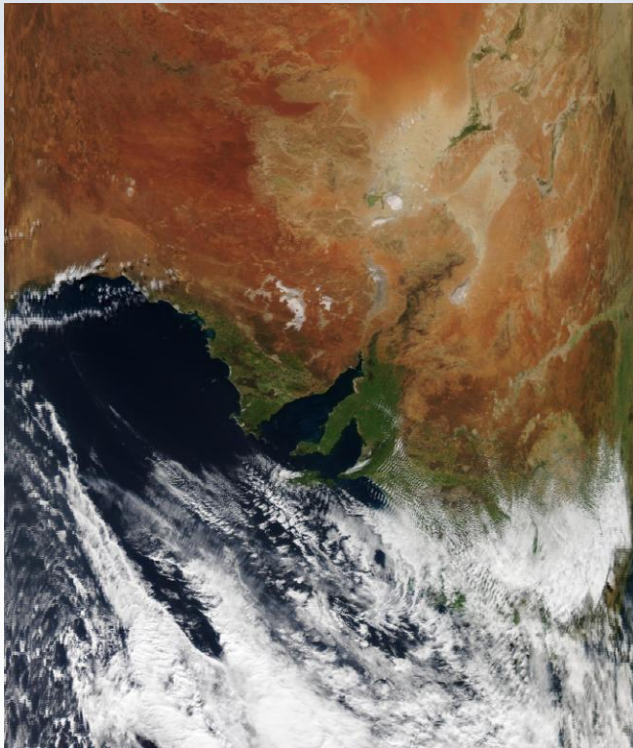




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Climate change and South Australian wine regions



Darren Ray

Senior Meteorologist/Climatologist

South Australian Regional Climate Services
Centre

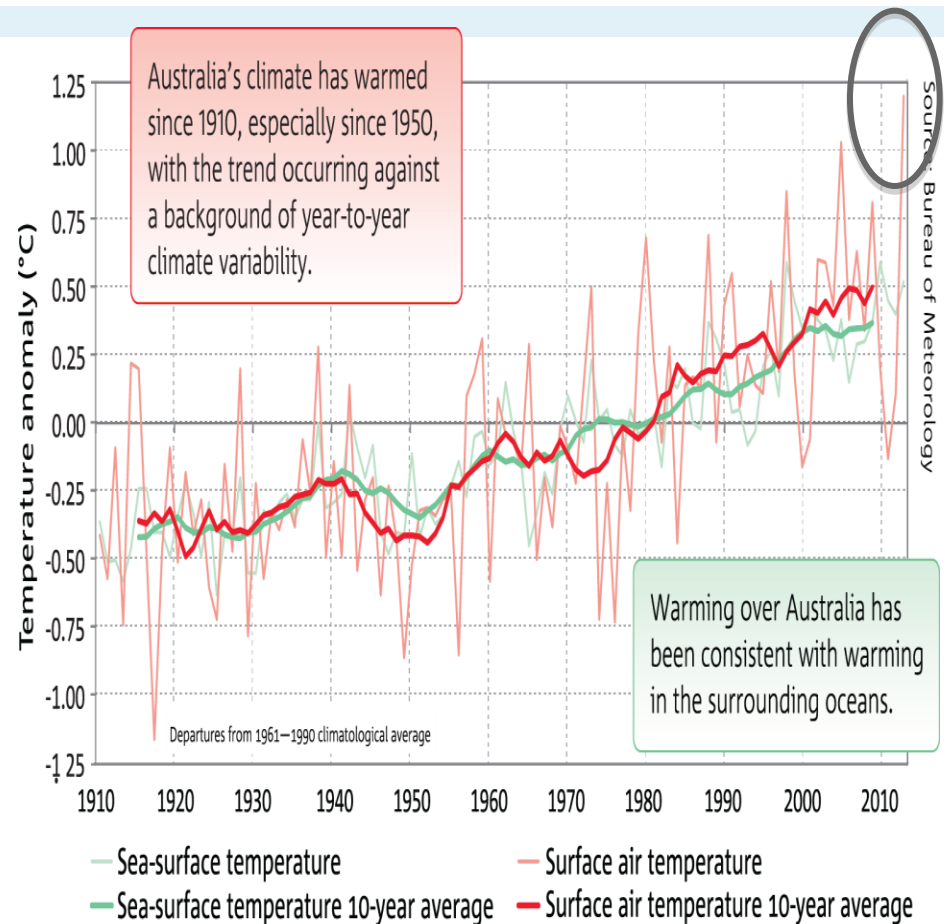
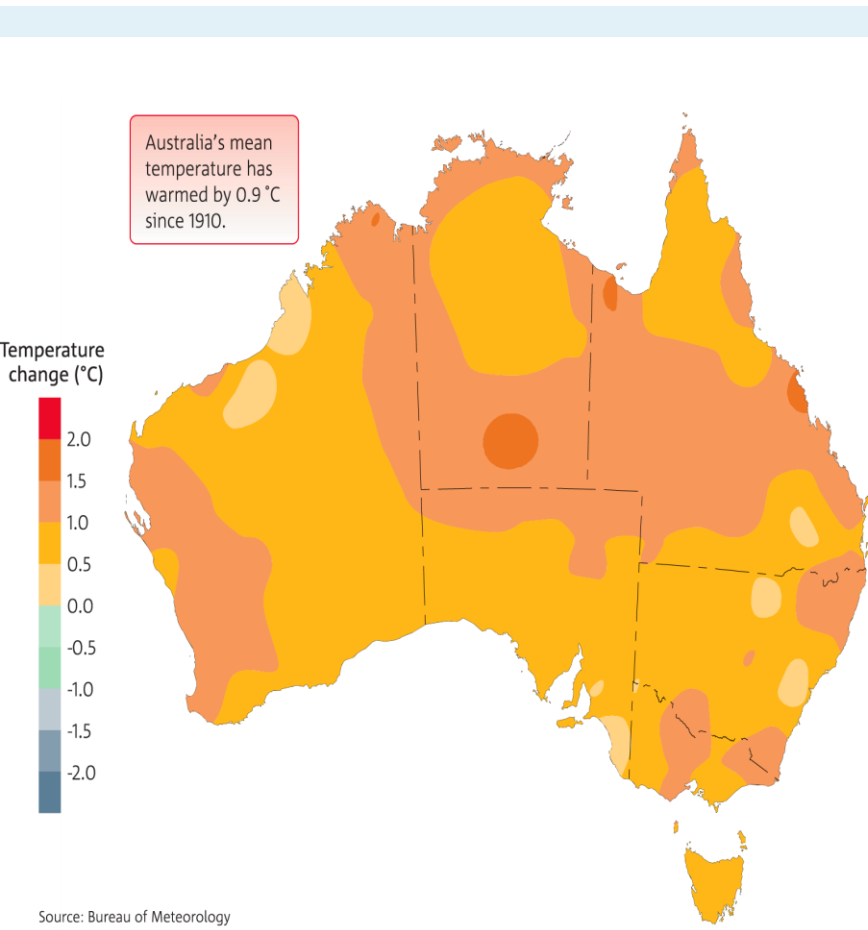
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d.ray@bom.gov.au



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Australia is warming, on land and in the oceans



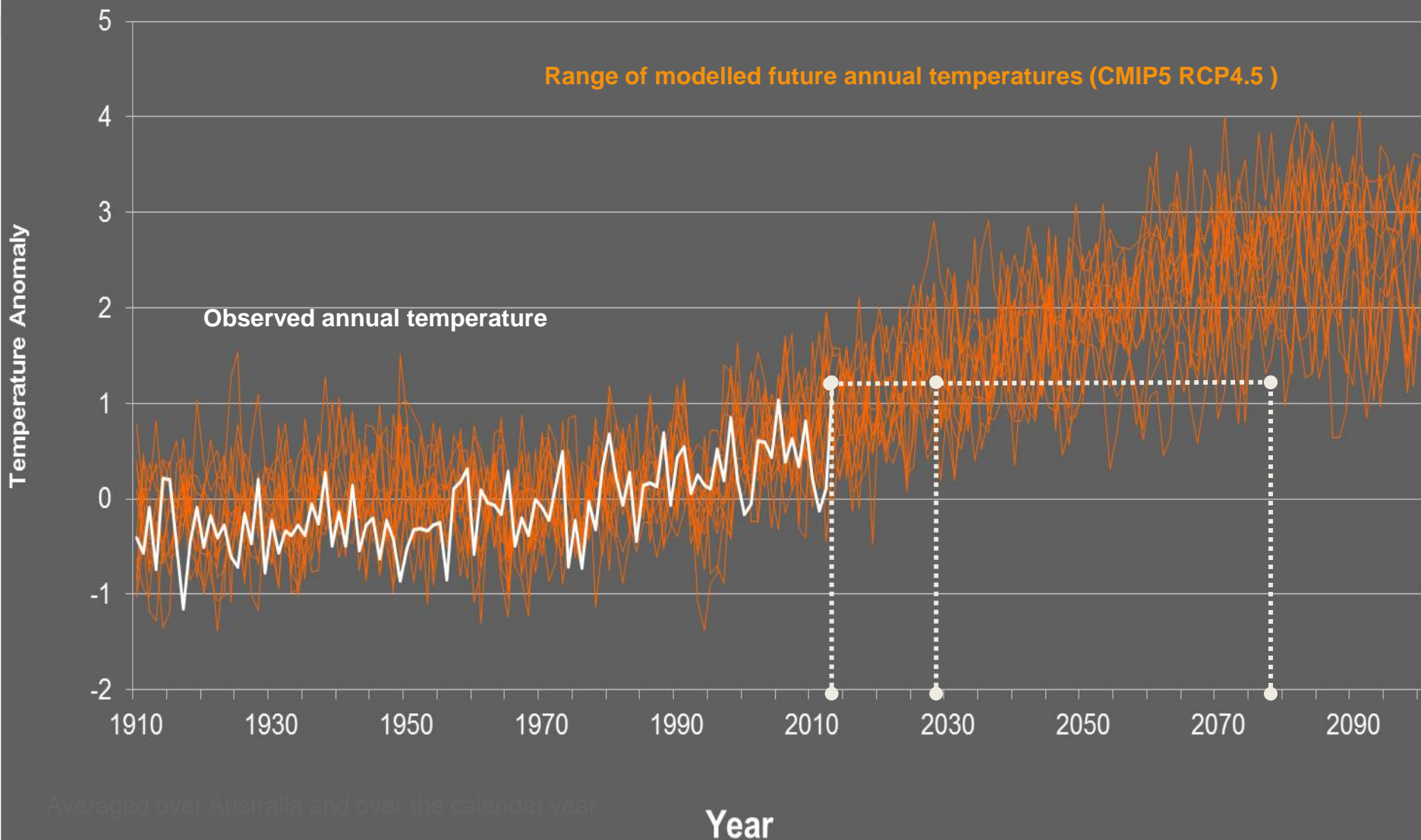
2013 was hottest year on record for Australia and South Australia



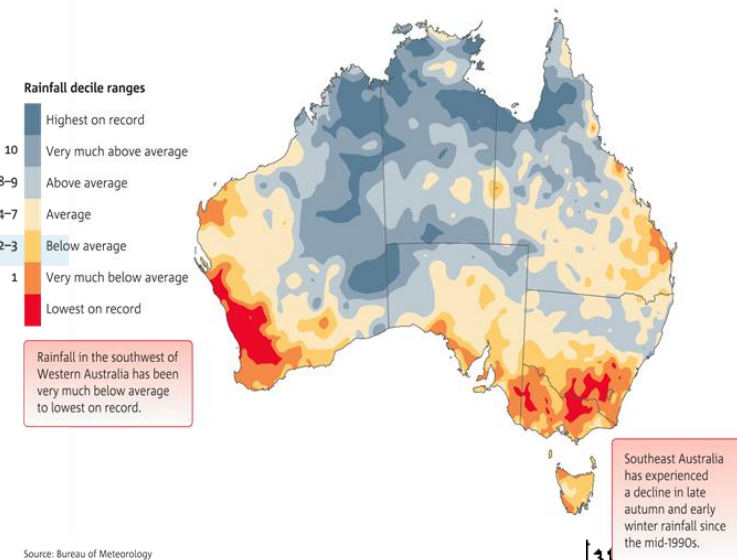
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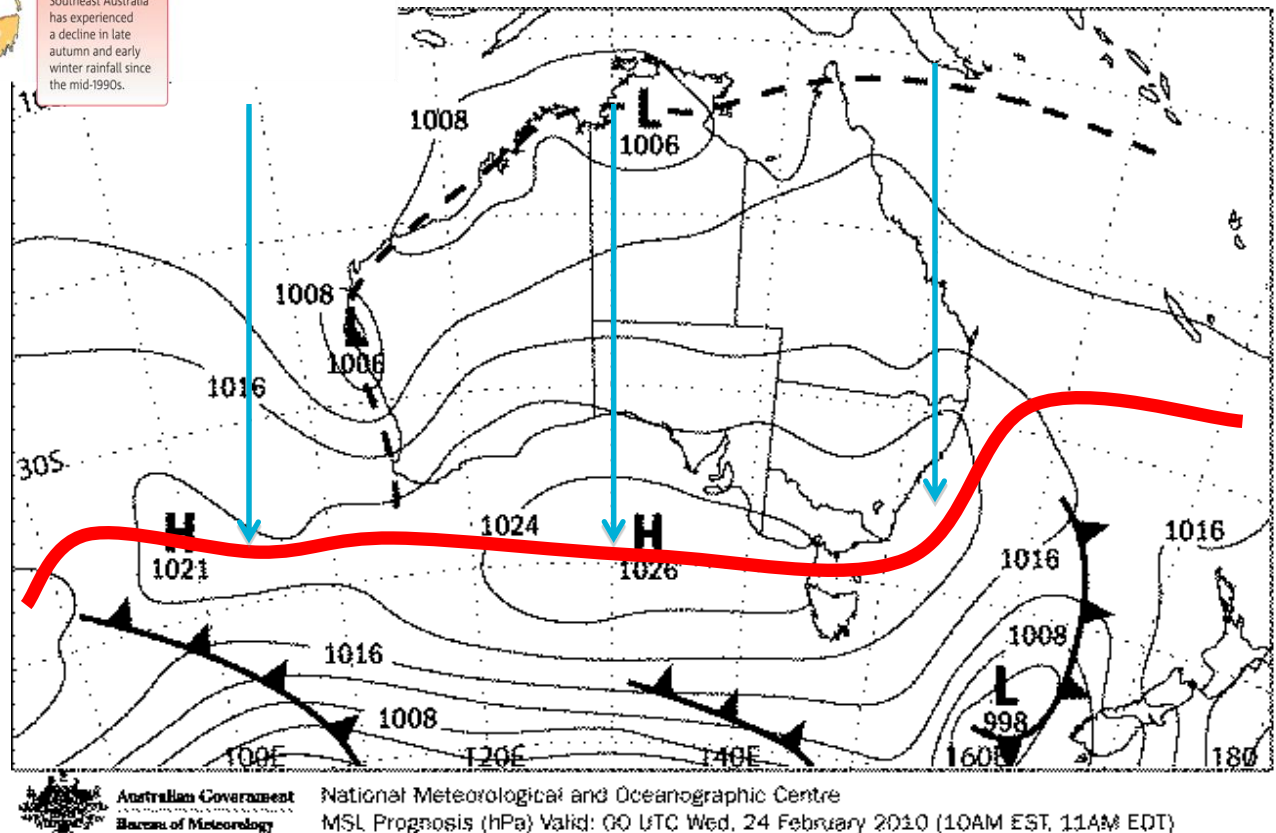
Australia's future is very likely to be hotter



Changes in weather patterns

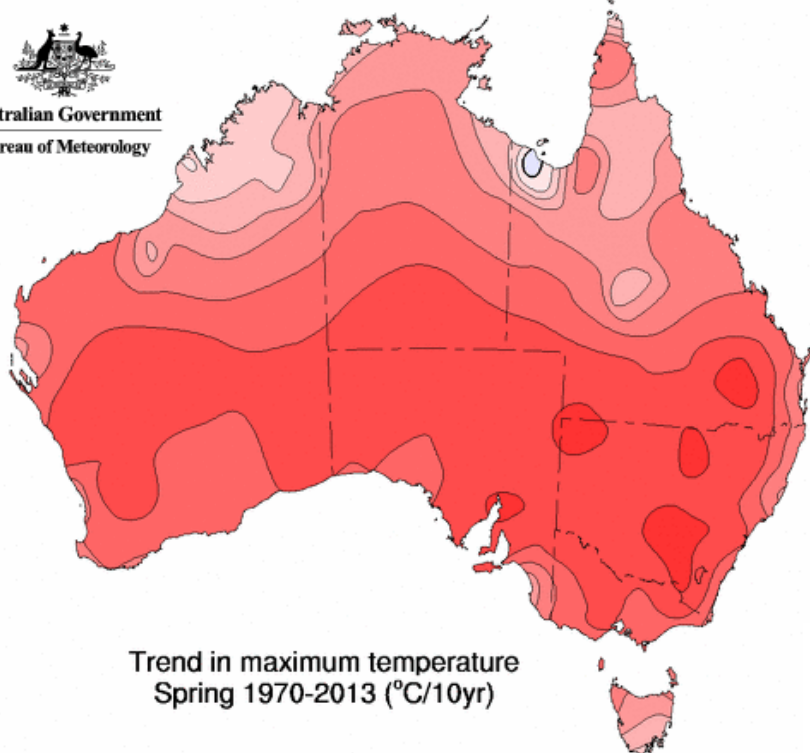


Daily weather map





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Trend in maximum temperature
Spring 1970-2013 ($^{\circ}\text{C}/10\text{yr}$)

© Commonwealth of Australia 2014, Australian Bureau of Meteorology

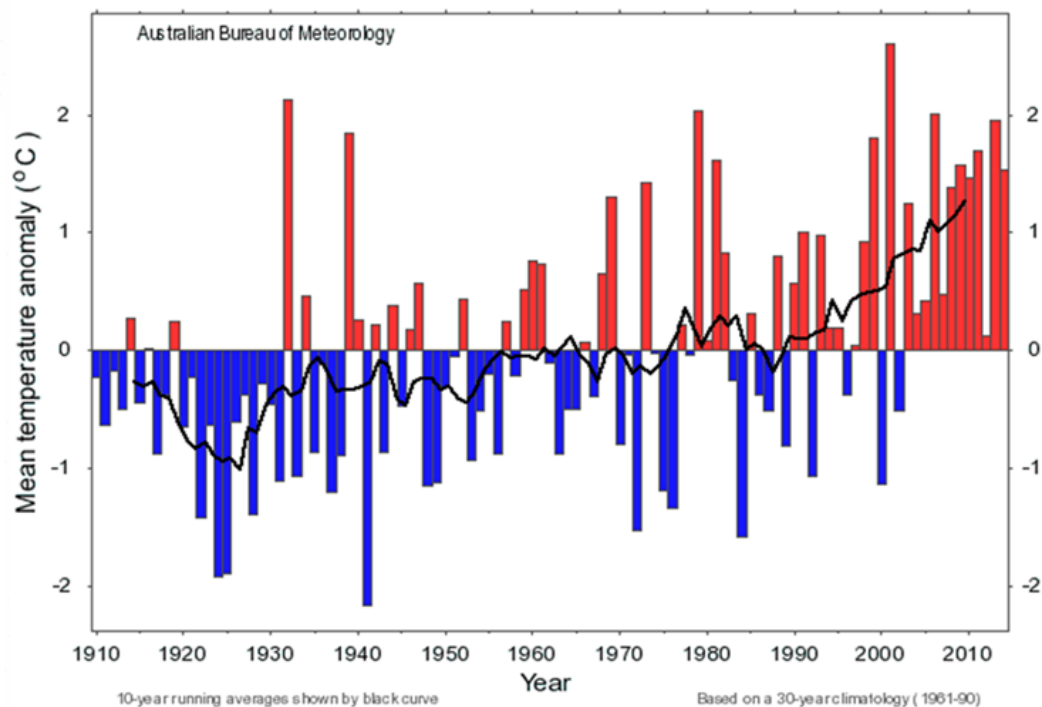
Warming by $\sim 1.0^{\circ}\text{C}$,
particularly at night and in
spring

Earlier bud burst and
flowering resulting in
earlier harvests in late
summer

Climate trends and changes



January mean temperature anomaly - Southern Australia (1910-2014)



© Commonwealth of Australia 2013, Australian Bureau of Meteorology

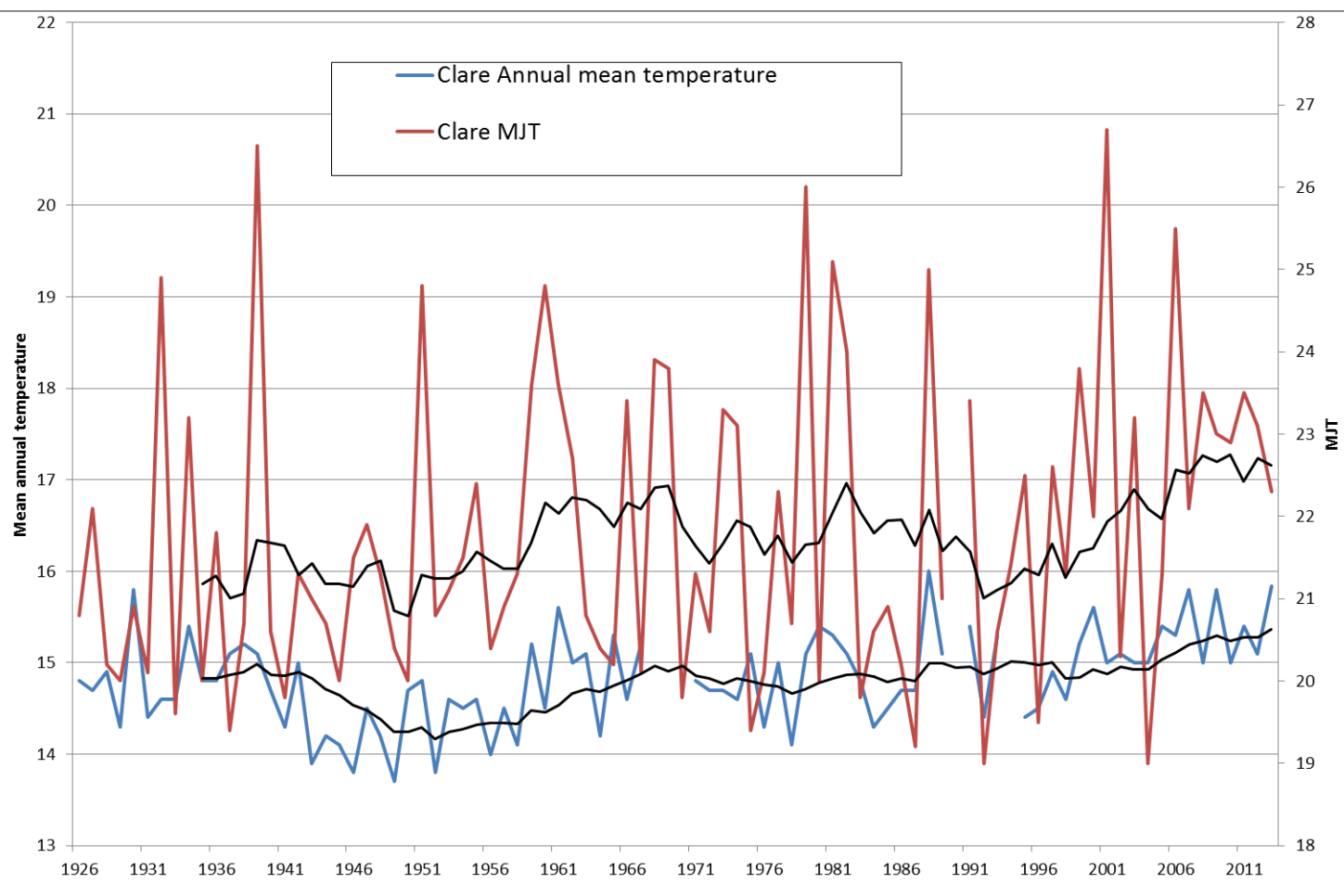
Issued: 03/03/2013



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Clare Valley



Annual mean temperature increases from $\sim 14.8^{\circ}\text{C}$ to $\sim 15.2^{\circ}\text{C}$

MJT increases from $\sim 21.2^{\circ}\text{C}$ to $\sim 22.6^{\circ}\text{C}$

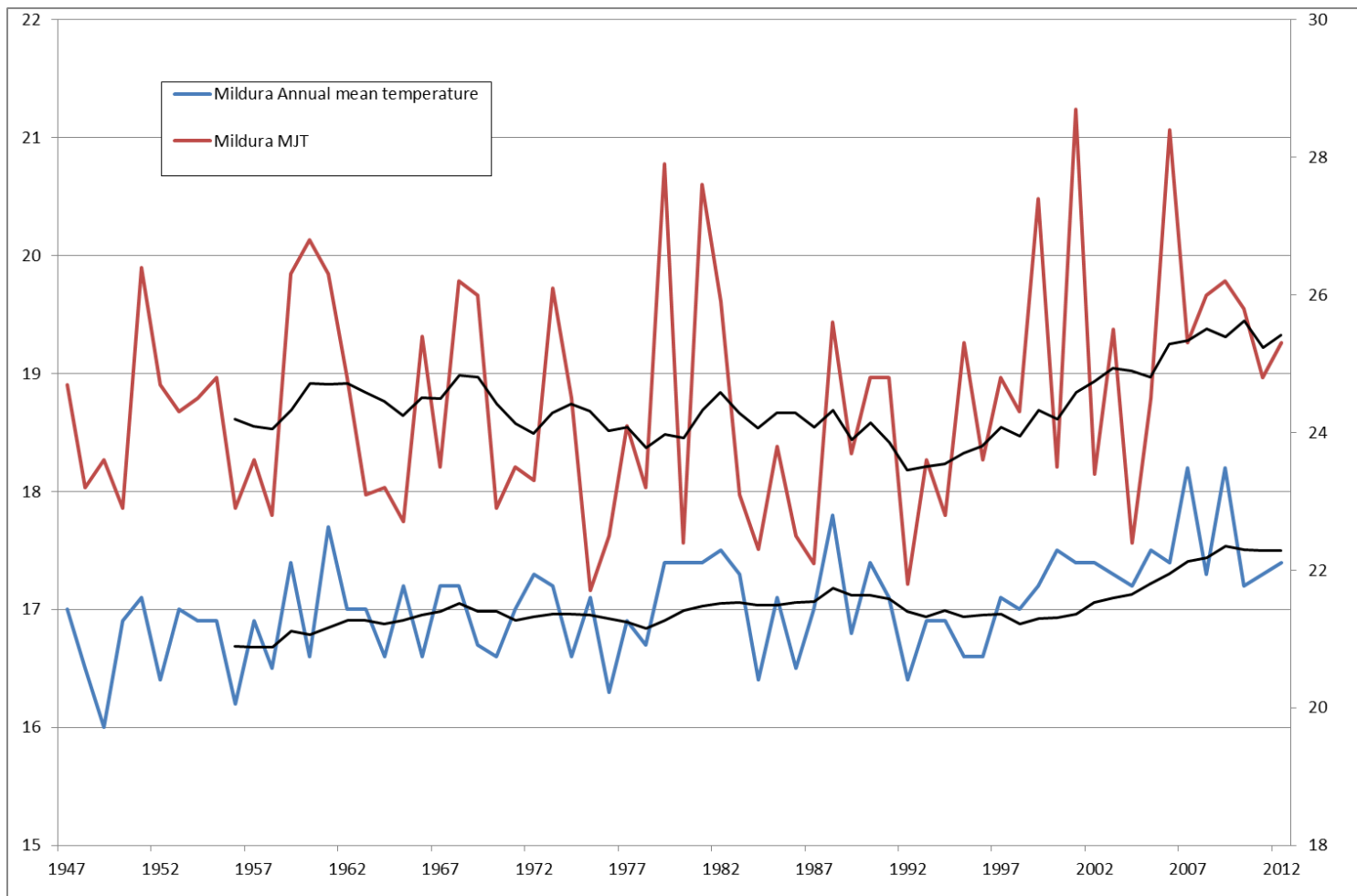
Strong increase in MJT relative to annual mean



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Mildura



Annual mean temperature increases from $\sim 16.8^{\circ}\text{C}$ to $\sim 17.5^{\circ}\text{C}$

MJT increases from $\sim 24.0^{\circ}\text{C}$ to $\sim 25.5^{\circ}\text{C}$

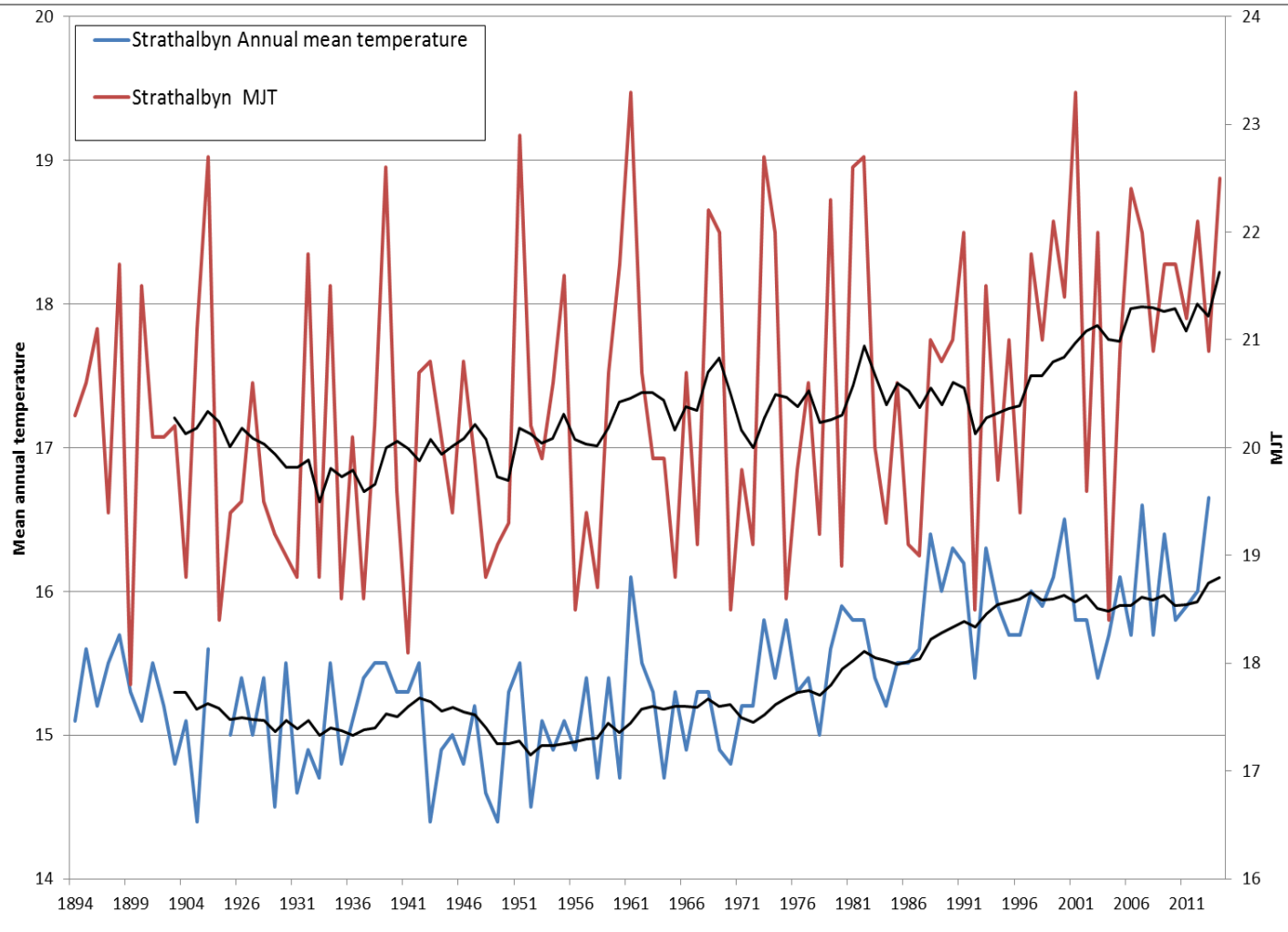
Strong increase in MJT relative to annual mean



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Strathalbyn



Annual mean temperature increases from $\sim 15.0^{\circ}\text{C}$ to $\sim 16.0^{\circ}\text{C}$

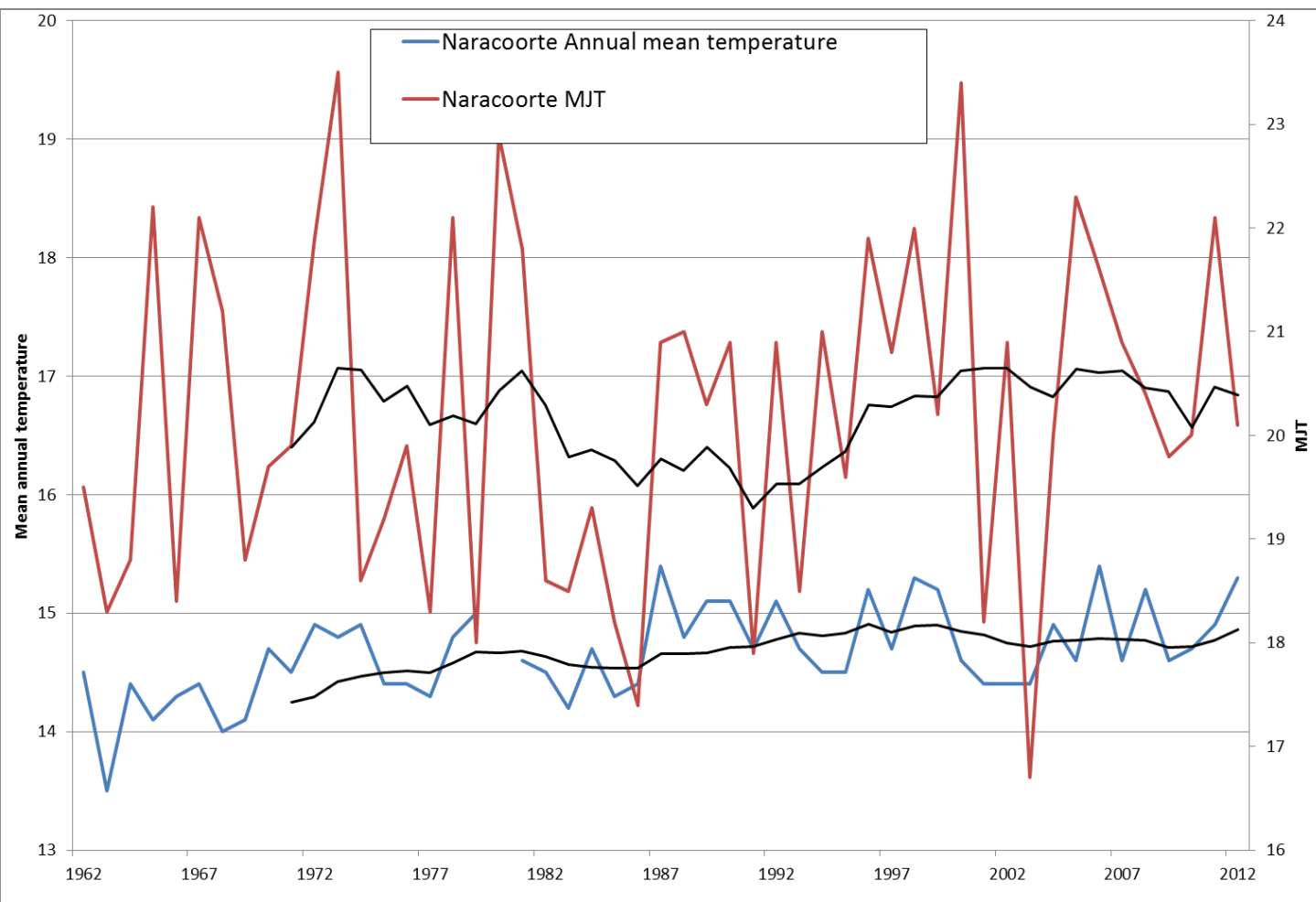
MJT increases from $\sim 19.9^{\circ}\text{C}$ to $\sim 21.2^{\circ}\text{C}$



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Naracoorte



Annual mean temperature increases from $\sim 14.1^{\circ}\text{C}$ to $\sim 14.8^{\circ}\text{C}$

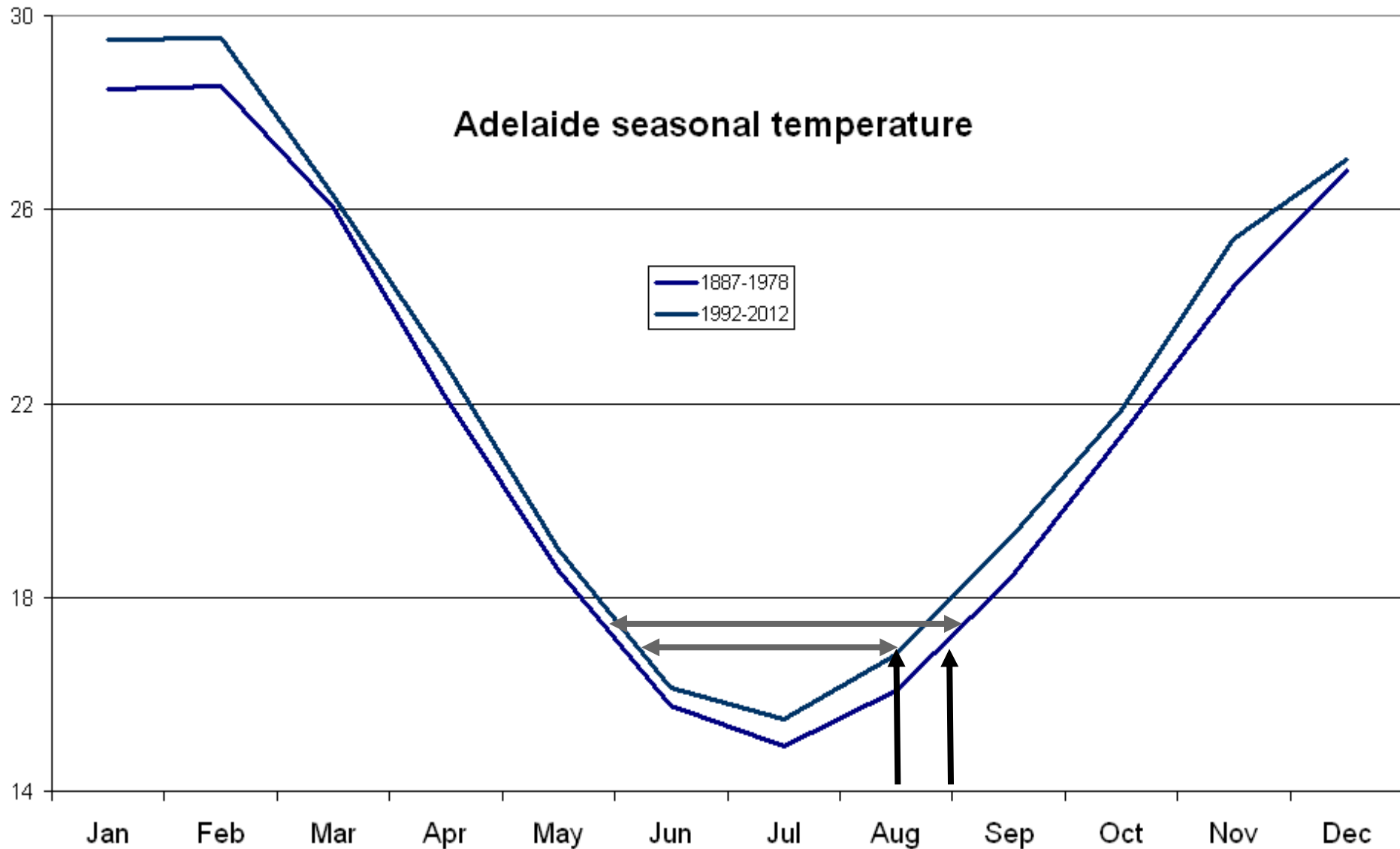
MJT increases from $\sim 20.0^{\circ}\text{C}$ to $\sim 20.7^{\circ}\text{C}$

Likely cooler back in the first half of the 20th C



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Shrinking seasons- warming temperatures are shrinking winter from both ends

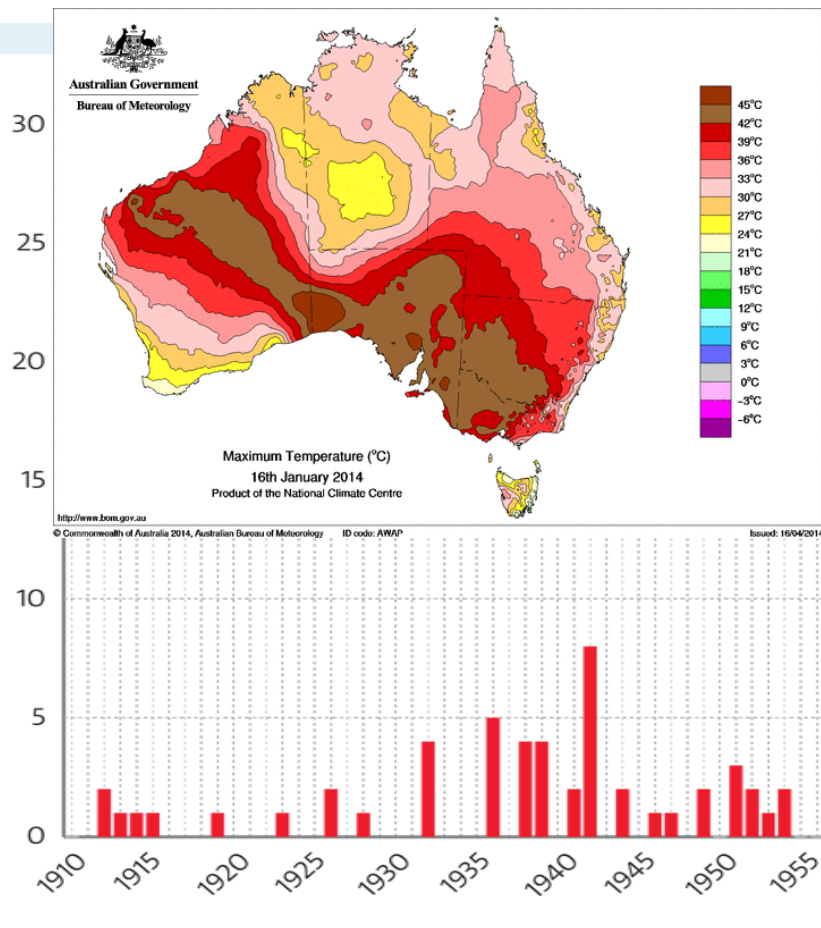




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Getting longer and more frequent heatwaves and very hot days

Number of days that Australian area-averaged mean temperatures were in the warmest 1 per cent of records



Source: Bureau of Meteorology

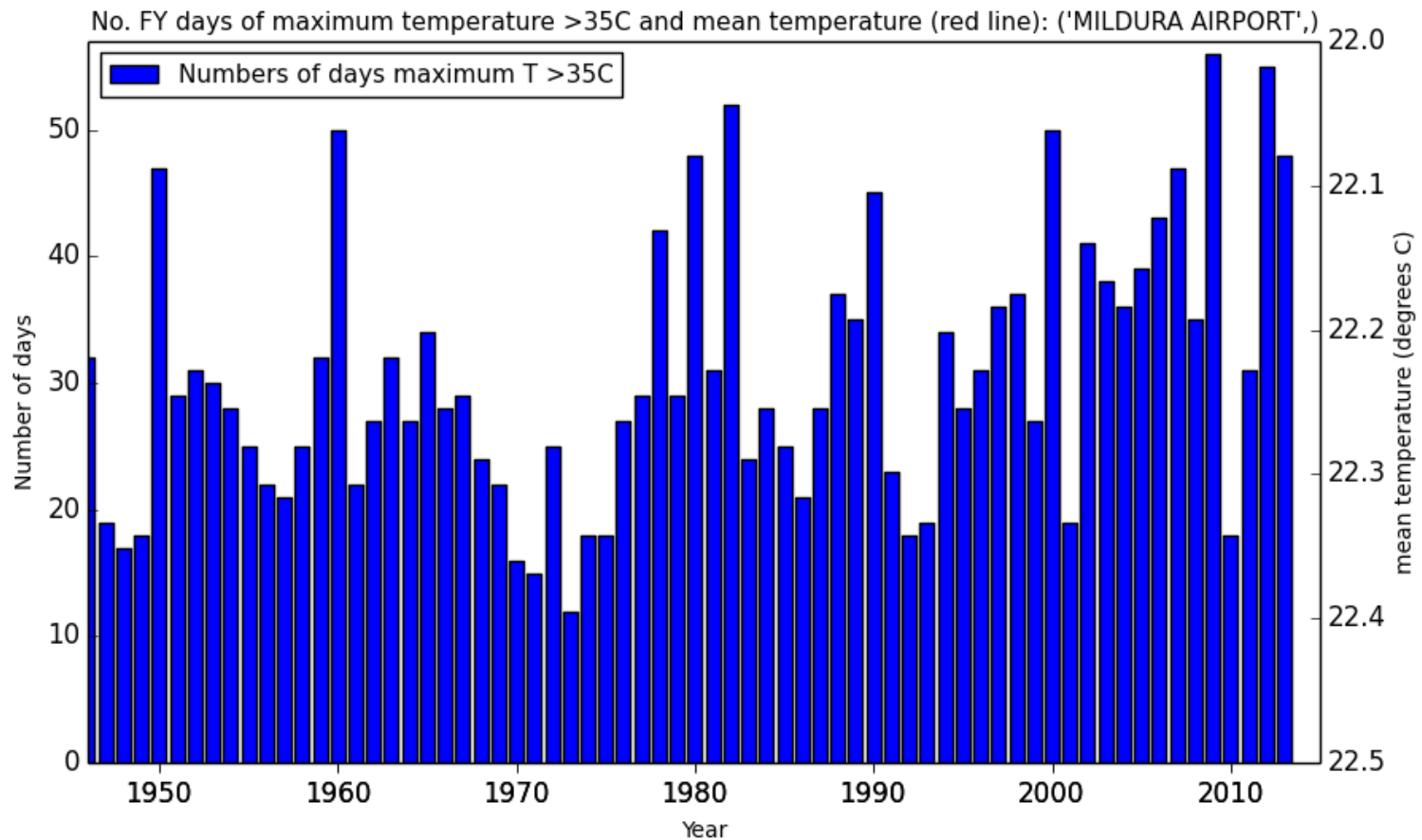
Also increased bushfire risk (smoke taint), sea level rise for coastal areas



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Increased extremes





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MetEye

The Next Generation
forecasting system
allows more
information out 7
days ahead for a
point or as
maps/grids

Key features:

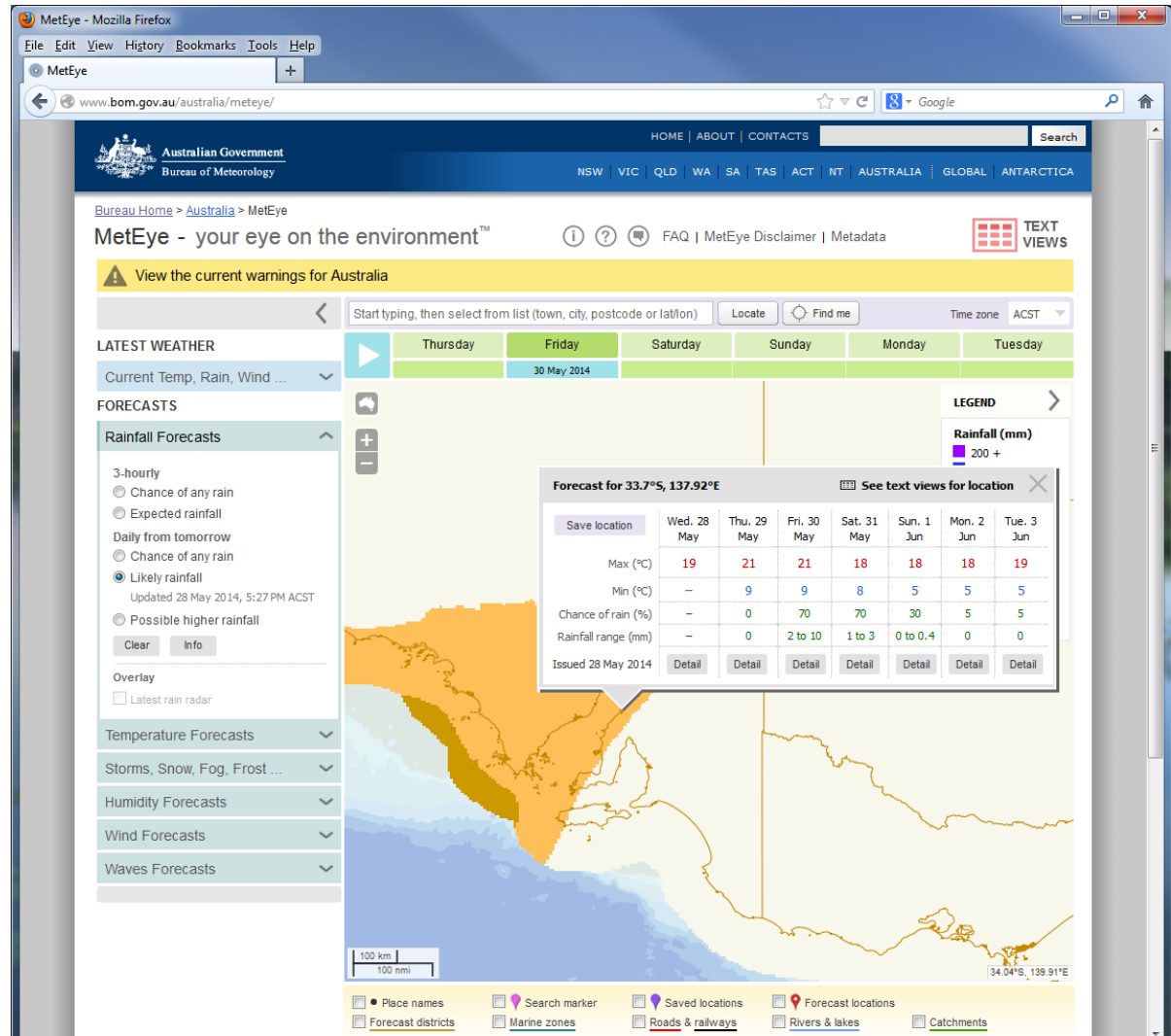
GIS enabled data

Zoom/pan

Multiple forecast element
overlay & marine (waves)

Includes observations,
radar, satellite overlays

Potential to add profiles
such as Agriculture profile





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Evapotranspiration (Eto) data for irrigation

- Daily past Eto figures derived from BoM weather stations
- On our 'Agriculture' page from the BoM homepage
- 7 day forecast Eto is in development

Recent Evapotranspiration - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Recent Evapotranspiration x Sea Surface Temperature Maps +

www.bom.gov.au/wat/eto/

About evapotranspiration

These maps and tables provide daily reference evapotranspiration (ET₀) derived from automatic weather station records and satellite measurements. Monthly data is available via the location links in the tables for each state.

Map NSW Vic Qld WA SA Tas NT

Evapotranspiration Calculations

Boarlunga - September 2013 daily calculations

Date	Evapotranspiration (mm) 0000-2400	Rain (mm) 0900-0900	Pan Evaporation (mm) 0900-0900	Max Temp	Min Temp	Max Rel Hum (%)	Min Rel Hum (%)	Average 10m Wind Speed (m/sec)	Solar Radiation (MJ/sq m)
01/09/2013	5.3	0.0		25.1	18.8	73	33	4.91	20.83
02/09/2013	3.6	0.0		25.3	12.7	81	46	1.96	21.15
03/09/2013	4.2	0.0		28.9	15.8	66	20	2.41	16.53
04/09/2013	6.2	0.0		27.9	19.6	74	19	6.83	10.40
05/09/2013	1.1	0.0		15.1	14.1	88	75	1.30	4.12
06/09/2013	4.2	3.6		15.4	12.5	88	74	1.22	4.86
07/09/2013	3.4	0.2		18.6	9.4	85	47	3.06	22.10
08/09/2013	4.8	0.0		25.7	12.4	72	26	4.22	16.01
Totals:	29.8	3.8							

Monthly Archive

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009												
2010												
2011												
2012												
2013												

Product Code: IDCKWCDEA0

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Indigenous Weather Knowledge
Glossary



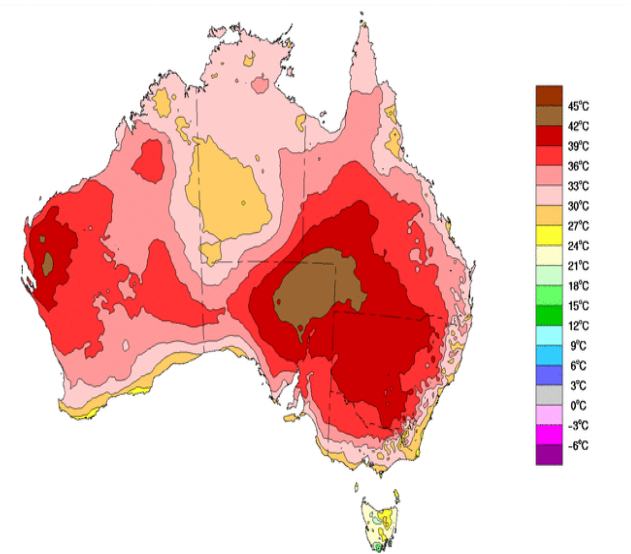
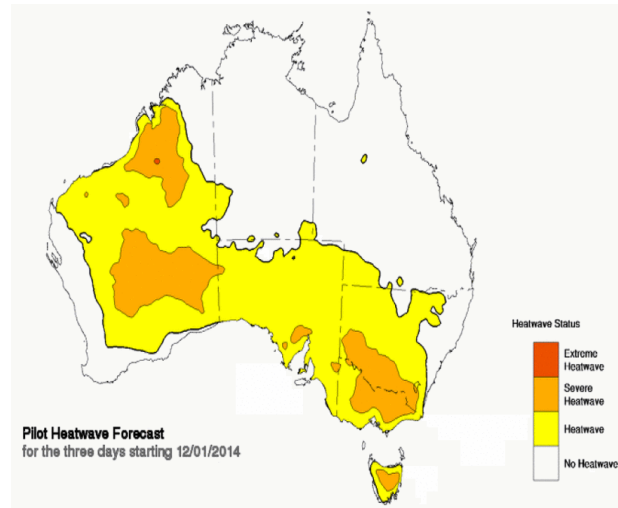
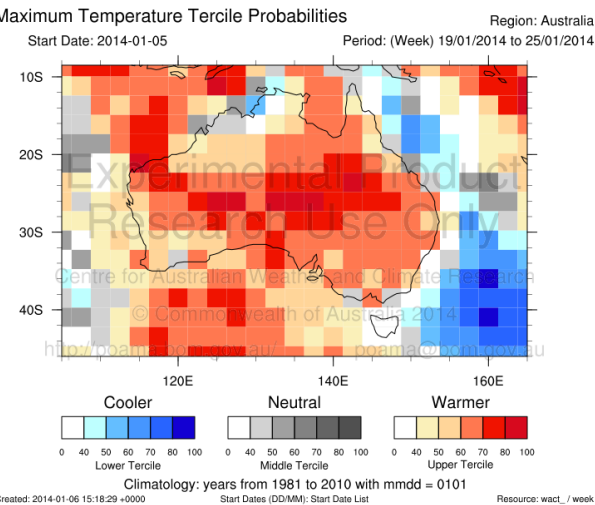
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Predicting extremes – BoM pilot heatwave warning service

Observed Temperatures

Week ending 04 January 2014

Pilot heatwave Forecast



POAMA January 5 outlook

4 day prediction of January 2014 heatwave

Observed maximum temperature for mid-January 2014



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BoM Seasonal Outlook now uses POAMA

Predictive Ocean Atmosphere Model for Australia

National rainfall outlook for December to February

Issued 27 November 2013

Please give feedback

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Alerts

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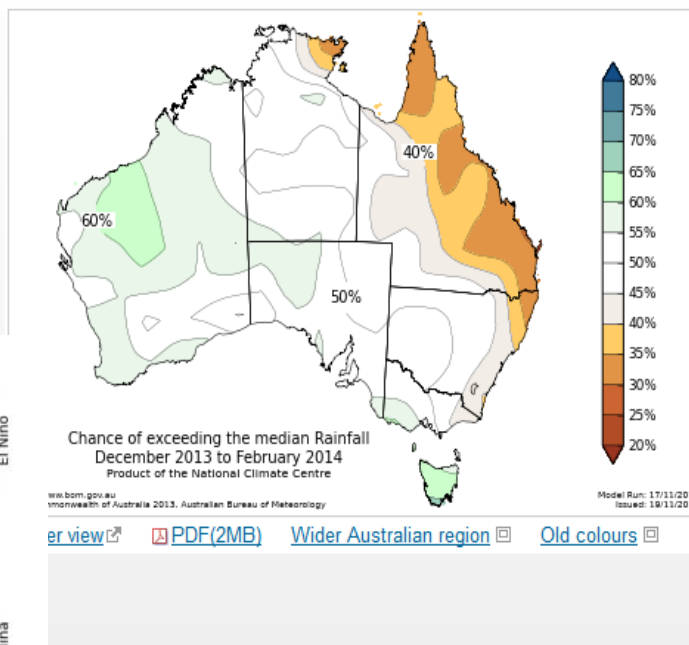
Rainfall

Outlook accuracy

Rainfall averages

About the outlook

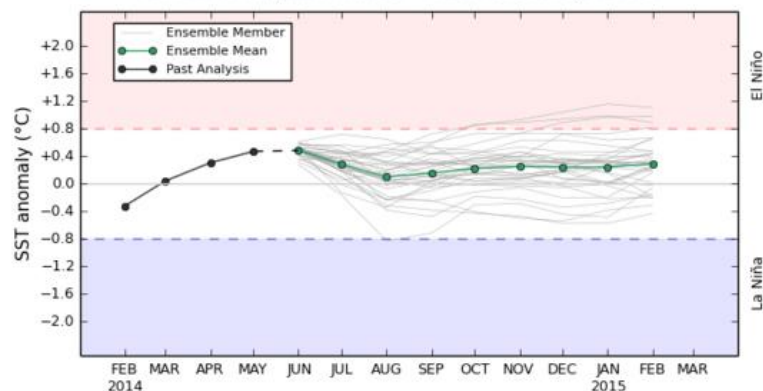
Drier summer more likely for parts of northeast Australia



Summary

- A drier than normal season is more likely for much of northeast Australia
- A wetter than normal season is more likely for Tasmania and the eastern parts of the Pilbara and Gascoyne in WA
- The chances of a wetter or drier than normal season are roughly equal over the remainder of the country
- Climate influences include a neutral tropical Pacific, and local sea surface temperature patterns
- Outlook accuracy is moderate over most of the eastern mainland, the Top End of the NT, and most of WA. Elsewhere, outlook accuracy is low.

POAMA monthly mean NINO34 - Forecast Start: 1 JUN 2014

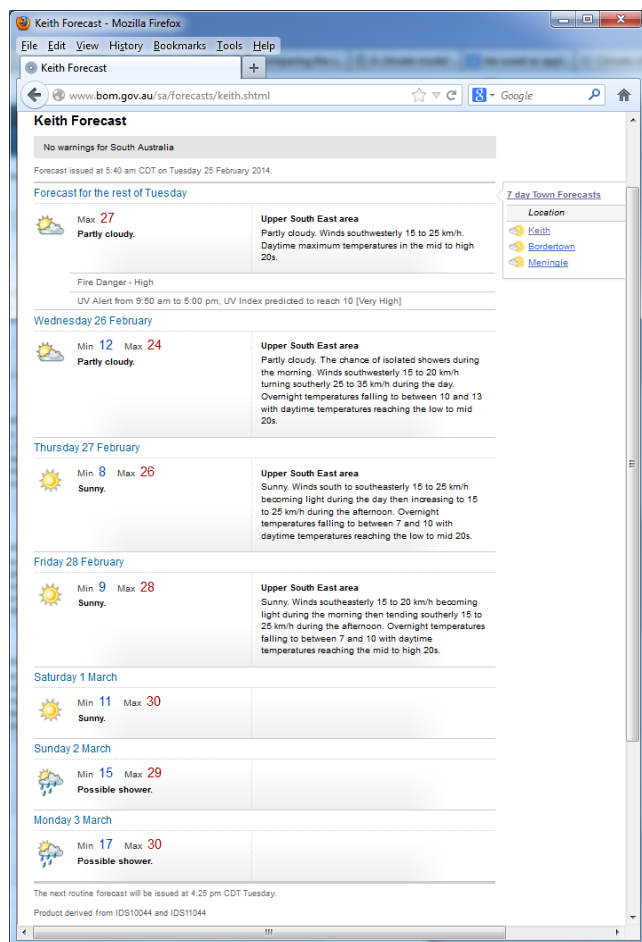




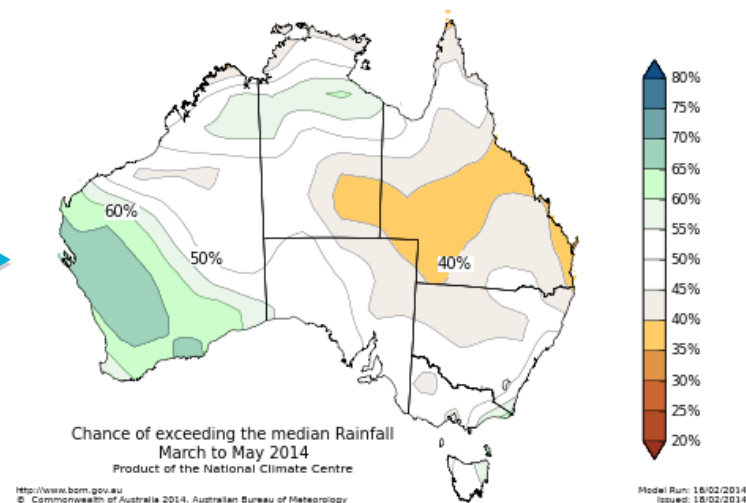
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Providing information across a range of timescales

7 day forecasts

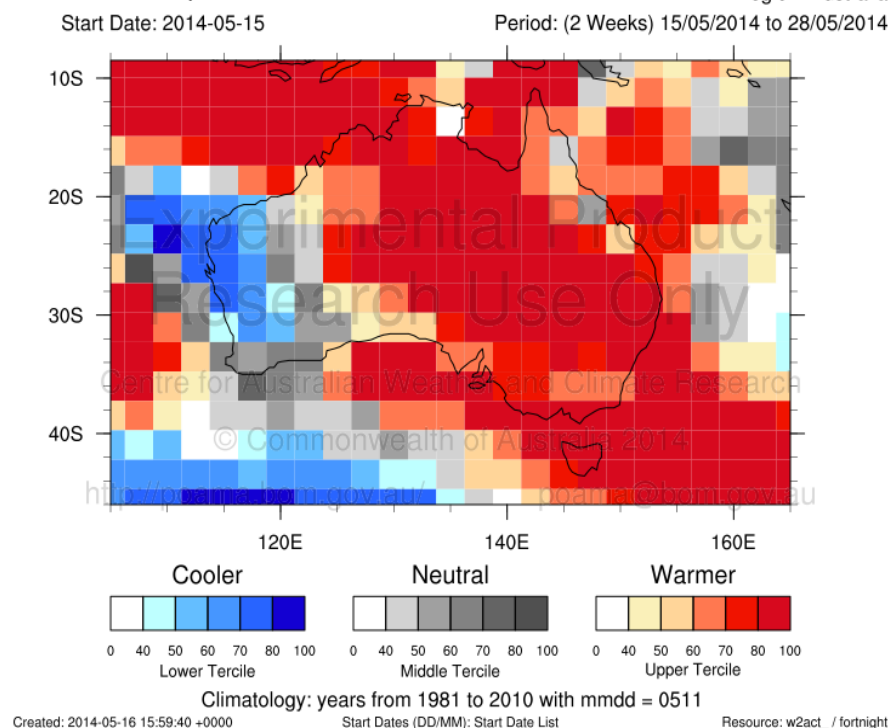


3 month block seasonal outlook



BoM is moving toward more specific products across a range of timescales

Maximum Temperature Tercile Probabilities

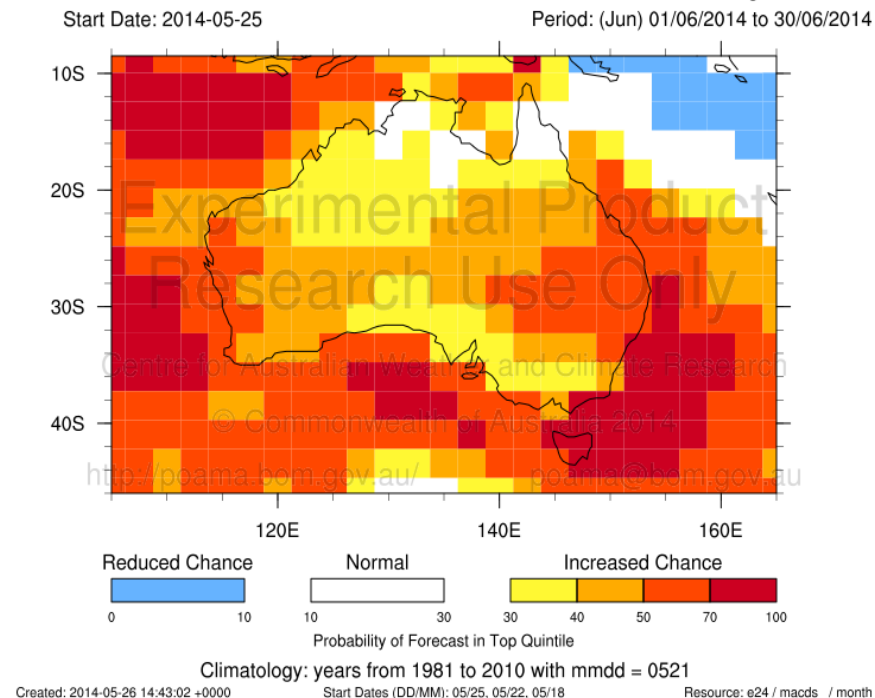


POAMA gives useful predictions of heatwaves 2-6 weeks ahead

POAMA- bridging the gap between the week ahead and the season ahead

Temperature

Probability in Top Quintile (Deciles 9 and 10) for Max Temp



Likelihood of extreme heat in June 2014



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Thank you

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