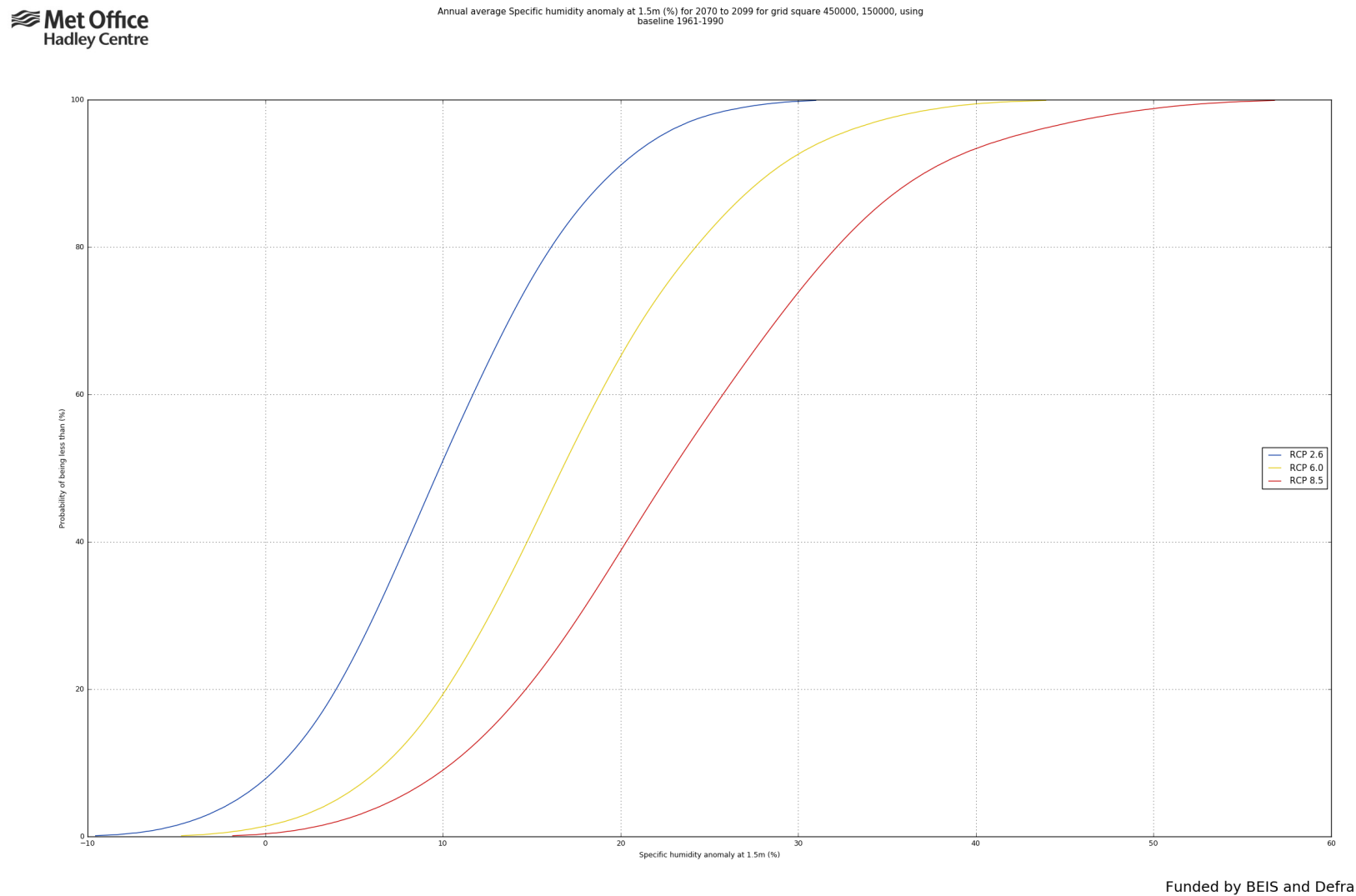
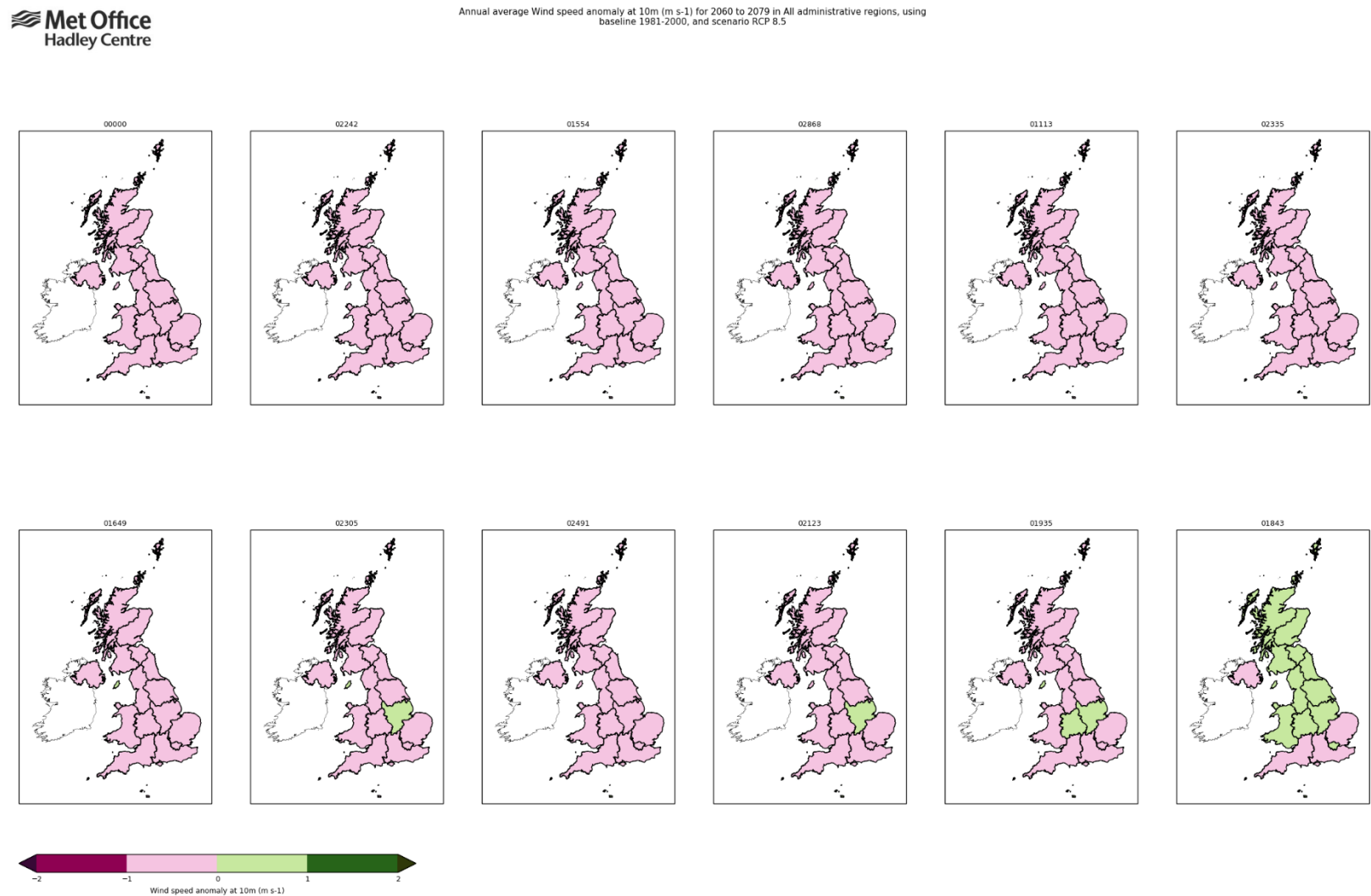
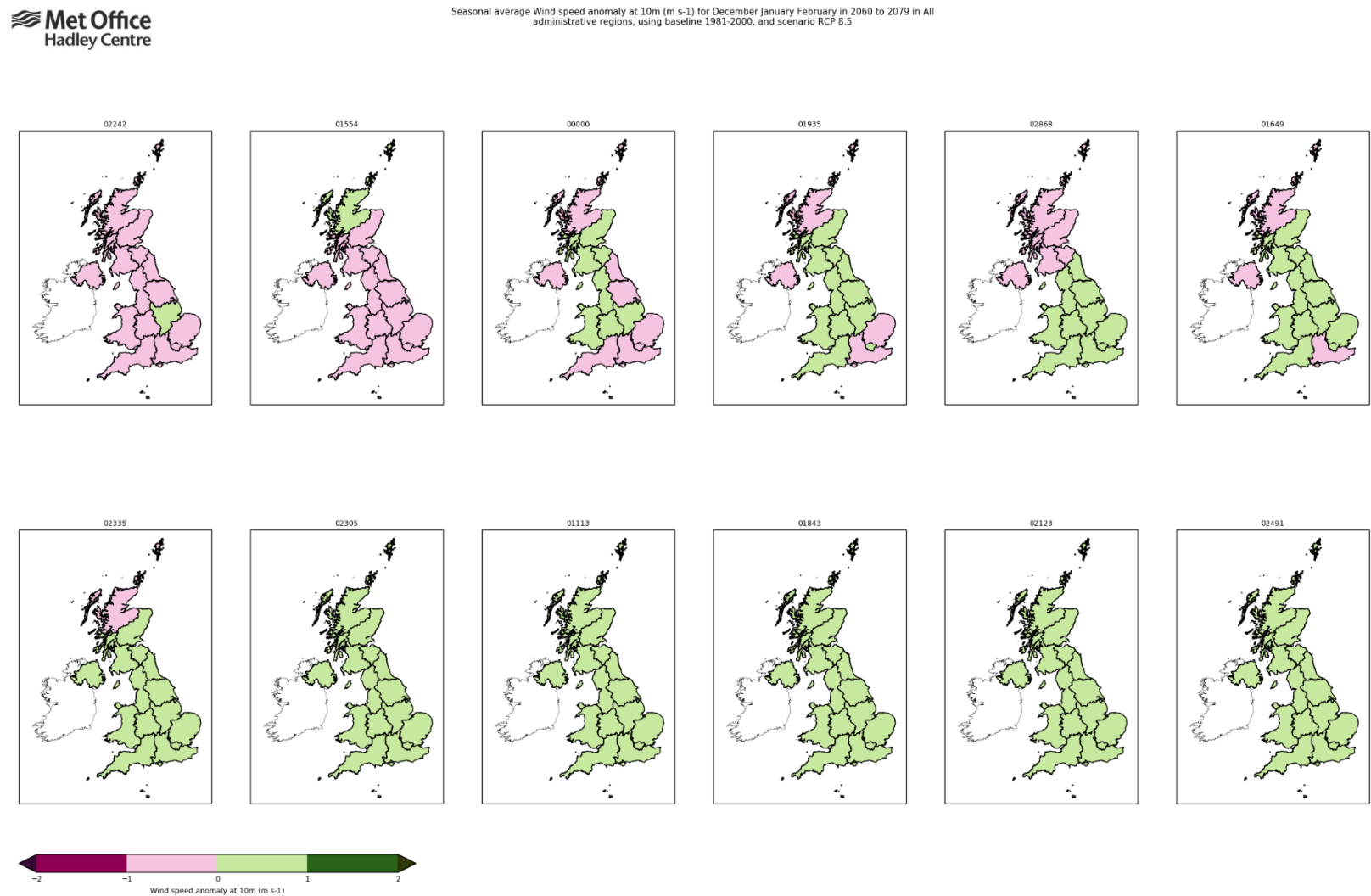


Figure 8: Annual Humidity.



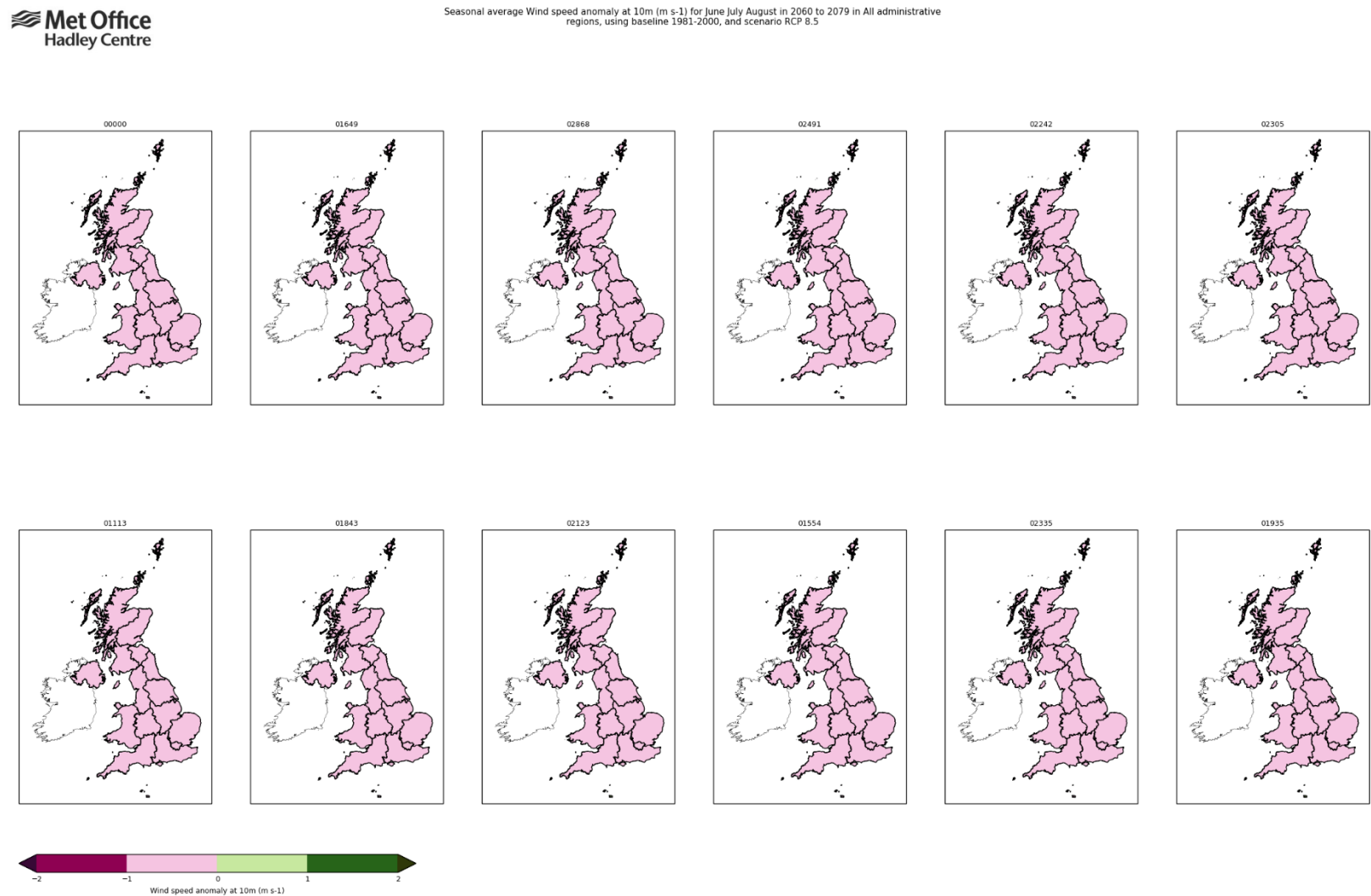
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Figure 9: Annual Wind Speed.



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Figure 10: Winter Wind Speed.



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Figure 11: Summer Wind Speed.