

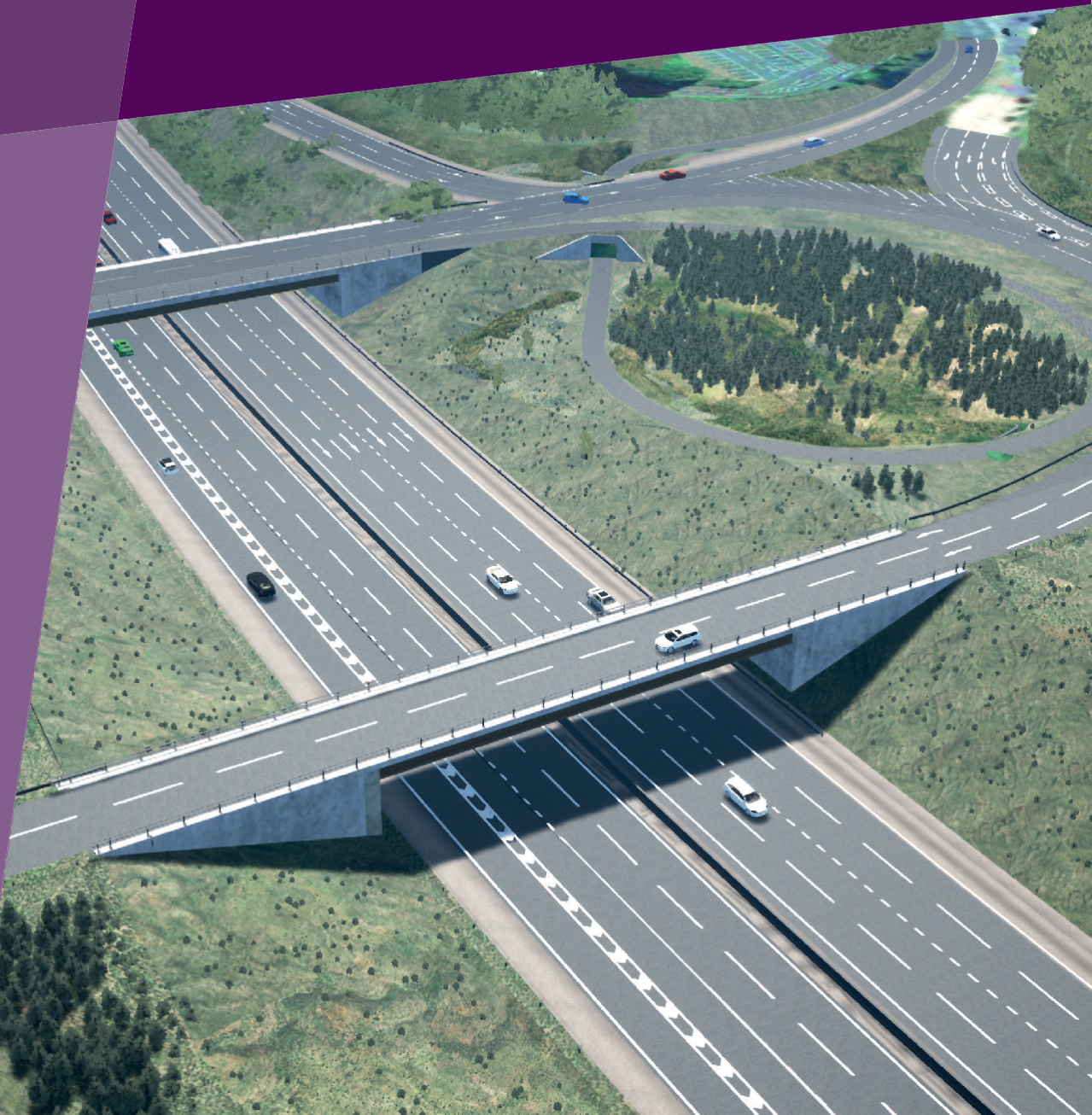
# M3

## junction 9 improvement scheme

### Preliminary Environmental Information Report

Appendix 14.1 – Climate Projections Data

May 2021



# Appendix 14.1 Climate Projections Data

## Appendix 14.1: Summary of Evolving Baseline Climate Projections

This document summarises the UK Climate Change Projections 2018 (UKCP18), produced by the UK Met Office, under the RCP8.5 probabilistic land projections for the two 25 km grid cell within which the M3 Junction 9 Improvement site is located (Grid Square 437500 E, 137500 N and 462500 E, 137500 N). This document should be read alongside PEIR [Chapter 14 Climate Change](#).

### Average Climatic Norms

#### Temperature

[Figure 14.1](#), [14.2](#) and [Table 14.1](#) show the projections for annual average mean air temperature. The projections show an almost continuous increase in annual average temperature over the next 60 years from the opening year of the Proposed Scheme.

Table 14.1: Mean average anomaly at 1.5 m (°C)

Date	Percentile						
	5th	10th	25th	50th	75th	90th	95th
2020	-0.55	-0.26	0.23	0.78	1.32	1.81	2.09
2026	-0.43	-0.13	0.37	0.91	1.47	1.96	2.26
2041	-0.02	0.30	0.85	1.48	2.11	2.68	3.03
2066	0.59	1.04	1.83	2.73	3.65	4.48	4.97
2086	1.43	1.99	2.97	4.09	5.27	6.33	6.95

#### Precipitation

[Figure 14.3](#), [14.4](#) and [Table 14.2](#) shows the projections for the annual average precipitation rate. The projections show that annual precipitation is likely to vary from year to year, with both increases and decreases over the next 60 years from the opening year of the Proposed Scheme.

Table 14.2: Annual Precipitation rate anomaly (%)

Date	Percentile						
	5th	10th	25th	50th	75th	90th	95th
2020	-22.41	-16.60	-7.32	1.39	12.68	24.07	30.10
2026	-21.61	-16.78	-8.44	0.76	11.01	23.02	28.58
2041	-20.66	-16.17	-7.91	1.25	10.46	19.21	24.85
2066	-26.91	-21.34	-10.63	-0.83	9.39	21.32	28.52
2086	-23.47	-18.26	-9.12	1.73	14.36	24.61	29.60

Figure 14.1: Annual Average Mean Temperature, Grid Square 437500, 137500



Annual average Mean air temperature anomaly at 1.5m (°C) for years 1961 up to and including 2099, for grid square 437500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

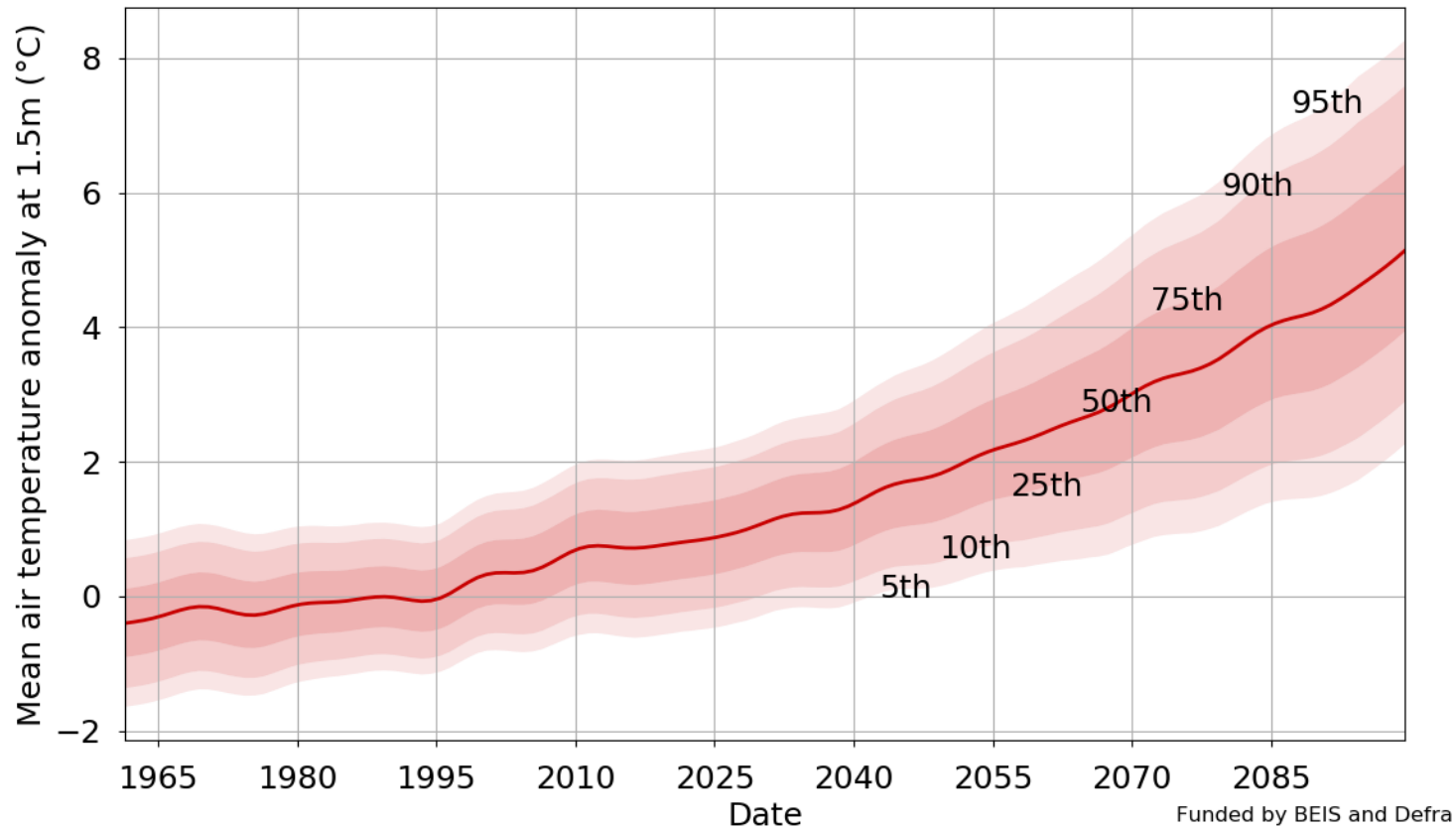


Figure 14.2: Annual Average Mean Temperature, Grid Square 462500, 137500



Annual average Mean air temperature anomaly at 1.5m (°C) for years 1961 up to and including 2099, for grid square 462500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

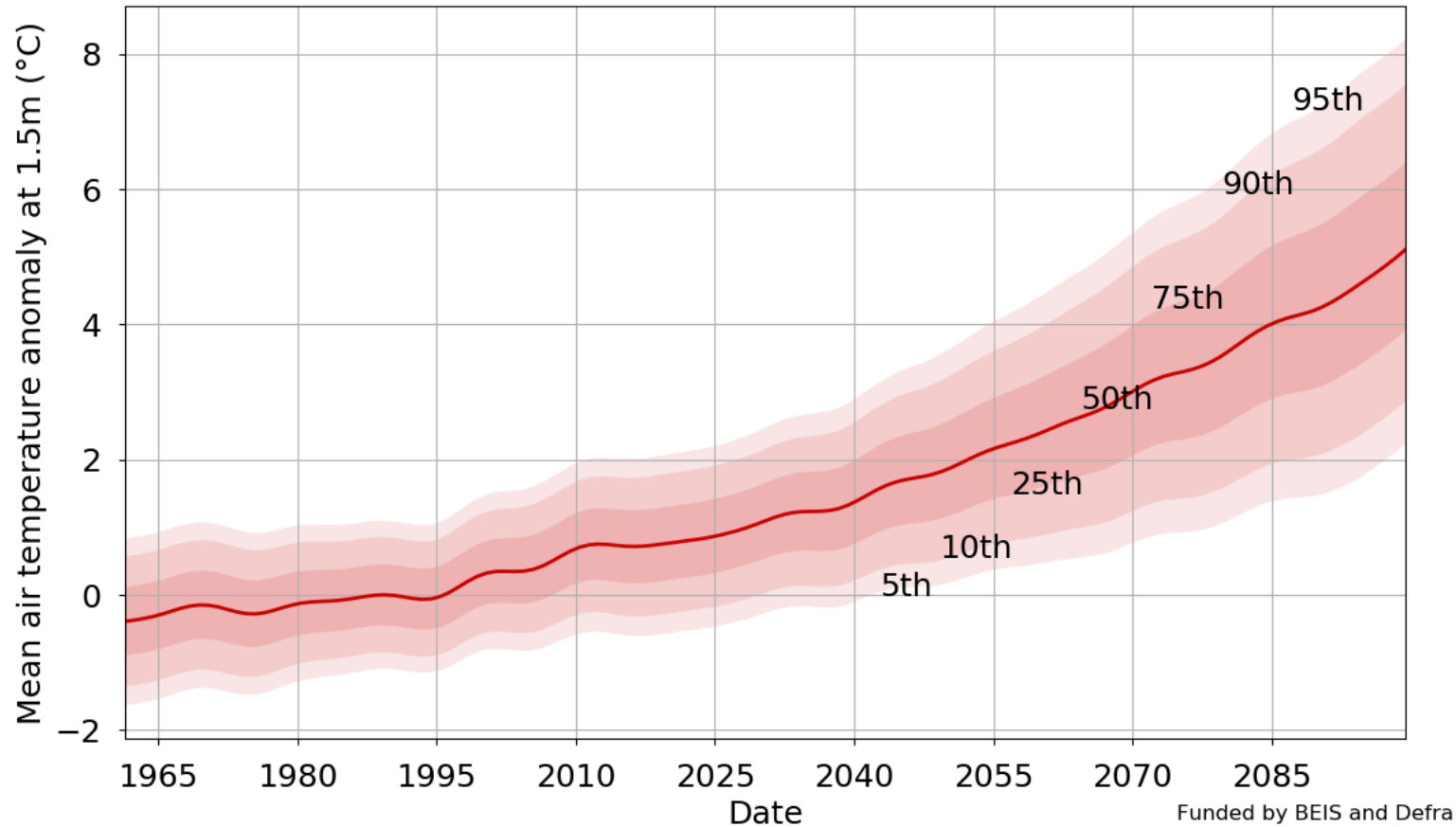
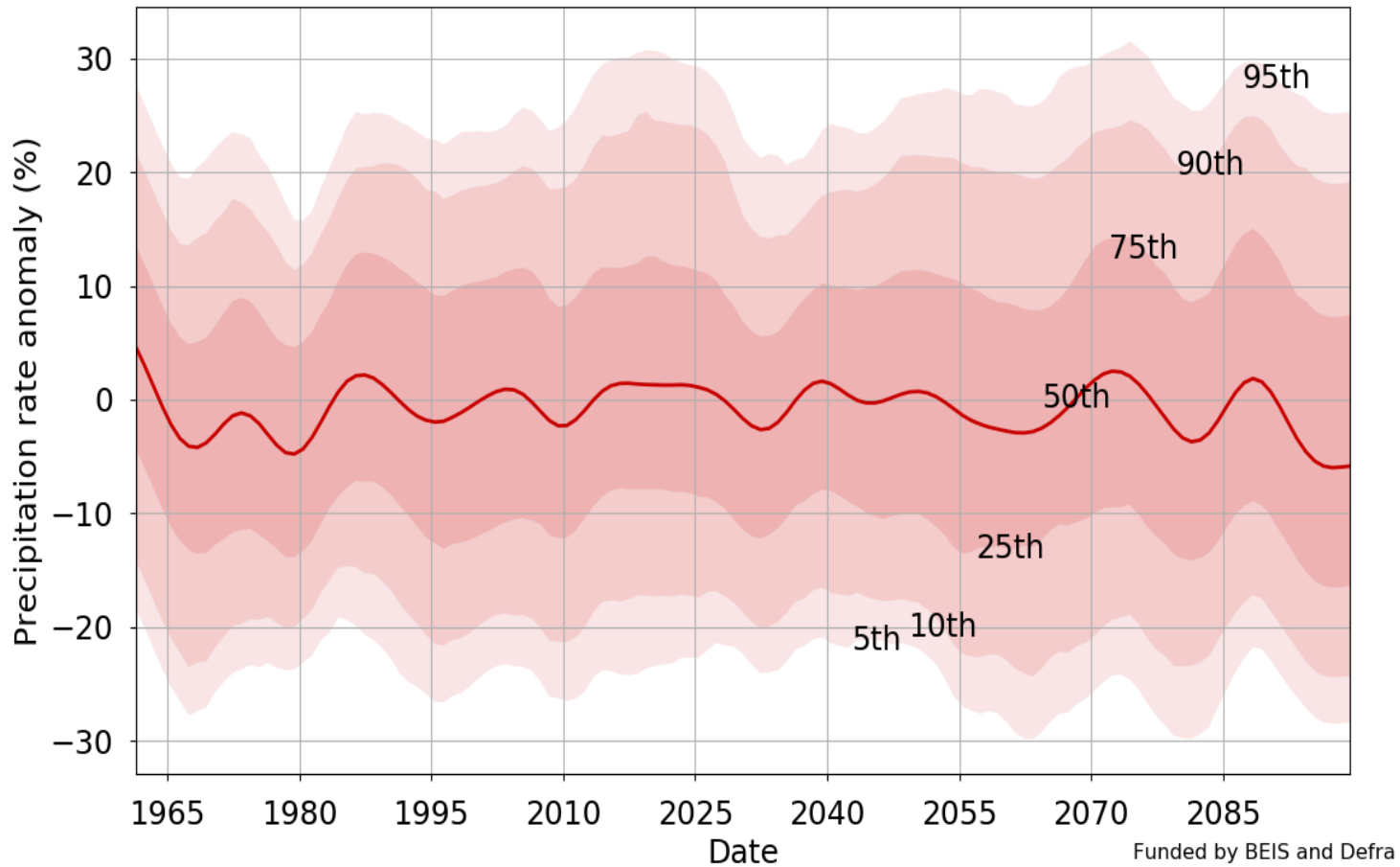


Figure 14.3: Annual Average Precipitation, Grid Square 437500, 137500



Annual average Precipitation rate anomaly (%) for years 1961 up to and including 2099, for grid square 437500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

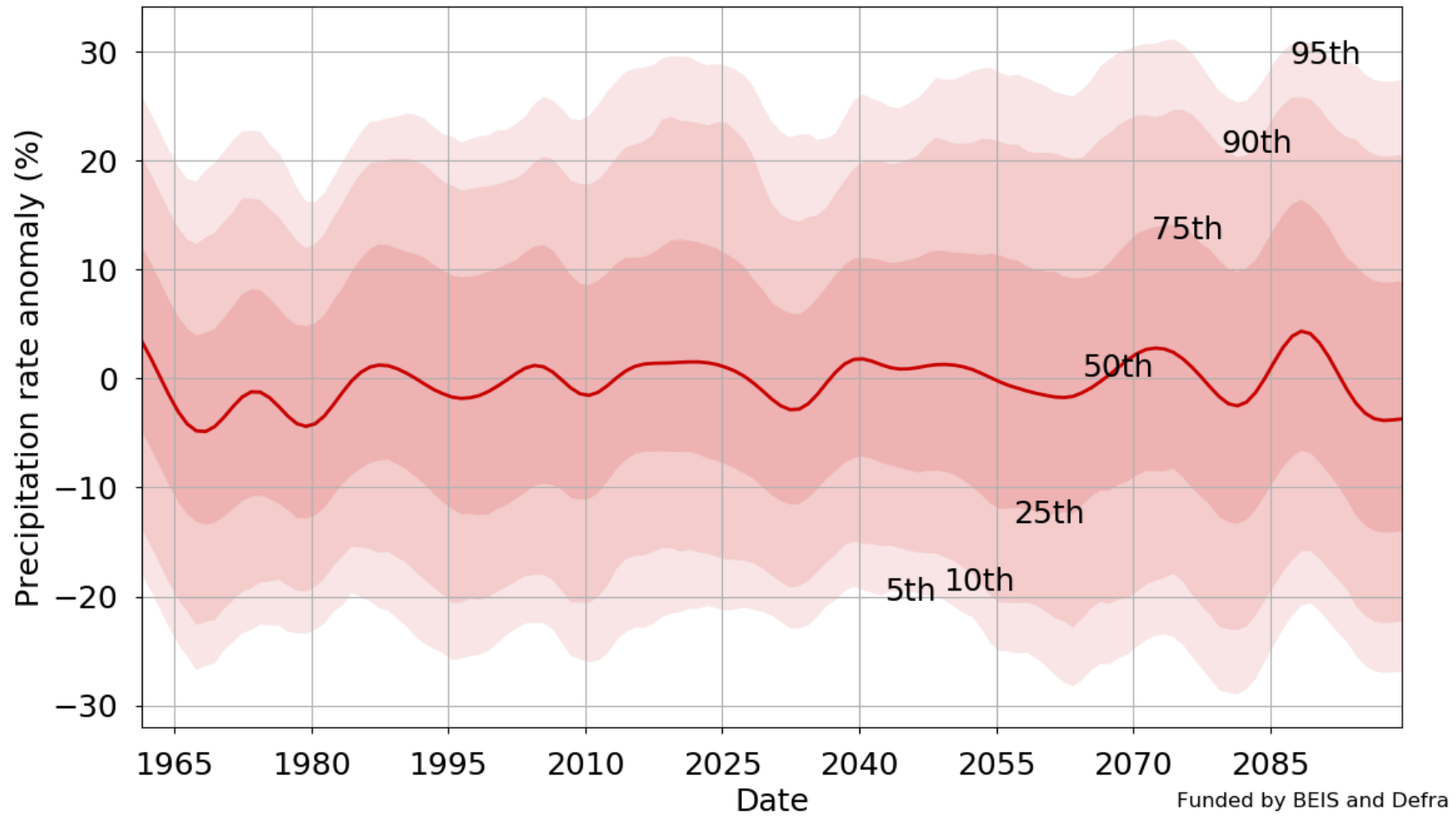


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Figure 14.4: Annual Average Precipitation, Grid Square 462500, 137500



Annual average Precipitation rate anomaly (%) for years 1961 up to and including 2099, for grid square 462500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



## Seasonal Changes

### Summer

Figure 14.5, 14.6 and Table 14.3 show the projections for average summer (June, July, August) maximum air temperature. The projections show an overall increase in maximum temperature over the next 60 years from the opening year of the Proposed Scheme.

Table 14.3 Maximum Summer air temperature anomaly at 1.5m (°C)

Date	Percentile						
	5th	10th	25th	50th	75th	90th	95th
2020	-2.45	-1.70	-0.45	0.93	2.34	3.62	4.38
2026	-1.75	-1.01	0.25	1.65	3.06	4.33	5.09
2041	-1.69	-0.86	0.54	2.05	3.60	5.02	5.88
2066	-0.89	0.16	1.96	3.96	5.98	7.90	9.04
2086	0.35	1.64	3.76	6.21	8.76	11.05	12.50

Figure 14.7, 14.8 and Table 14.4 show the projections for average summer precipitation rate. The projections show an overall decline in precipitation over the next 60 years from the opening year of the Proposed Scheme.

Table 14.4: Average Summer Precipitation rate anomaly (%)

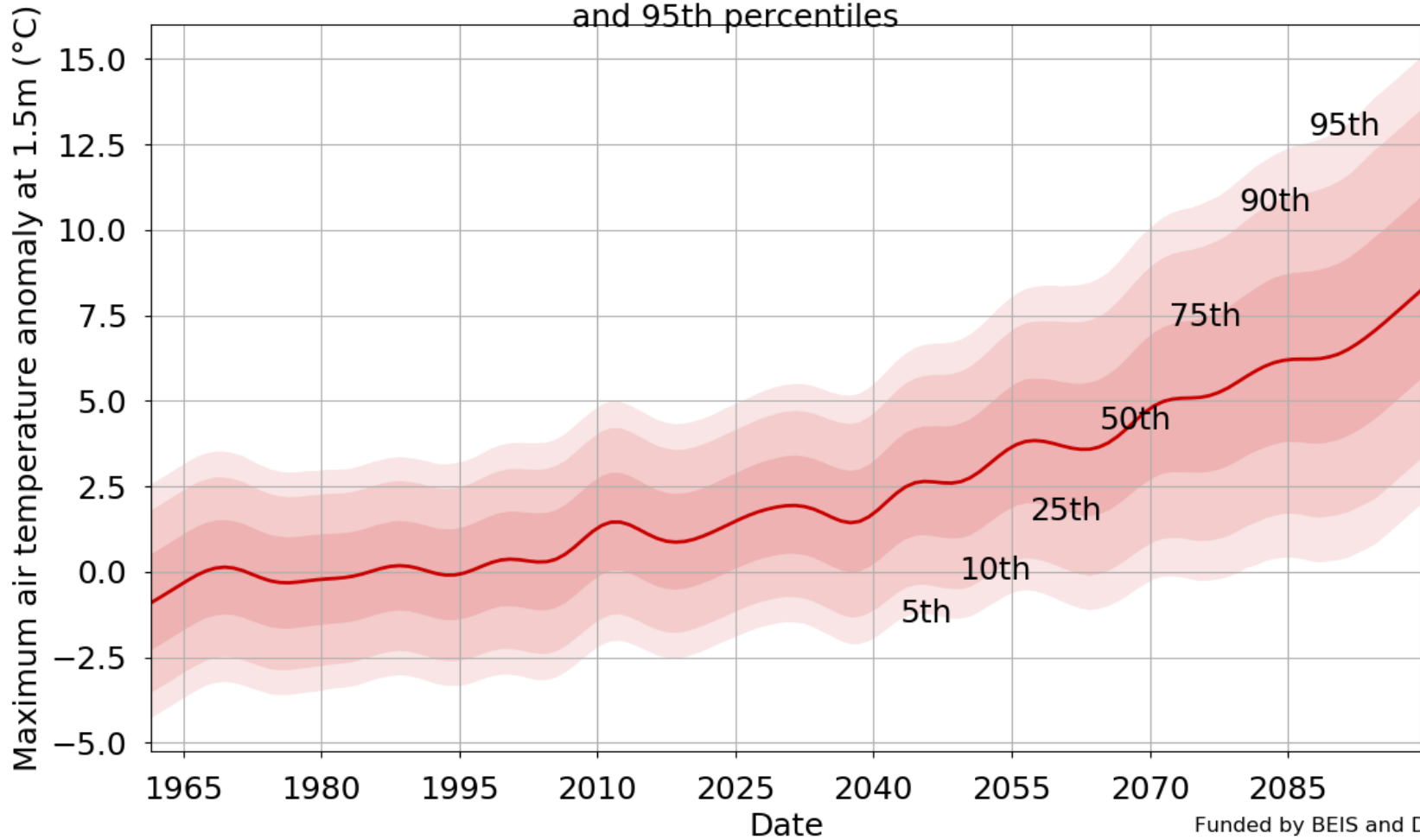
Date	Percentile						
	5th	10th	25th	50th	75th	90th	95th
2020	-65.35	-53.09	-31.95	-5.76	23.91	51.72	67.10
2026	-74.86	-63.17	-40.44	-9.27	24.36	51.89	66.94
2041	-78.14	-66.28	-44.39	-18.21	10.44	39.51	60.53
2066	-88.80	-77.42	-57.40	-32.50	-3.05	26.82	44.72
2086	-98.42	-86.43	-64.81	-38.29	-9.89	17.72	35.16



Figure 14.5: Maximum Average Summer Temperature, Grid Square 437500, 137500



Seasonal average Maximum air temperature anomaly at 1.5m (°C) for June July August in years 1961 up to and including 2099, for grid square 437500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

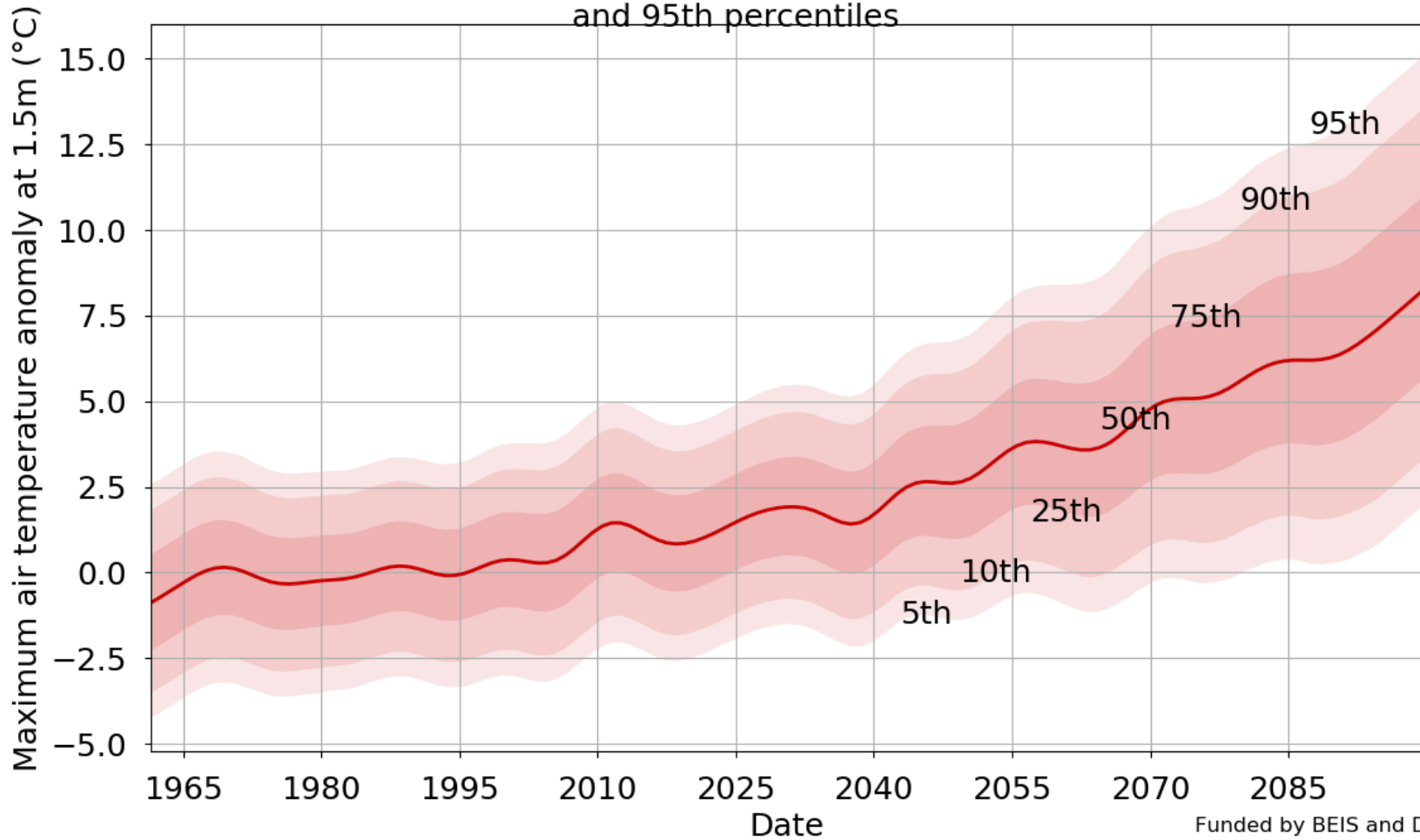


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Figure 14.6: Maximum Average Summer Temperature, Grid Square 462500, 137500



Seasonal average Maximum air temperature anomaly at 1.5m (°C) for June July August in years 1961 up to and including 2099, for grid square 462500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



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Figure 14.7: Average Summer Precipitation, Grid Square 437500, 137500



Seasonal average Precipitation rate anomaly (%) for June July August in years 1961 up to and including 2099, for grid square 437500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

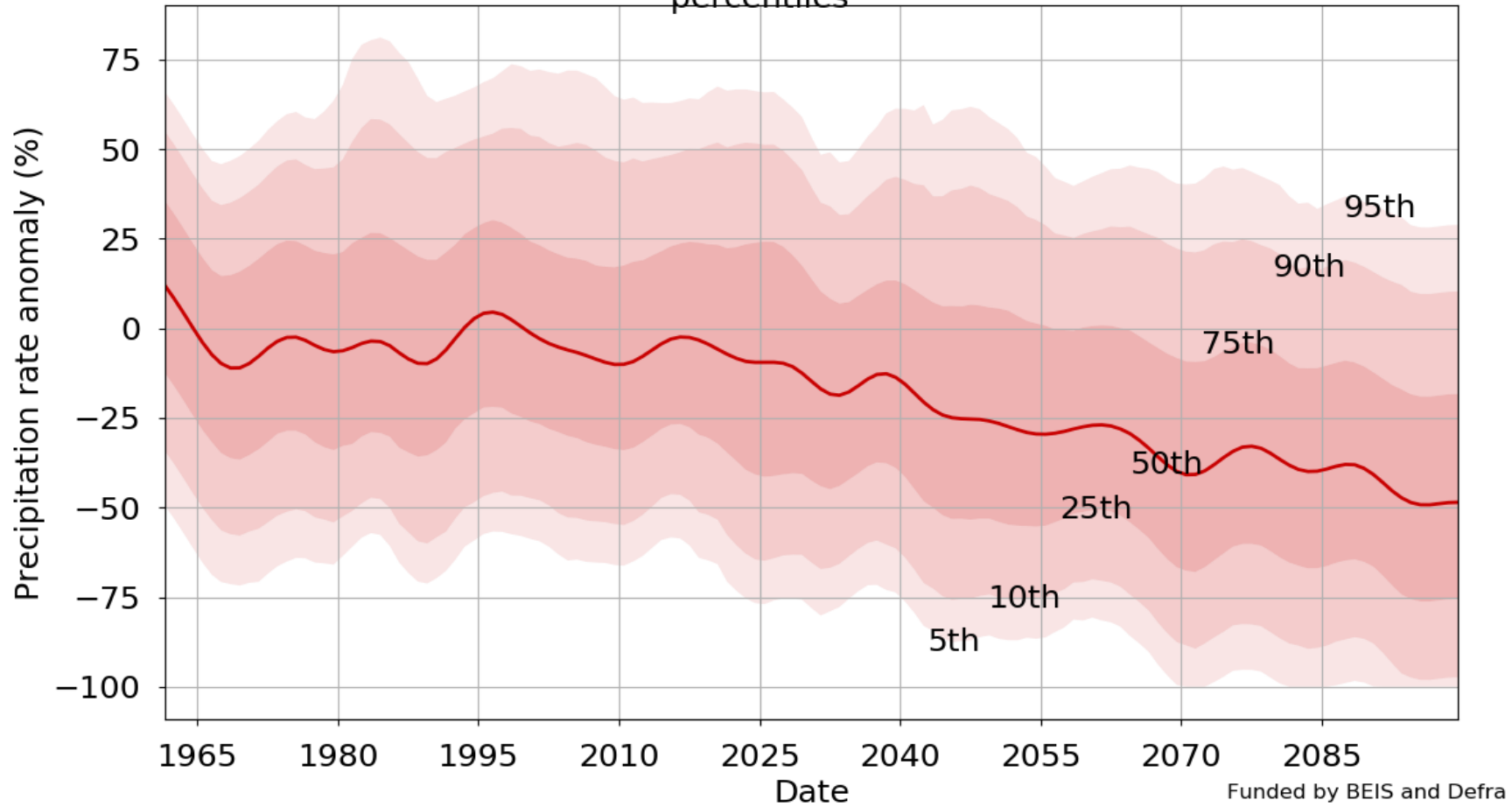
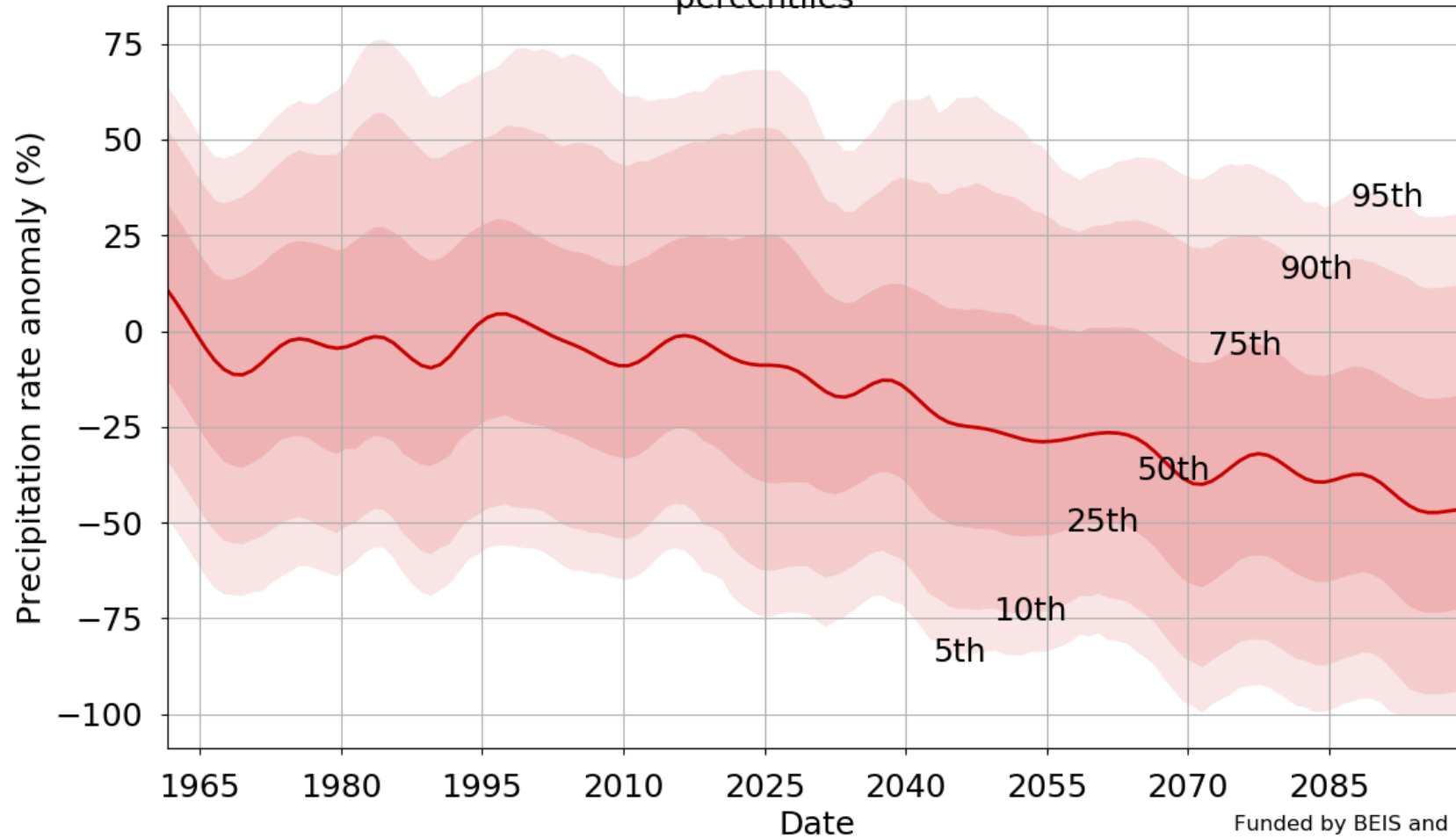


Figure 14.8: Average Summer Precipitation, Grid Square 462500, 137500



Seasonal average Precipitation rate anomaly (%) for June July August in years 1961 up to and including 2099, for grid square 462500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



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## Winter

Figure 14.9, 14.10 and Table 14.5 show the projections for average winter (December, January, February) minimum air temperature. The projections show an overall increase in minimum temperature over the next 60 years from the opening year of the Proposed Scheme.

Table 14.5: Minimum Winter air temperature anomaly at 1.5m (Å°C)

Date	Percentile						
	5th	10th	25th	50th	75th	90th	95th
2020	-1.53	-1.04	-0.22	0.67	1.58	2.39	2.90
2026	-1.56	-1.06	-0.23	0.70	1.62	2.45	2.98
2041	-1.09	-0.55	0.35	1.35	2.37	3.33	3.90
2066	-0.48	0.12	1.17	2.38	3.57	4.70	5.40
2086	-0.04	0.68	1.95	3.41	4.91	6.34	7.26

Figure 14.11, 14.12 and Table 14.6 shows the projections for average winter precipitation rate. The projections show an overall increase in precipitation over the next 60 years from the opening year of the Proposed Scheme.

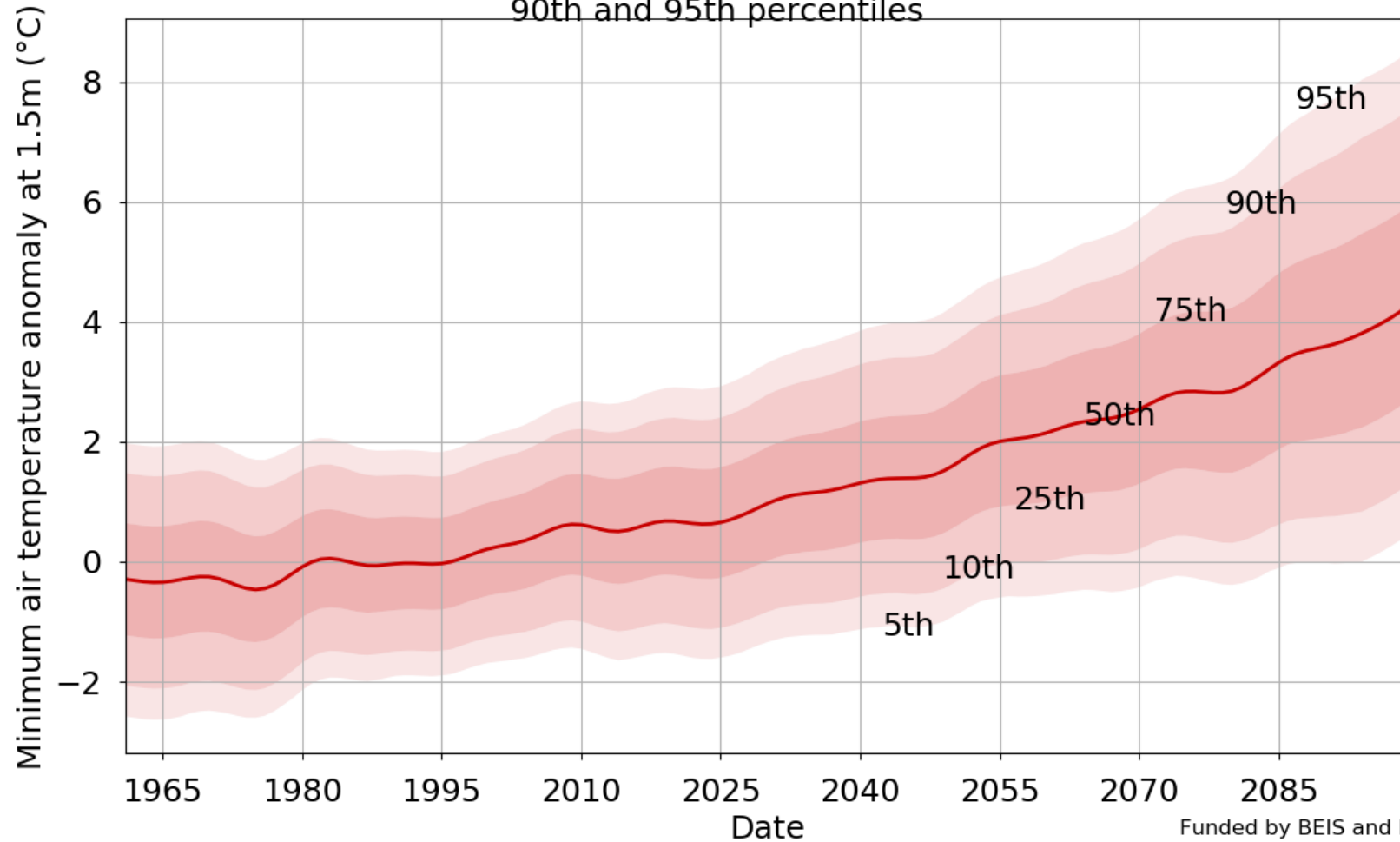
Table 14.6: Average Winter Precipitation rate anomaly (%)

Date	Percentile						
	5th	10th	25th	50th	75th	90th	95th
2020	-31.43	-22.19	-5.93	12.35	32.26	51.76	63.38
2026	-40.20	-31.31	-14.99	3.70	22.81	41.95	53.03
2041	-34.89	-24.35	-5.52	13.34	30.38	47.32	59.24
2066	-36.08	-25.24	-6.28	16.02	40.32	62.40	75.54
2086	-34.80	-21.34	1.12	26.13	51.08	74.21	89.03

Figure 14.9: Minimum Average Winter Temperature, Grid Square 437500, 137500



Seasonal average Minimum air temperature anomaly at 1.5m (°C) for December January February in years 1961 up to and including 2099, for grid square 437500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

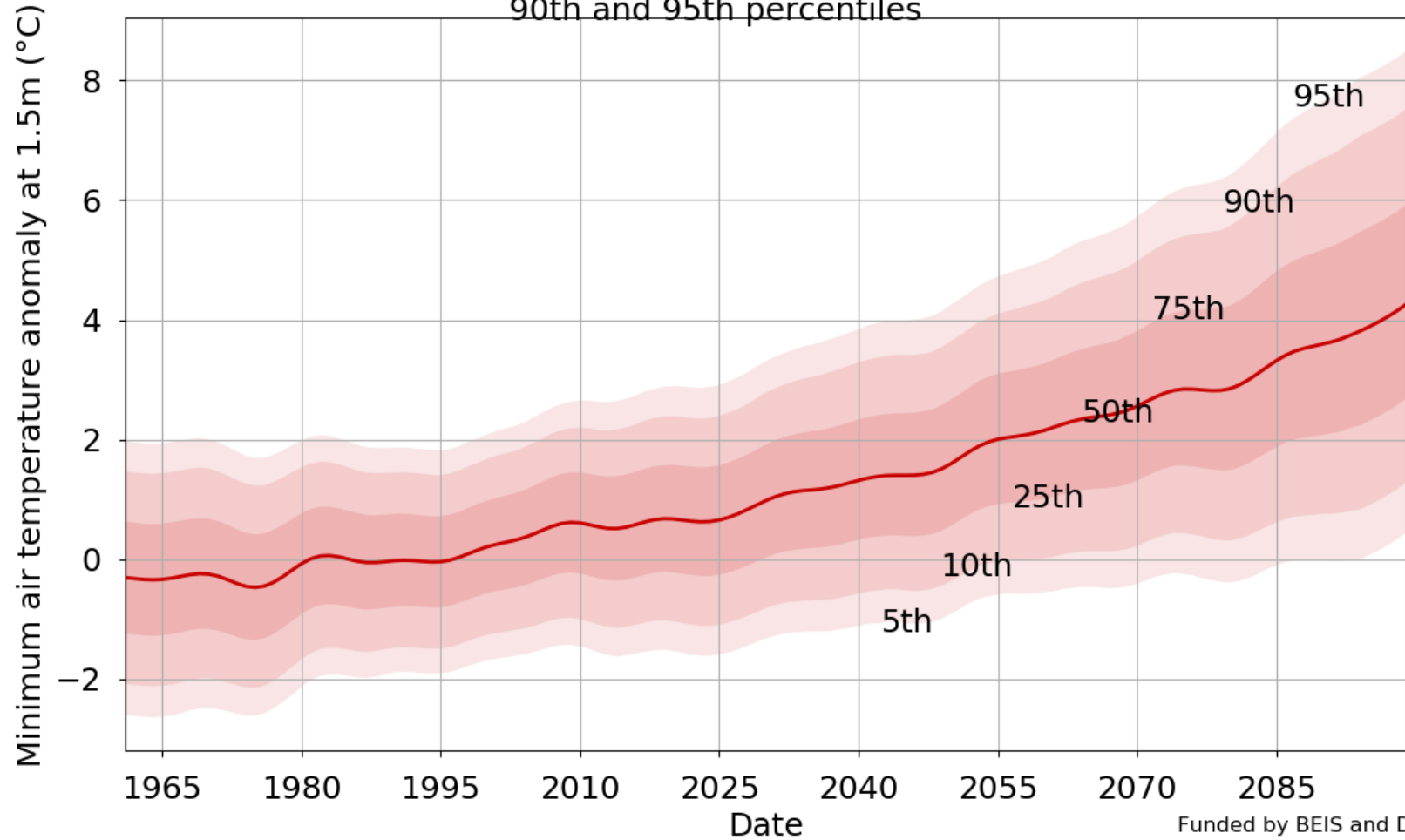


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Figure 14.10: Minimum Average Winter Temperature, Grid Square 462500, 137500



Seasonal average Minimum air temperature anomaly at 1.5m (°C) for December January February in years 1961 up to and including 2099, for grid square 462500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles

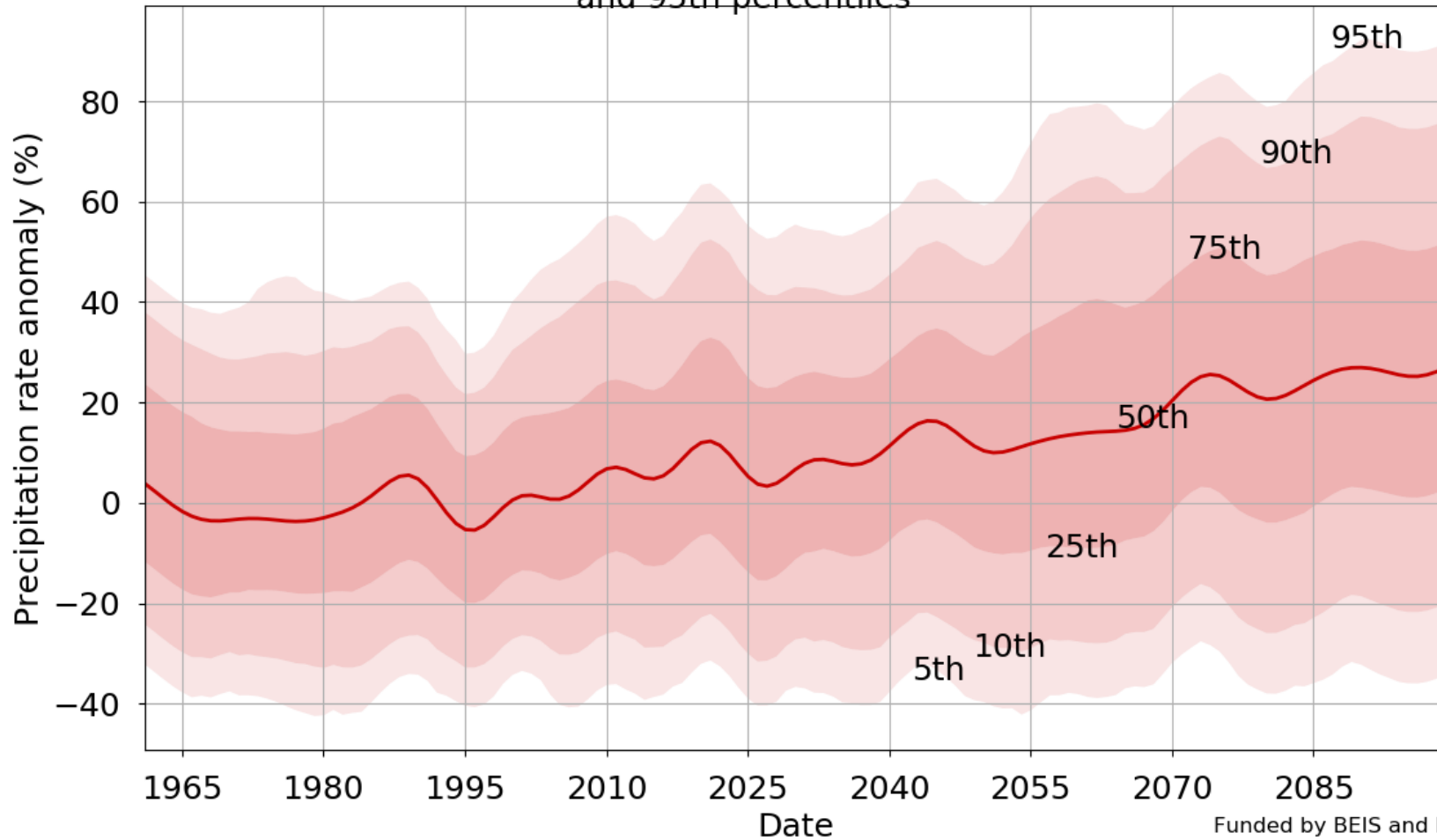


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Figure 14.11: Average Winter Precipitation, Grid Square 437500, 137500



Seasonal average Precipitation rate anomaly (%) for December January February in years 1961 up to and including 2099, for grid square 437500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



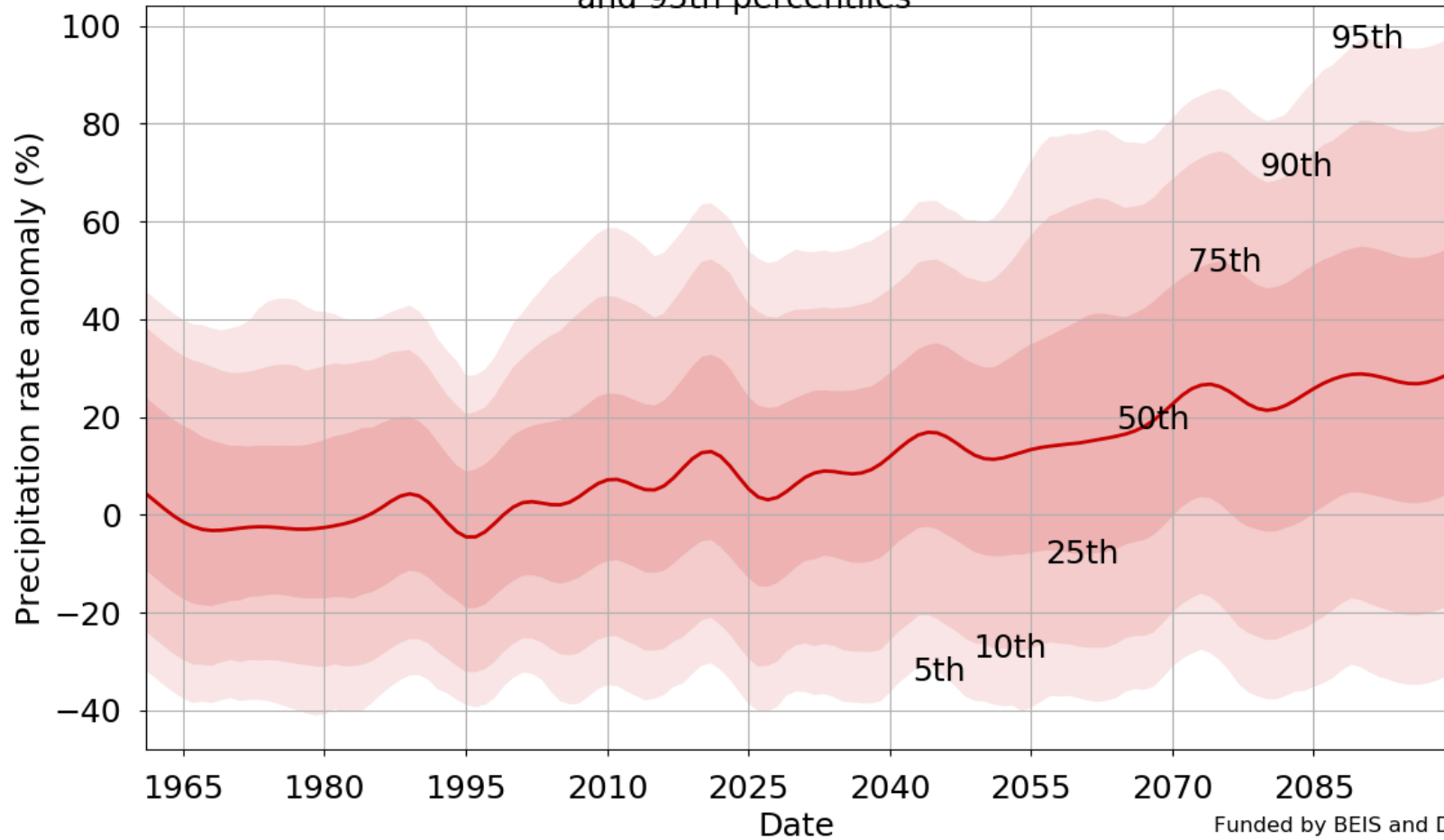
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Figure 14.12: Average Winter Precipitation, Grid Square 462500, 137500



Seasonal average Precipitation rate anomaly (%) for December January February in years 1961 up to and including 2099, for grid square 462500, 137500, using baseline 1981-2000, and scenario RCP 8.5, showing the 5th, 10th, 25th, 50th, 75th, 90th and 95th percentiles



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