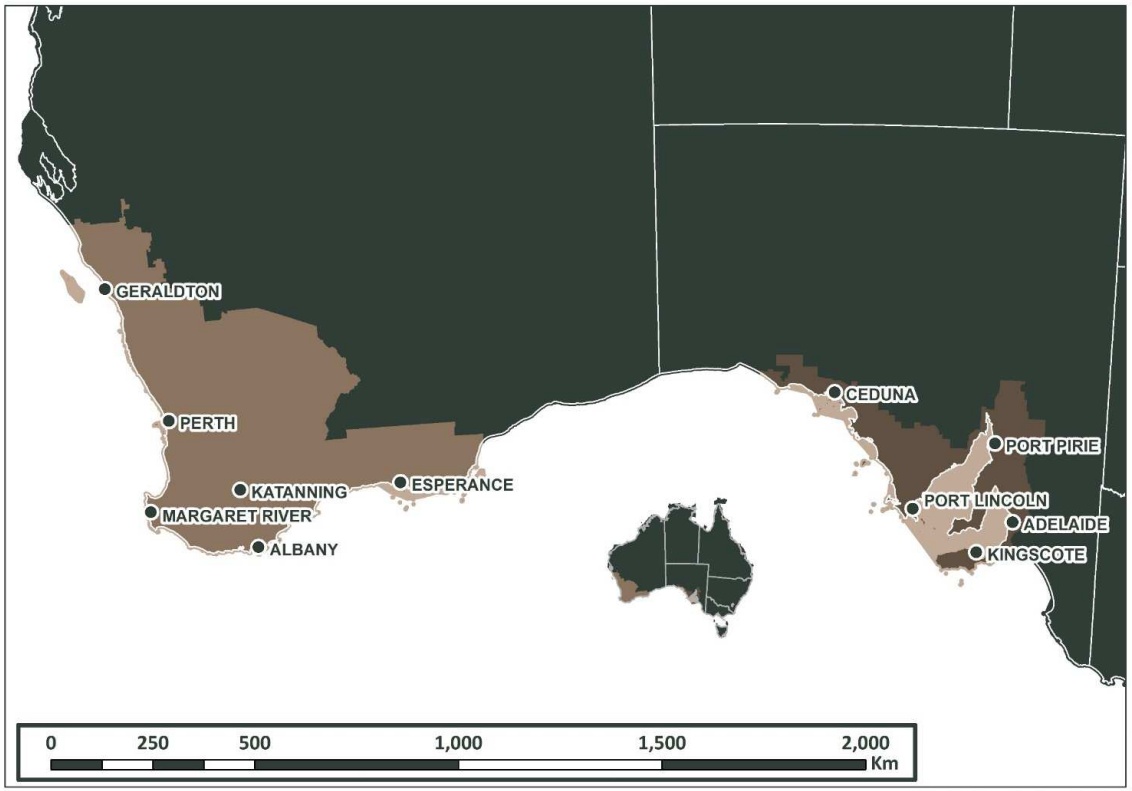
Climate projections for Southern and South-Western Flatlands



This brochure is for the Southern and South-Western Flatlands (SSWF) cluster, comprising regions in southwest Western Australia (lighter brown) and southern South Australia (darker brown).

Iconic features in SSWF include the Western Australian wheat and sheep belt, Eyre Peninsula and Kangaroo Island.

The SSWF area has a predominantly Mediterranean climate, with high winter rainfall and little summer rainfall in both the east (SSWF East) and west (SSWF West) sub-clusters.

Some of the content for this Pamphlet drawn from Gerbing, C. Webb, L. and Hope, P. 2015 Southern and South-western Flatlands Cluster brochure, CSIRO and BoM.

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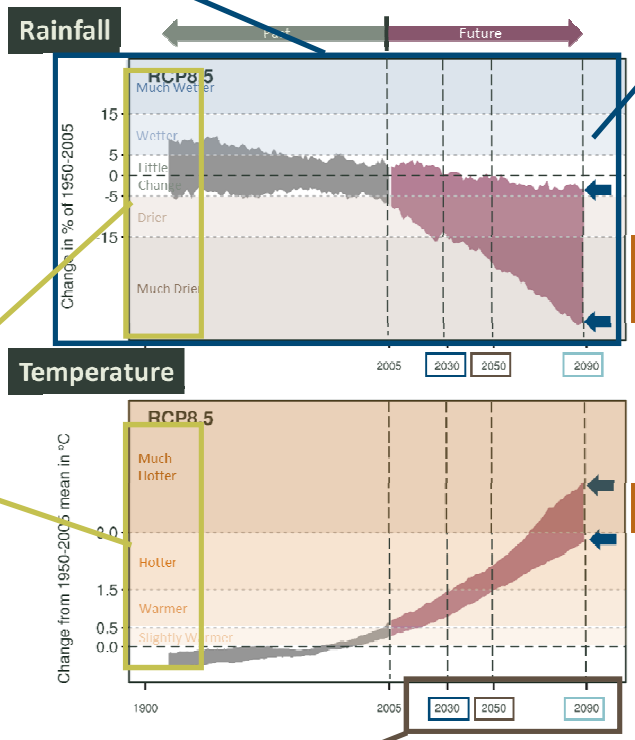
KEY TO THE PROJECTIONS SLIDES

Time series of rainfall (top) and temperature (below) for the historical period (1900 to 2005; grey) and projected period (2005 to 2099; purple) showing the 10th to 90th percentile of the 20-year running mean from 40 CMIP5 models.

Projected period colour code:
Purple: high emissions (RCP8.5)
Blue: intermediate emissions (RCP4.5)
Green: low emissions (RCP2.6)

Categories of warming and rainfall changes are indicated by colour shading on the graph as described in the table:

Rainfall (% change relative to 1950 - 2005)	Temperature (degrees Celsius change from 1950-2005)
Much Wetter (> 15 %)	Much Hotter (> 3.0)
Wetter (5 to 15 %)	Hotter (1.5 to 3.0)
Little change (-5 to +5 %)	Warmer (0.5 to 1.5)
Drier (-5 to -10 %)	Slightly Warmer (0 – 0.5)
Much Drier (> -15%)	



Outlook periods explored are 20 year periods centred on 2030, 2050, 2090.

For adaptation planning, consider top and bottom of the range of plausible change, indicated by the blue arrows.

Descriptions of what could be expected given model representation (40 CMIP5 models) in the various future periods:

2030: Warmer with little change in rainfall or a drier climate.

2050: Hotter with some models showing little change in rainfall, and most indicating a drier climate.

2090: Much hotter with a few models showing little change in rainfall, and the remainder indicating a drier or much drier climate (e.g. - 30 %).

*Seasonal projections may differ from annual. Seasonal detail shown later.
Maximum model consensus by 2090, if it exists, is indicated by orange bar.
For adaptation planning, consider top and bottom of the range of plausible change. The 2090 range is indicated by the blue arrows.

Maximum consensus (at least 33% of models) indicated by orange box. In this example, the maximum consensus future by 2090 could be described as 'much hotter and much drier'.

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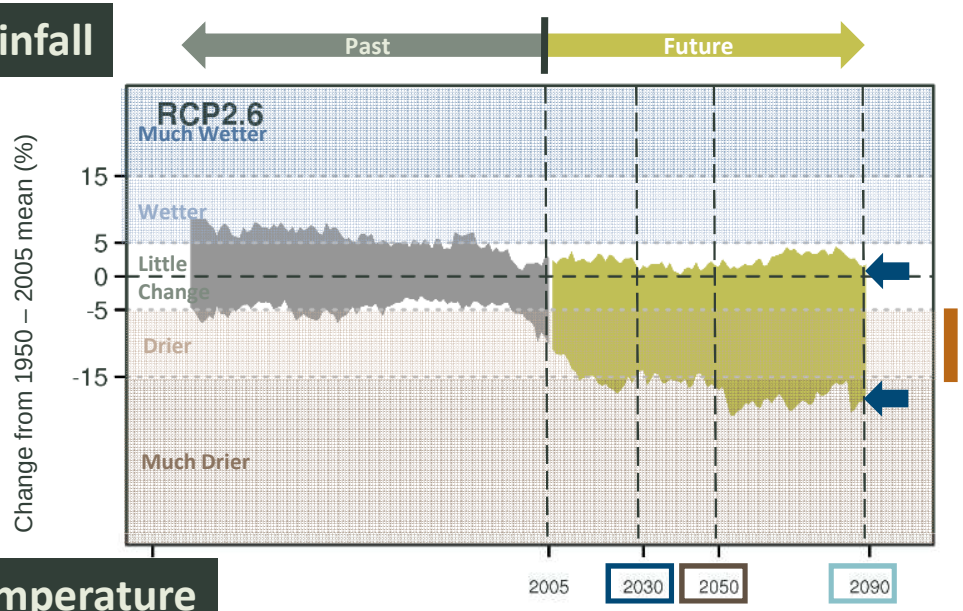
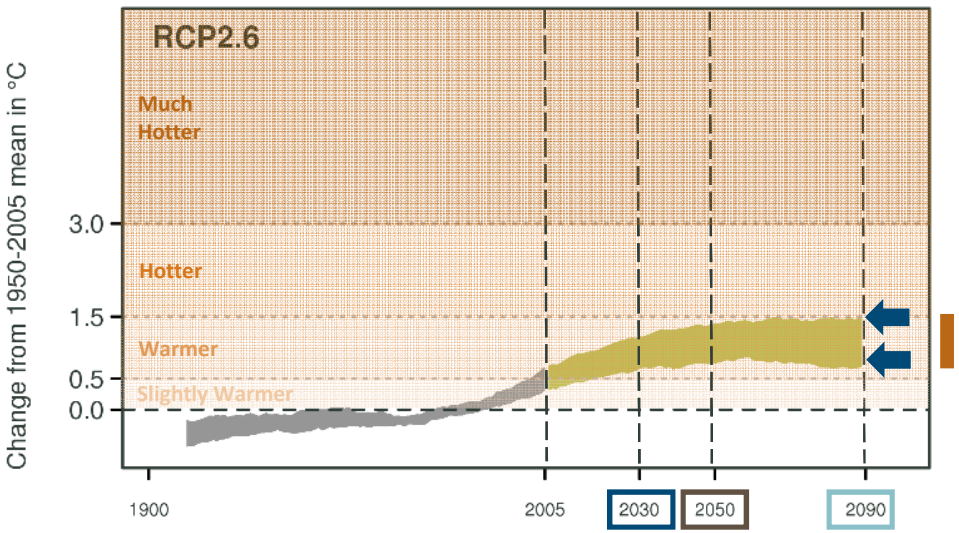
Projections for Southern and South-Western Flatlands (annual*) : Low emissions

Rainfall



Temperature



2030: Warmer with most models indicating drier or much drier, but some models indicating little change in rainfall.

2050: Warmer with most models indicating drier or much drier climate, but some models indicating little change in rainfall.

2090: Warmer with most models indicating drier or much drier climate, but some models indicating little change in rainfall.

***Seasonal projections may differ from annual. Seasonal detail shown later.**

Maximum model consensus by 2090, if it exists, is indicated by orange bar.

For adaptation planning, consider top and bottom of the range of plausible change. The 2090 range is indicated by the blue arrows.

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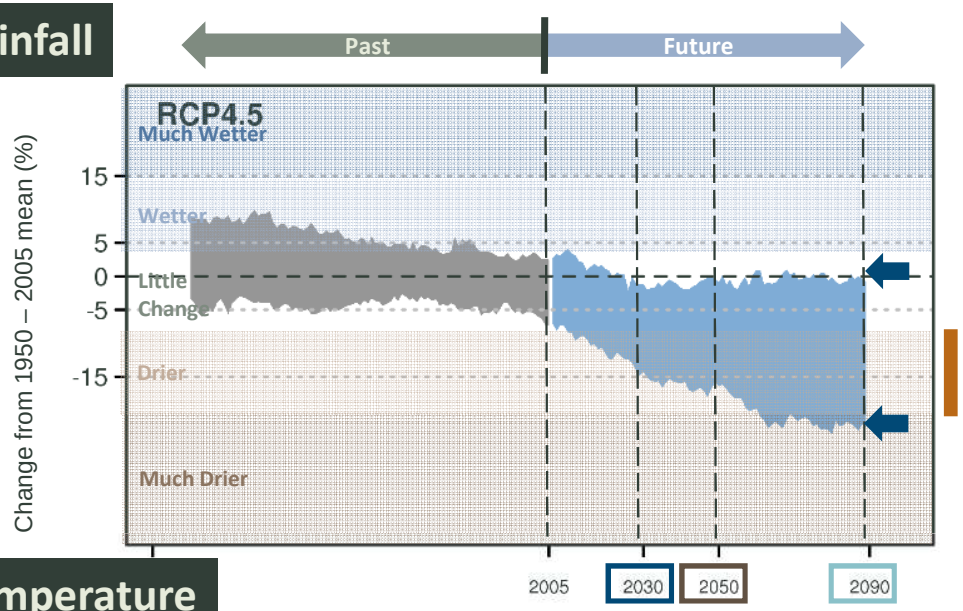
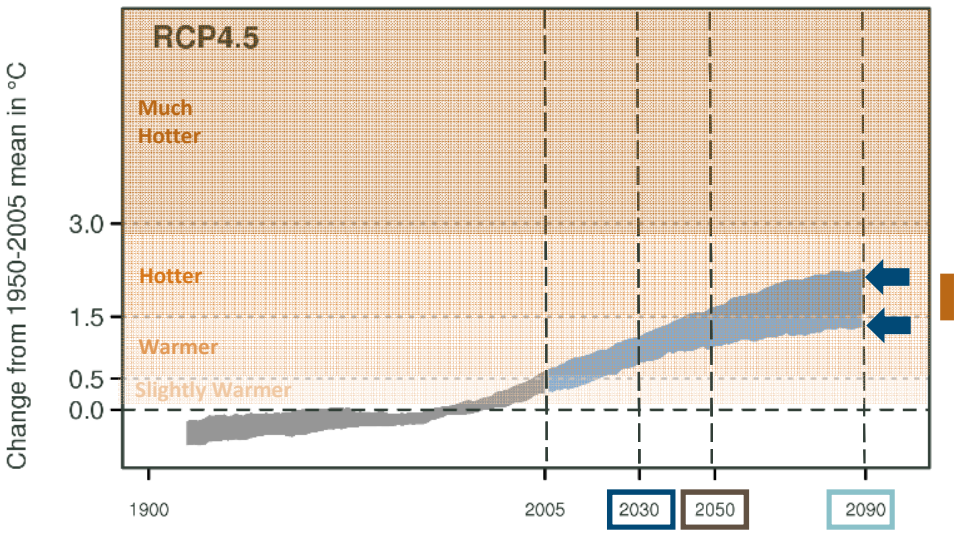
Projections for Southern and South-Western Flatlands (annual*) : Intermediate emissions

Rainfall



Temperature



2030: Warmer with an equal number of models indicating either little change in rainfall or a drier climate.

2050: Warmer to hotter with most models indicating drier climate, but some models indicating little change in rainfall.

2090: Warmer to hotter, with most models indicating drier to much drier climate and some models indicating little change in rainfall.

***Seasonal projections may differ from annual. Seasonal detail shown later.**

Maximum model consensus by 2090, if it exists, is indicated by orange bar.

For adaptation planning, consider top and bottom of the range of plausible change. The 2090 range is indicated by the blue arrows.

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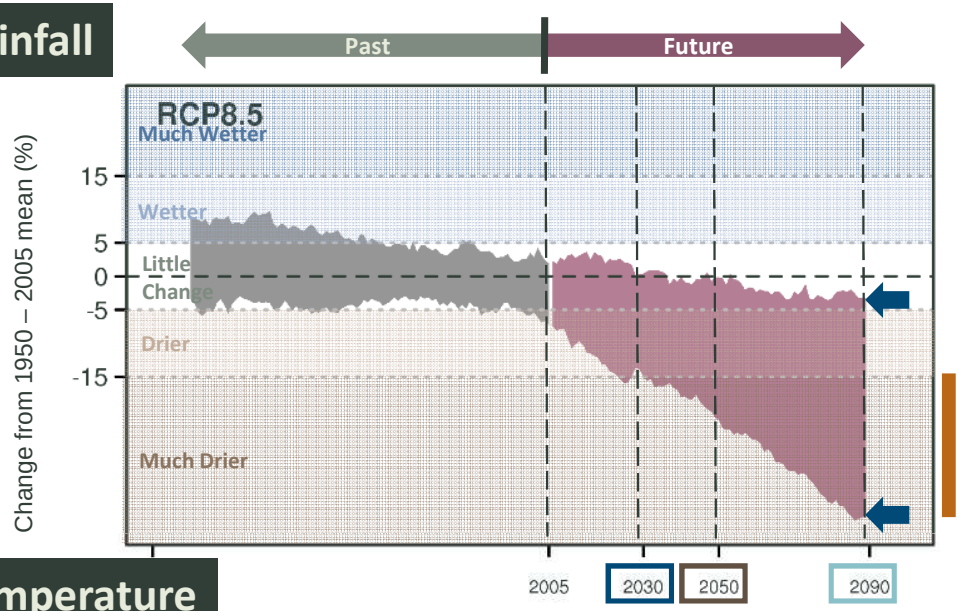
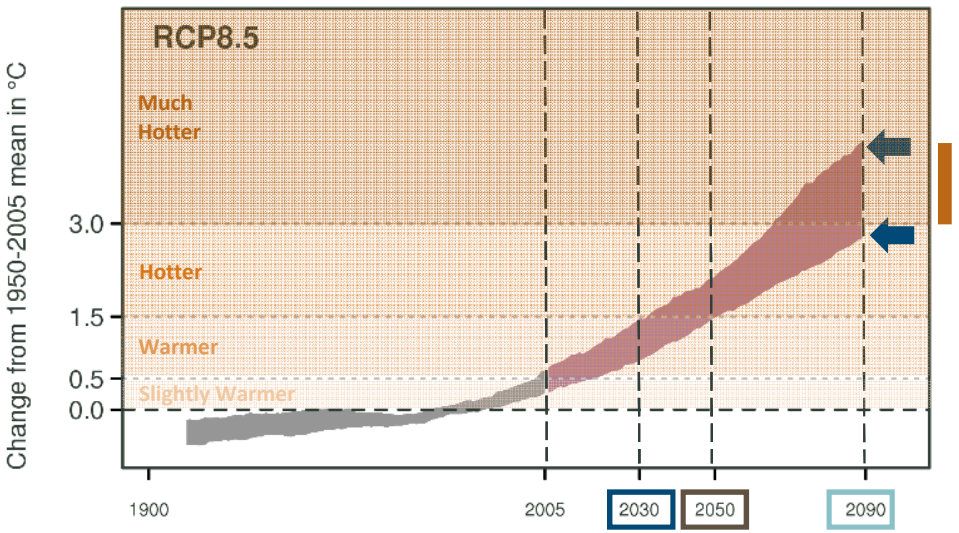
Projections for Southern and South-Western Flatlands (annual*) : High emissions

Rainfall



Temperature



2030: Warmer with little change in rainfall or a drier climate.

2050: Hotter with some models showing little change in rainfall, and most indicating a drier climate.

2090: Much hotter with a few models showing little change in rainfall, and the remainder indicating a drier or much drier climate (e.g. - 30 %).

***Seasonal projections may differ from annual. Seasonal detail shown later.**

Maximum model consensus by 2090, if it exists, is indicated by orange bar.

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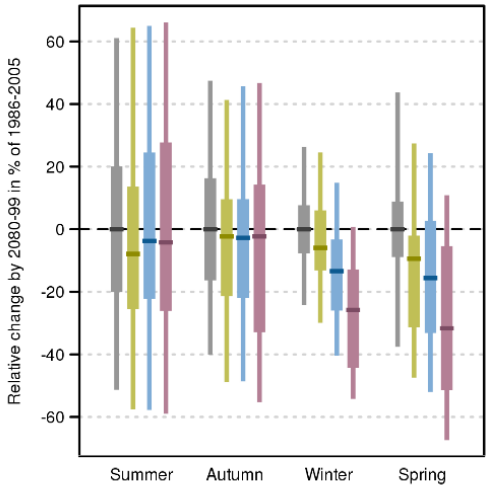
Seasonal Rainfall

Graph shows projected change in seasonal precipitation for 2090 (2080-99) in (from left) summer, autumn, winter and spring. Anomalies are given in % relative to 1995(1986-2005) under RCP2.6 (Green), RCP4.5 (blue) and RCP8.5 (purple). Natural climate variability is represented by the grey bar.

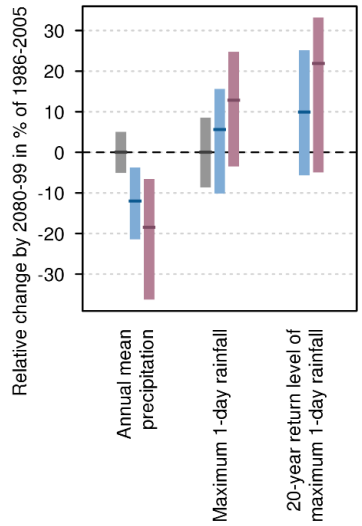


A continuation of the trend of decreasing winter rainfall is projected with high confidence. Spring rainfall decrease is also projected with high confidence. There is strong model agreement and good understanding of the contributing underlying physical mechanisms driving this change (southward shift of winter and spring storm systems).

Changes in autumn and summer are less clear.

Extreme Rainfall

Modelled differences (per cent) in annual average rainfall, rainfall on the wettest day of the year, and rainfall on the wettest day in 20 years for 2080-2099 compared to 1986 to 2005 under RCP4.5 (blue) and RCP8.5 (purple). Natural climate variability is represented by the grey bar.



Even though annual mean rainfall is projected to decrease in the region, understanding of the physical processes that cause extreme rainfall, coupled with modelled projections indicate with high confidence a future increase in the intensity of extreme rainfall events. However, the magnitude of the increases cannot be confidently projected. Strongly decreasing mean rainfall in the western sub-cluster gives us medium confidence in the projection of increased extreme rainfall for that region.

Time spent in drought is projected (with high confidence) to increase over the course of the century.

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