

Climate Outlook

Northern Australia Seasonal Fire Outlook Workshop

20 and 21 June 2016

Greg Browning and David Jones
Climate Services
Bureau of Meteorology



Australian Government
Bureau of Meteorology



Overview

1. **Review of the 2015 season**
2. Background climate change signal
3. Outlook for 2016

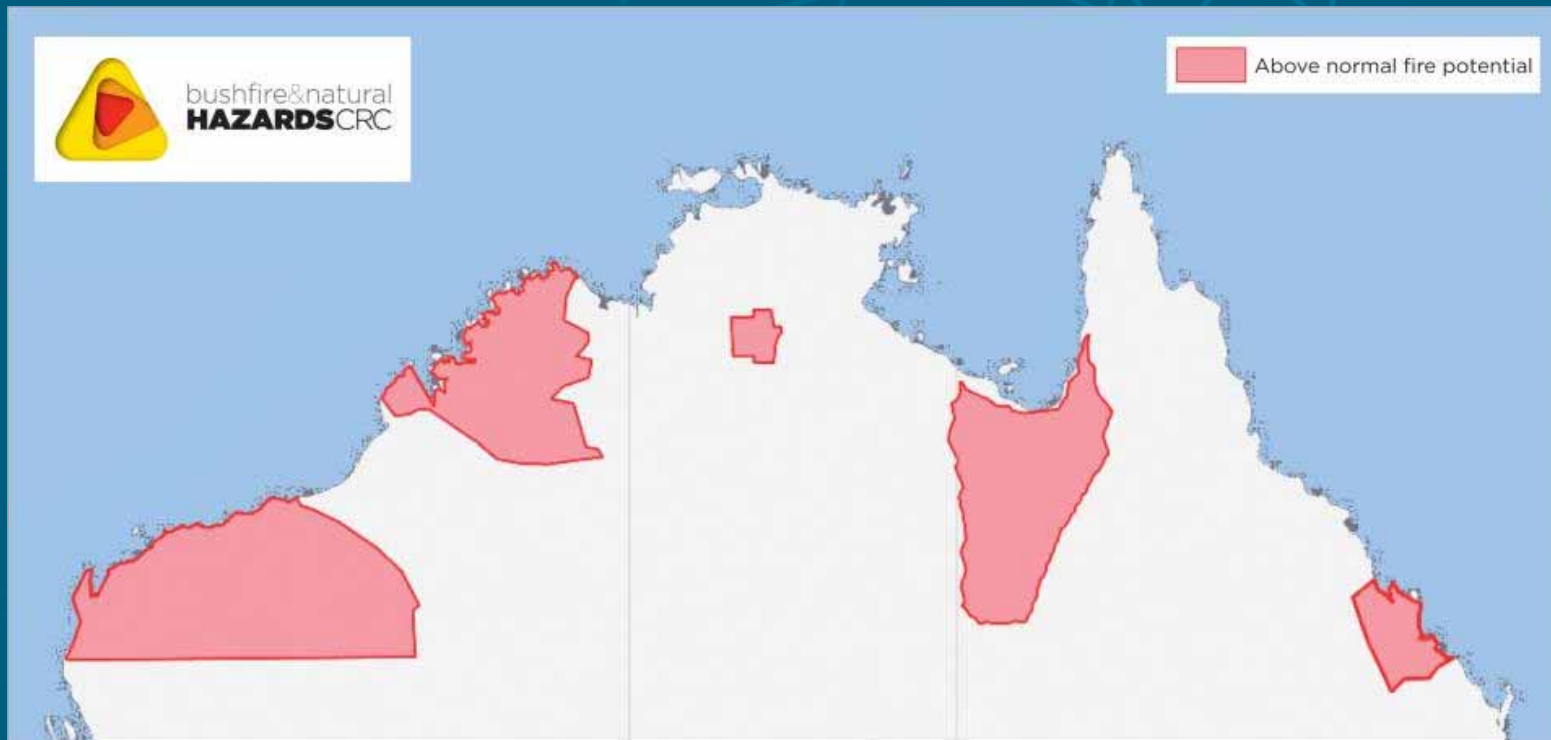
Antecedent conditions

Seasonal Climate Outlook



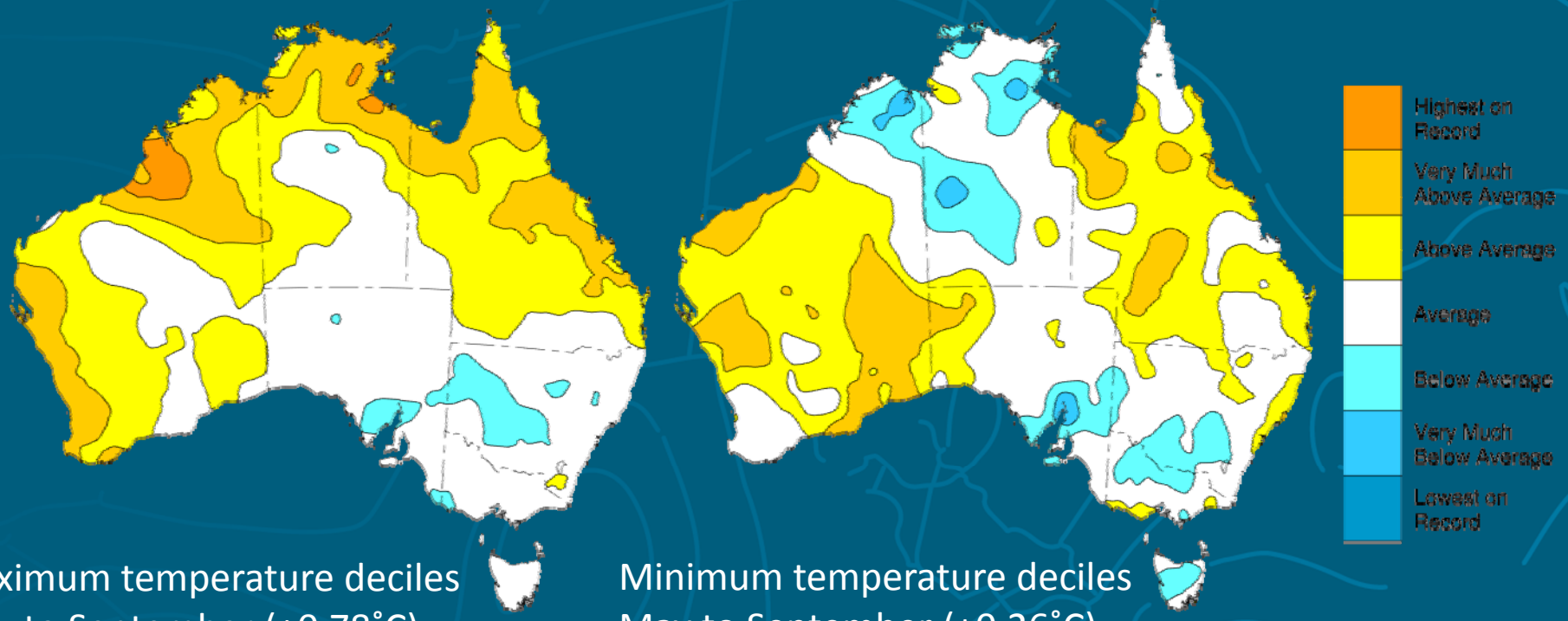
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2015 fire season outlook



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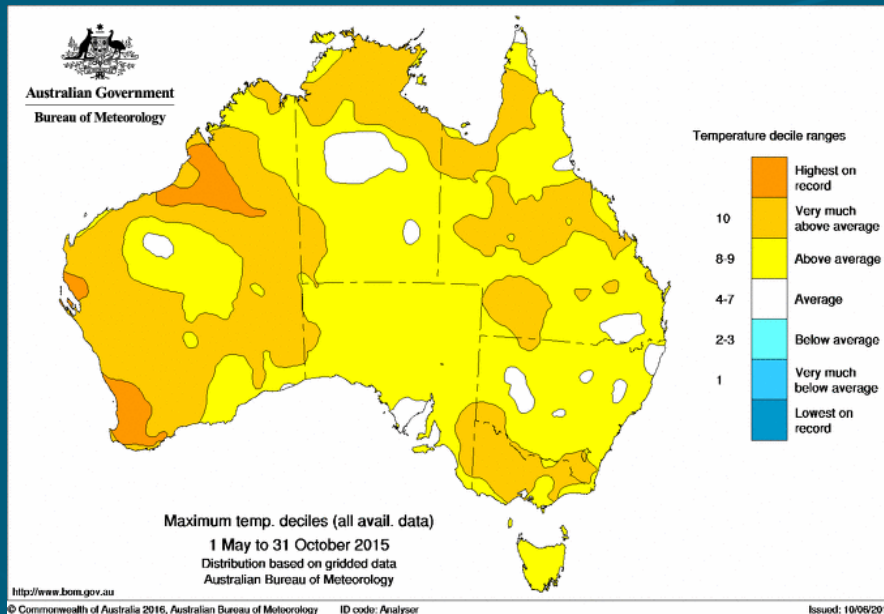
2015 season: very warm days, near *normal* nights



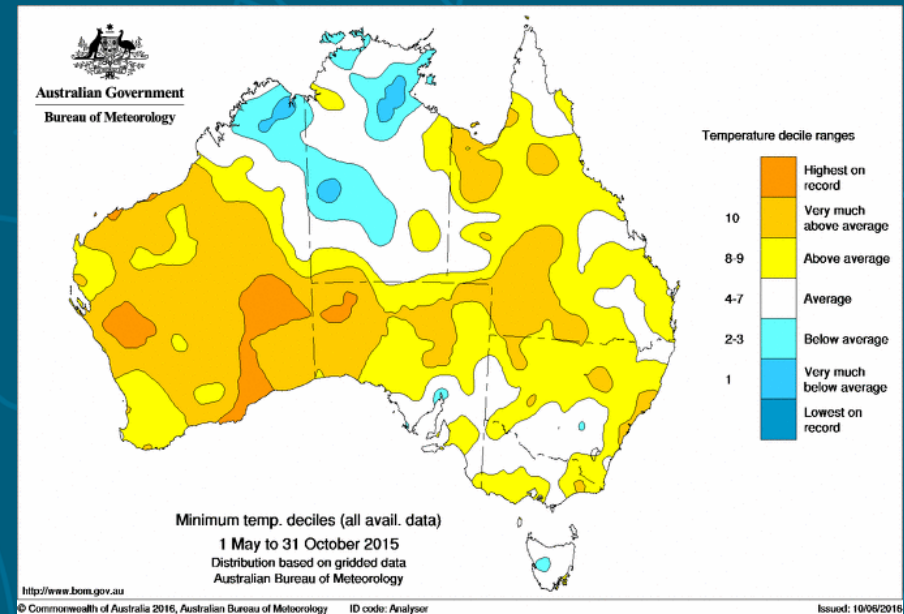
Maximum temperature deciles
May to September (+0.78°C)

Minimum temperature deciles
May to September (+0.26°C)

2015 season: very warm days, near *normal* nights

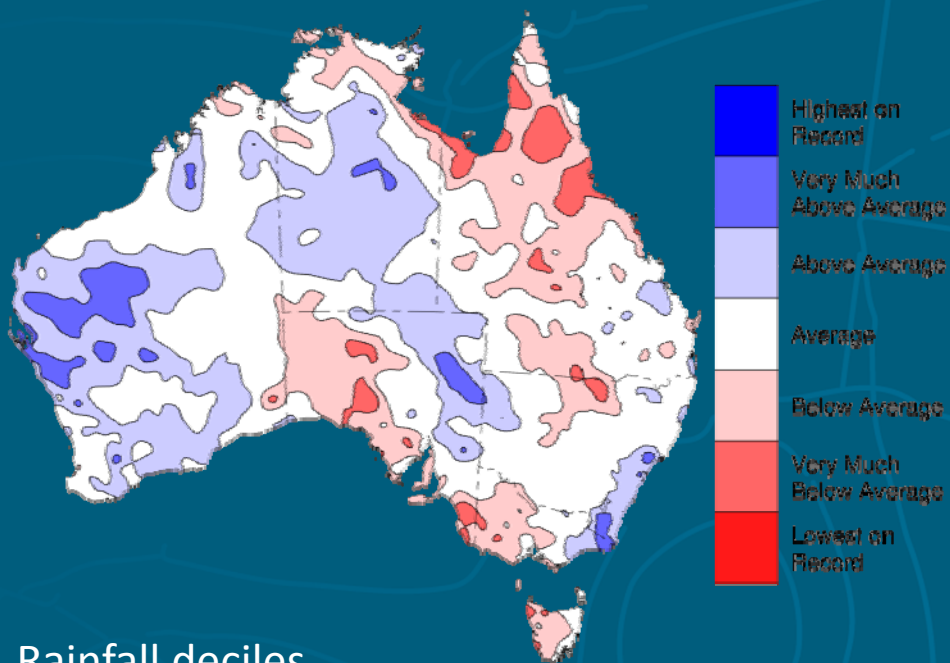


Maximum temperature deciles
May to October

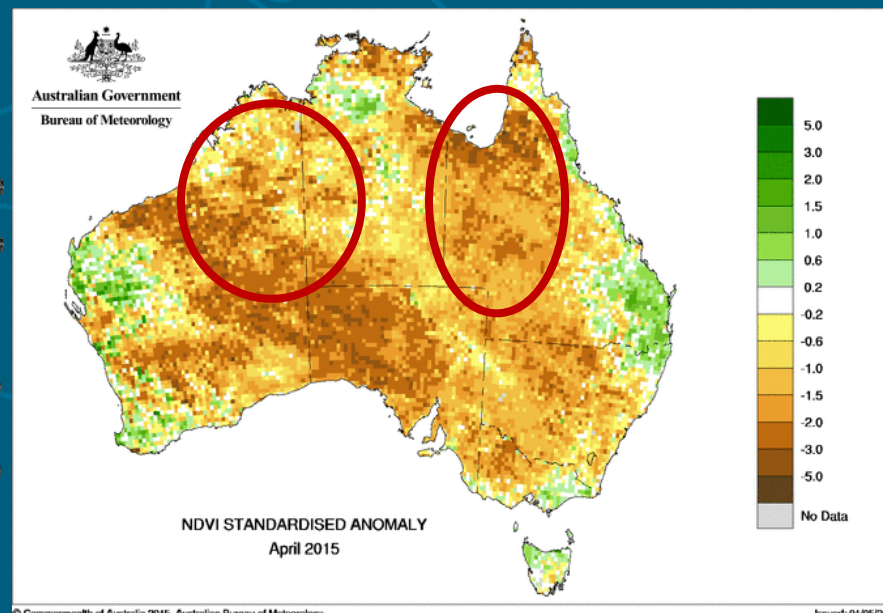


Minimum temperature deciles
May to October

Seasonal rainfall deciles: Pre-season

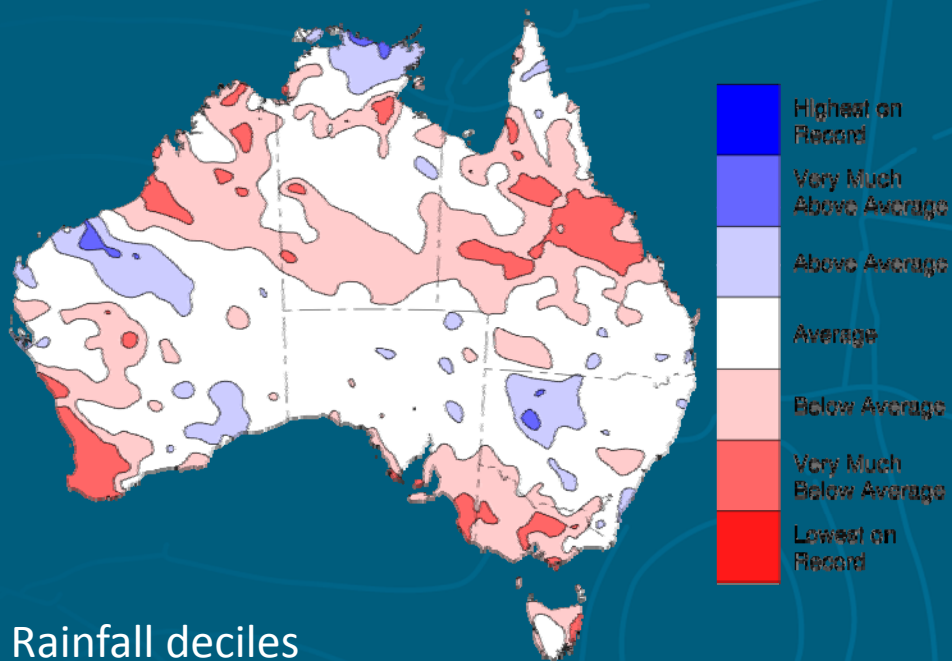


Rainfall deciles
October 2014-April 2015

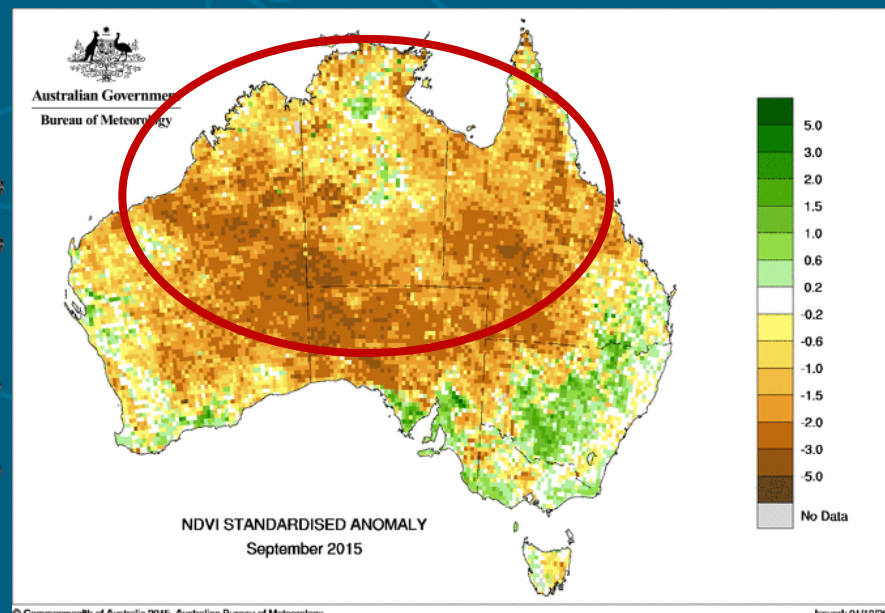


April 2015 NDVI anomaly

Seasonal rainfall deciles: Fire season

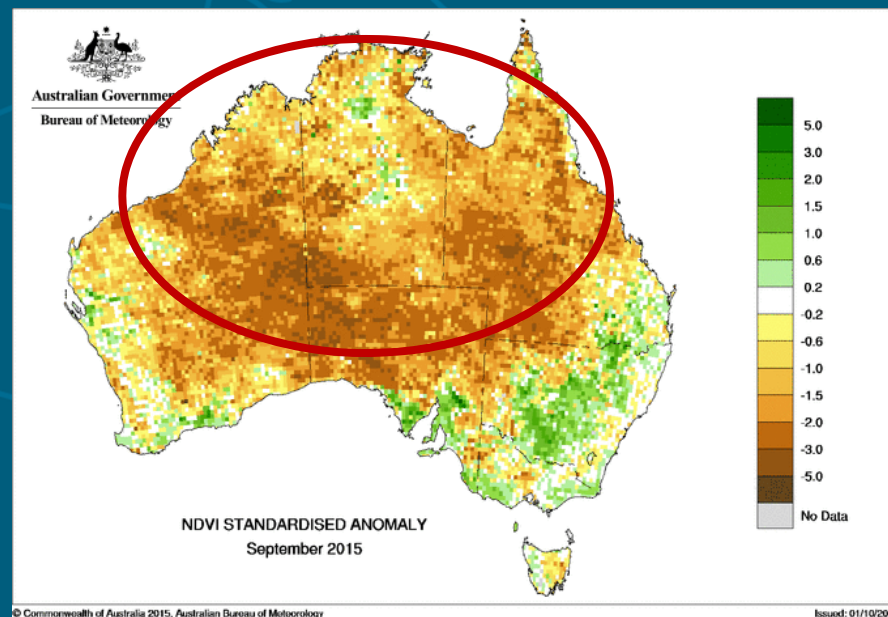
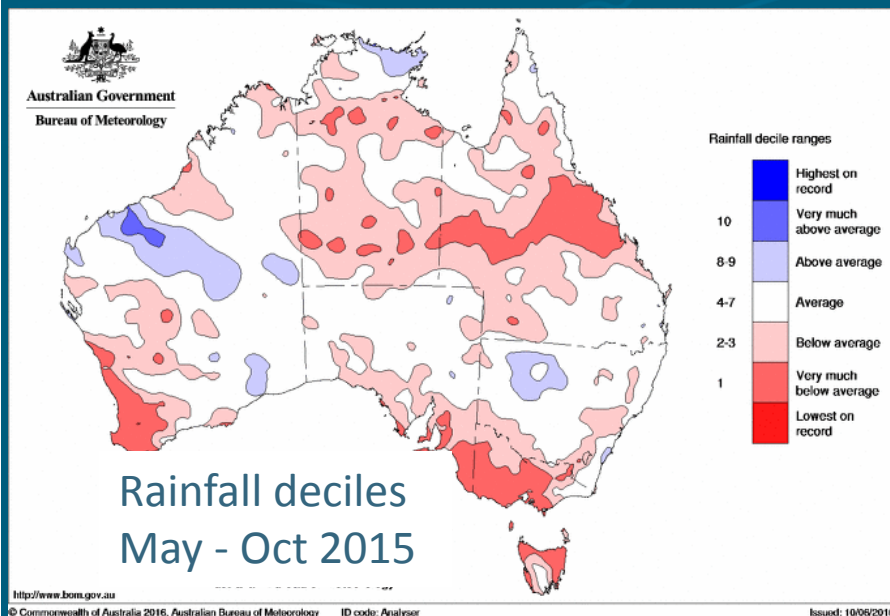


Rainfall deciles
May - September 2015



September 2015 NDVI anomaly

Seasonal rainfall deciles: Fire season



September 2015 NDVI anomaly



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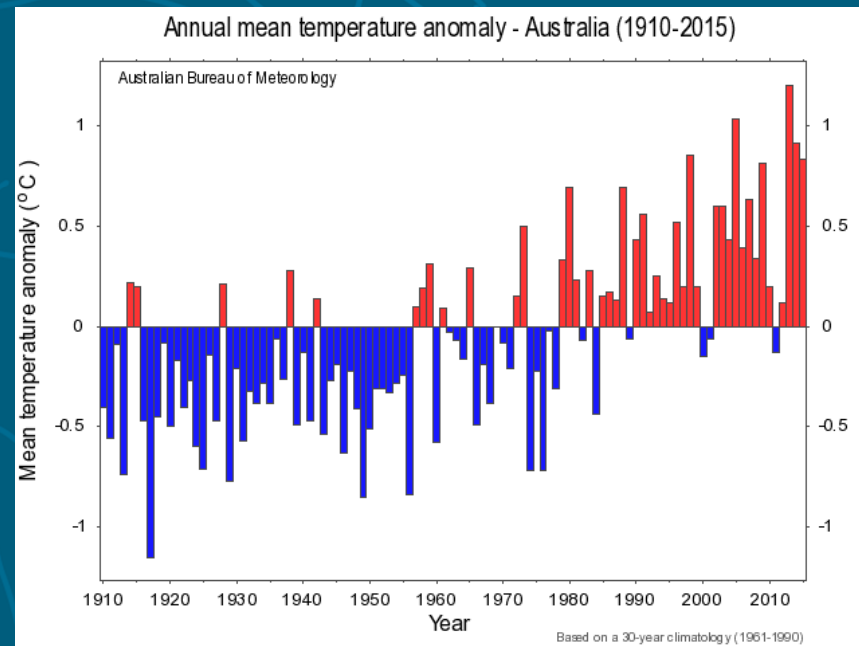
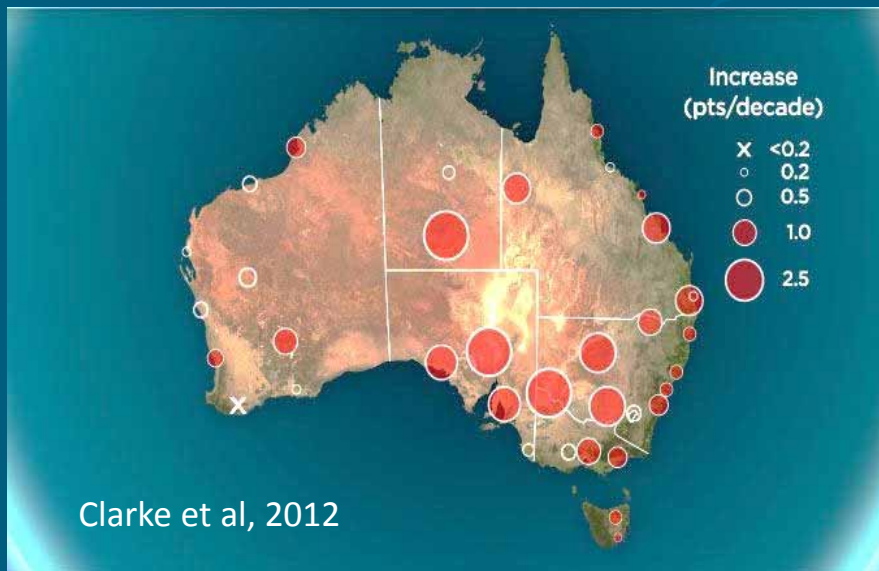
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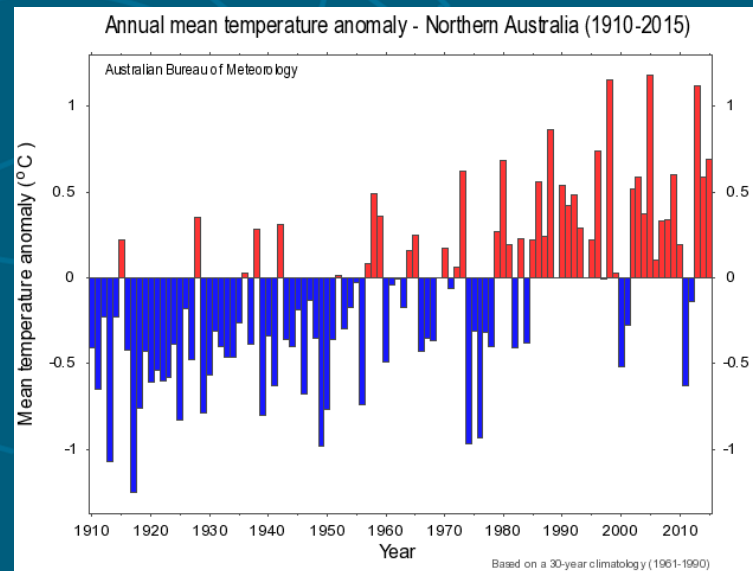
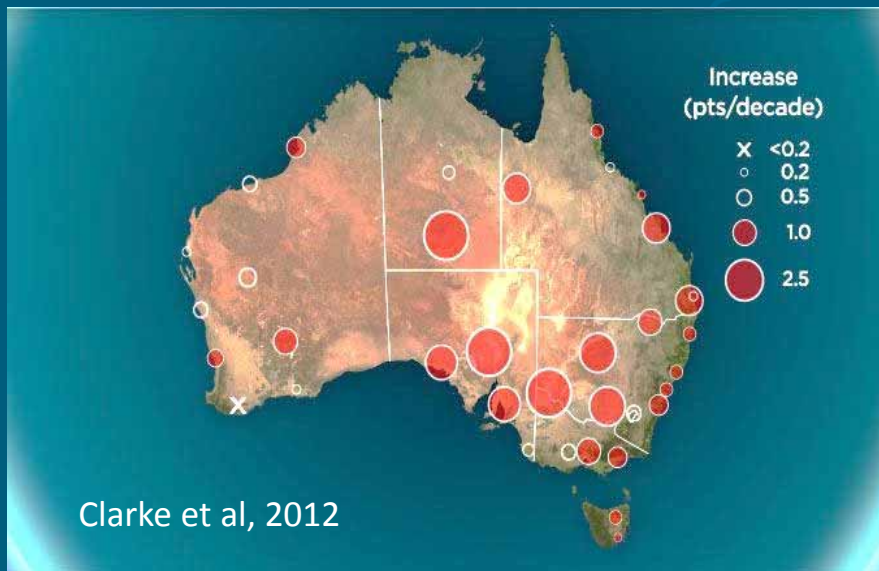
Bushfire weather and a warming planet



Trends in Forest Fire Danger Index
(1973-2010)

Australian temperature trends
(1910 – 2015)

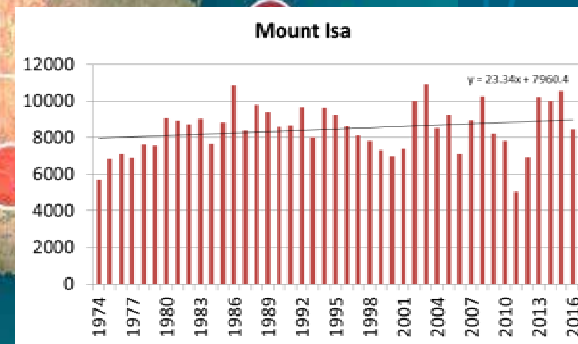
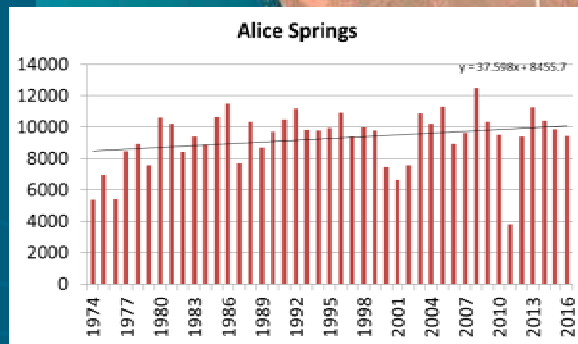
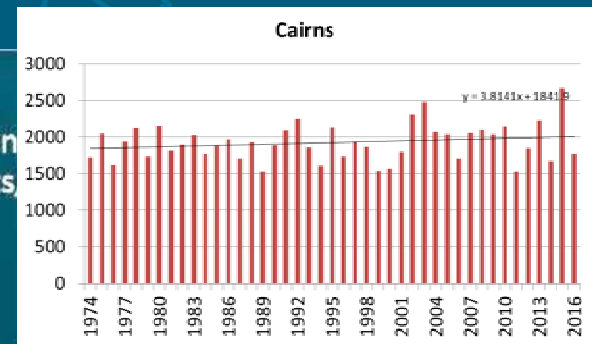
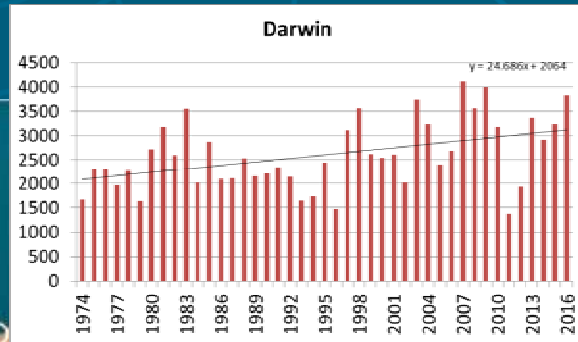
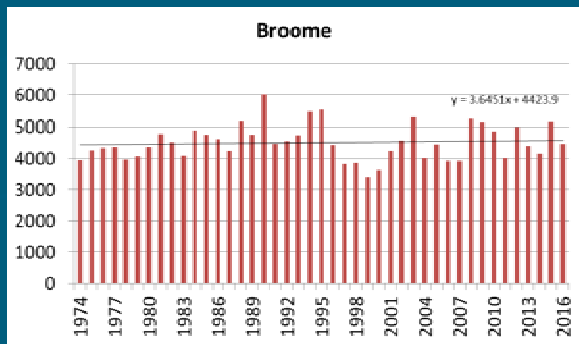
Bushfire weather and a warming planet



Trends in Forest Fire Danger Index
(1973-2010)

Northern Australian temperature
trends (1910 – 2015)

Representative FFDI graphs



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FFDI: Forest Fire Danger Index

Southern and Northern fire seasons overlapped



Lancefield, 6 October 2015
FFDI 78 (highest so early in spring
by nearly a month)

Esperance Fire, 17
November

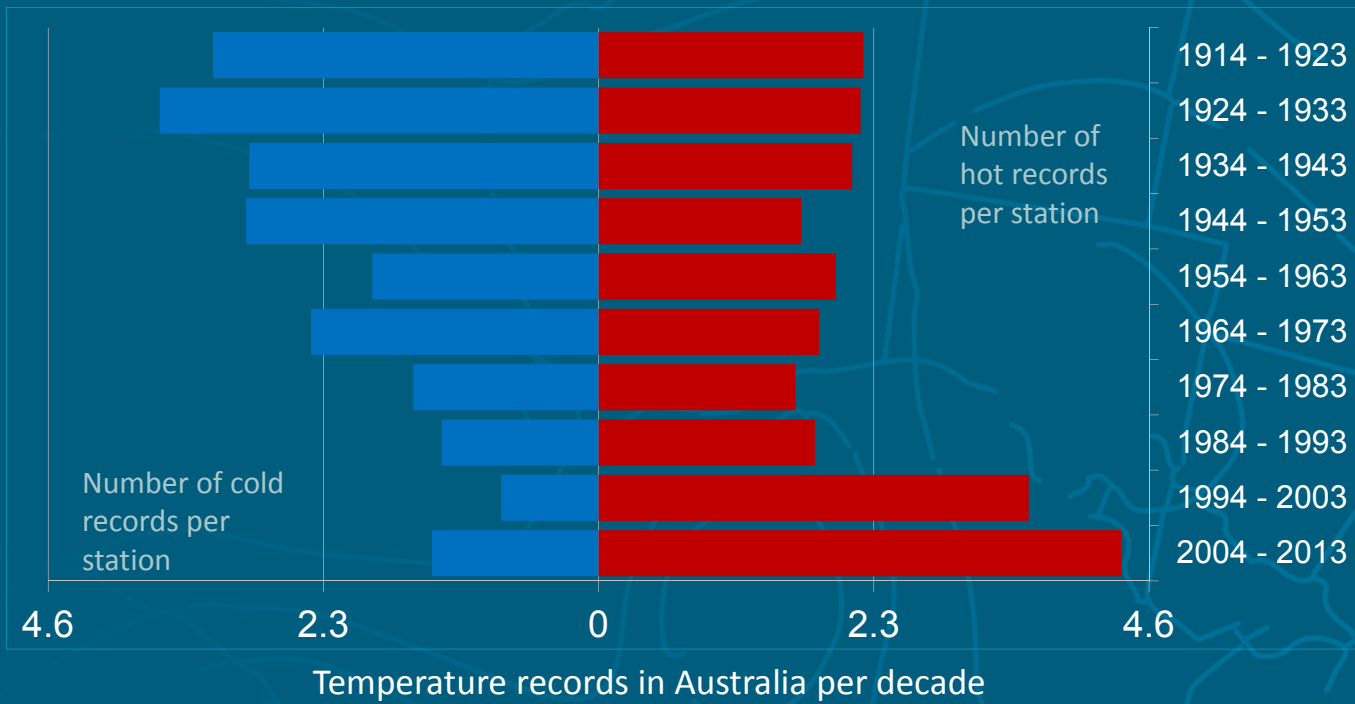


Pinery Fire, 25
November



Bushfire weather and a warming planet

More heat extremes: more hot records and less cold records



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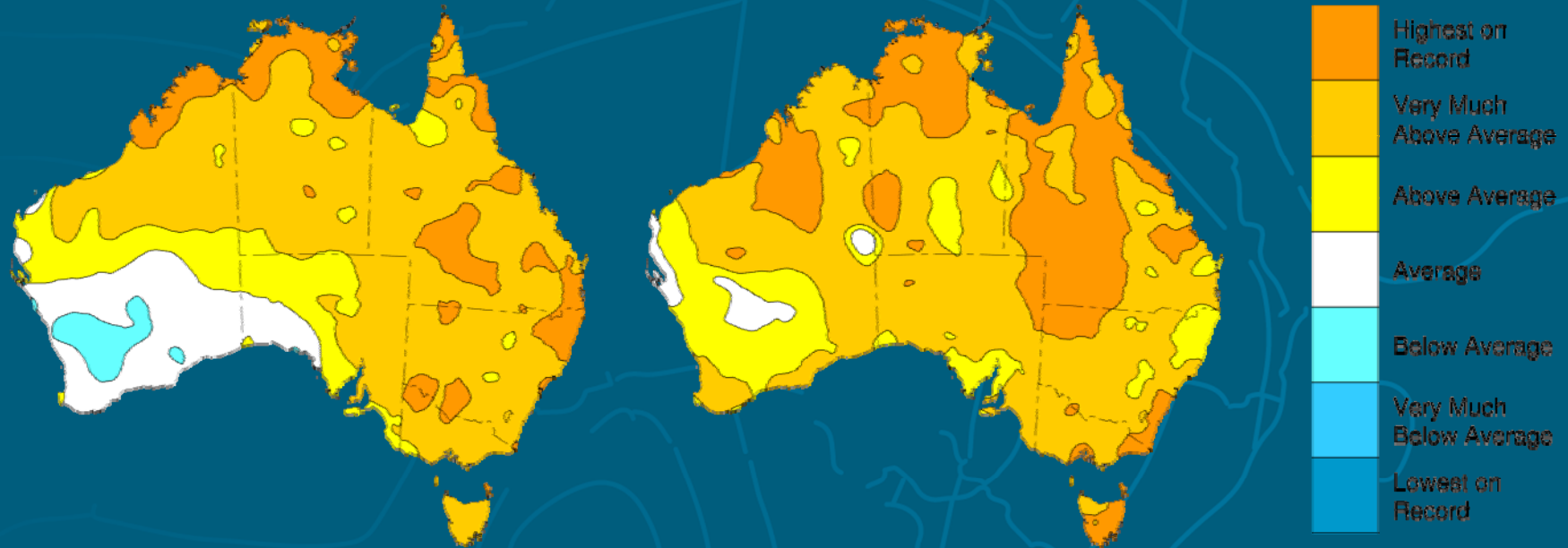
Antecedent conditions

Seasonal Climate Outlook



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Temperatures: Record hot for Australia and the North



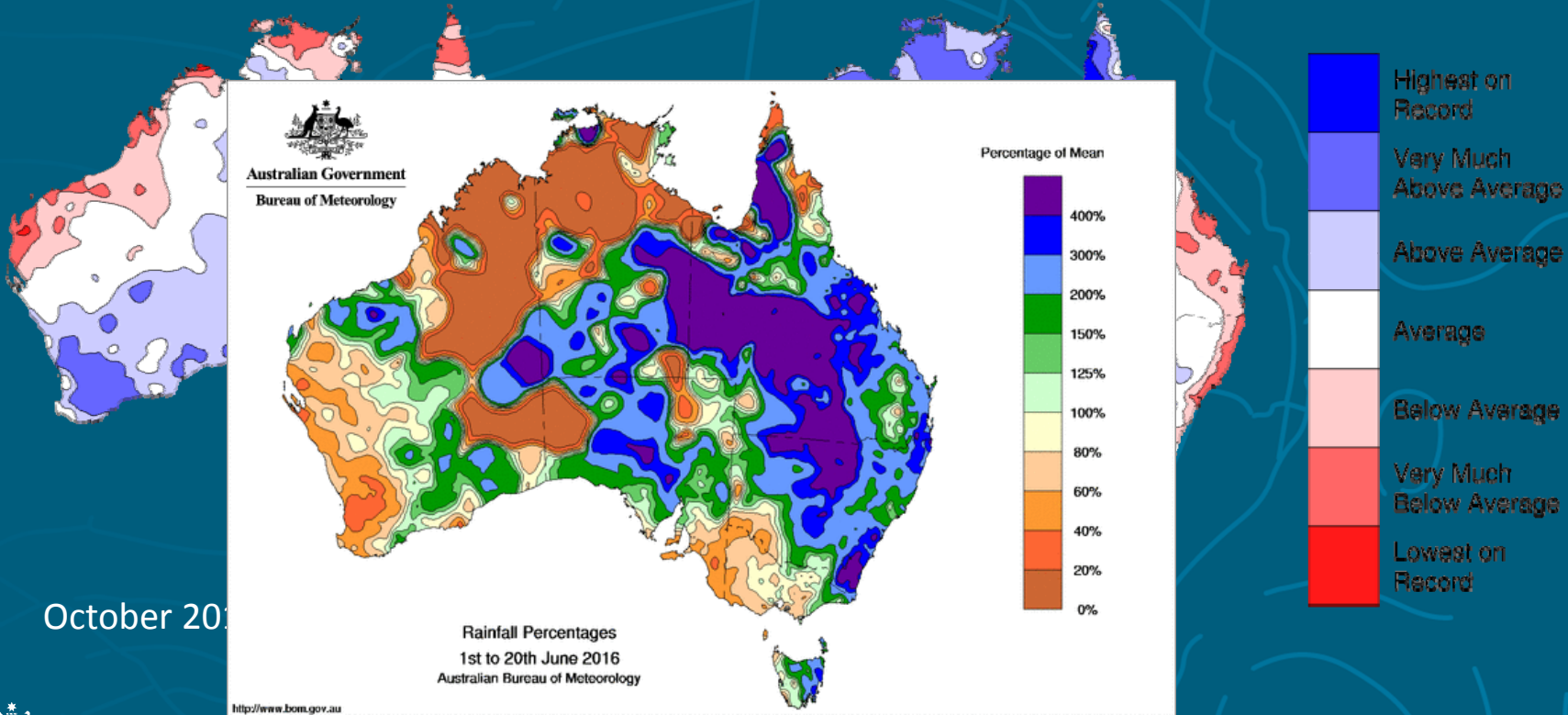
Maximum temperature deciles
January to May 2016 (+1.74°C, 2nd warmest)

Minimum temperature deciles
January to May 2016 (+1.55°C, warmest)

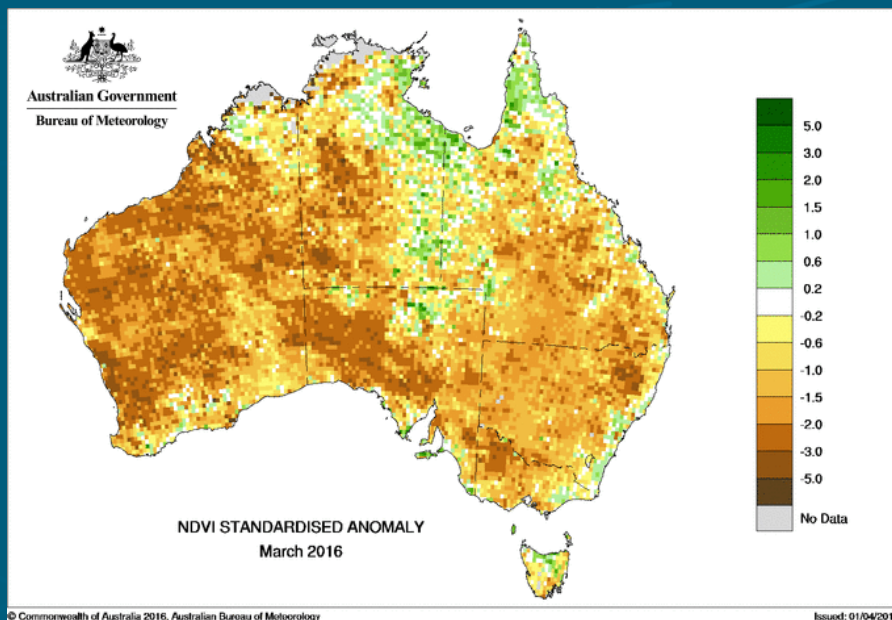


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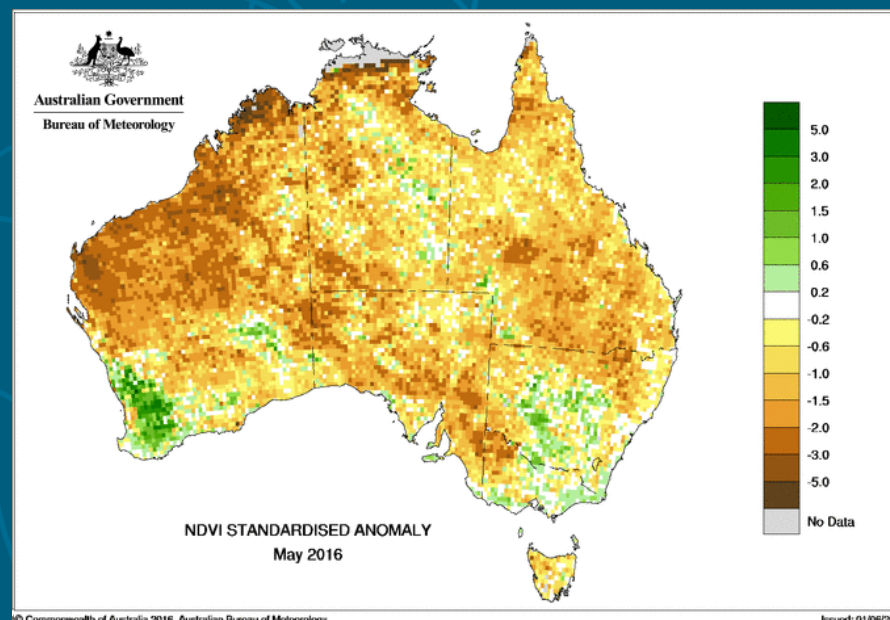
Rainfall: Monsoon season and the dry (so far)



Recent NDVI: March & May 2016

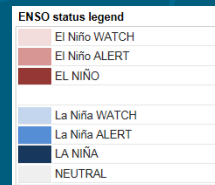
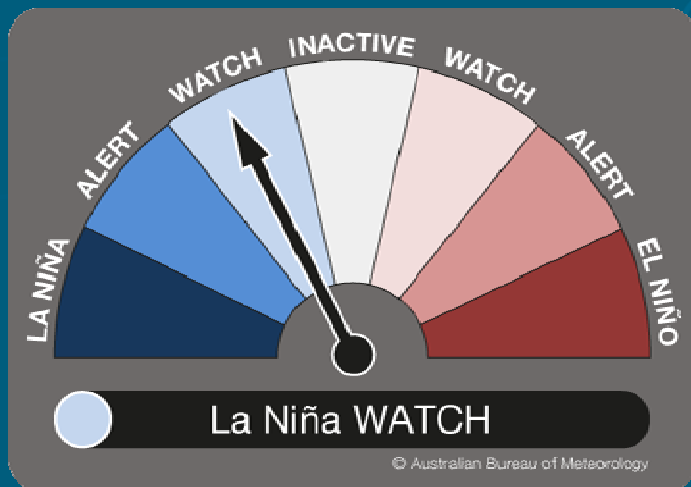


March 2016 NDVI anom



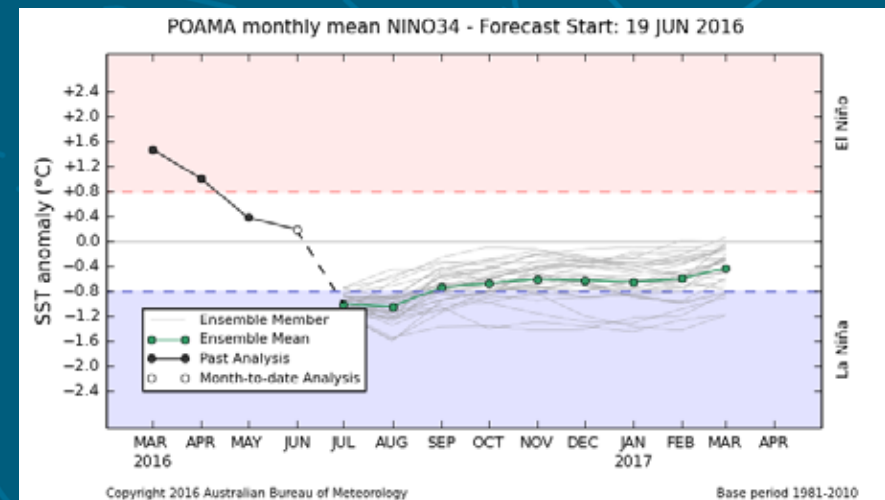
May 2016 NDVI anom

La Niña watch → 50% probability of an event



Model forecasts show neutral to La Niña conditions

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	EL NIÑO	EL NIÑO	EL NIÑO	WATCH	WATCH	WATCH	LA NIÑA	LA NIÑA	LA NIÑA	LA NIÑA	LA NIÑA	LA NIÑA
2011	LA NIÑA	LA NIÑA	LA NIÑA	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH
2012	LA NIÑA	LA NIÑA	LA NIÑA	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH
2013	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH
2014	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH
2015	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO	EL NIÑO
2016	EL NIÑO	EL NIÑO	EL NIÑO	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH	WATCH



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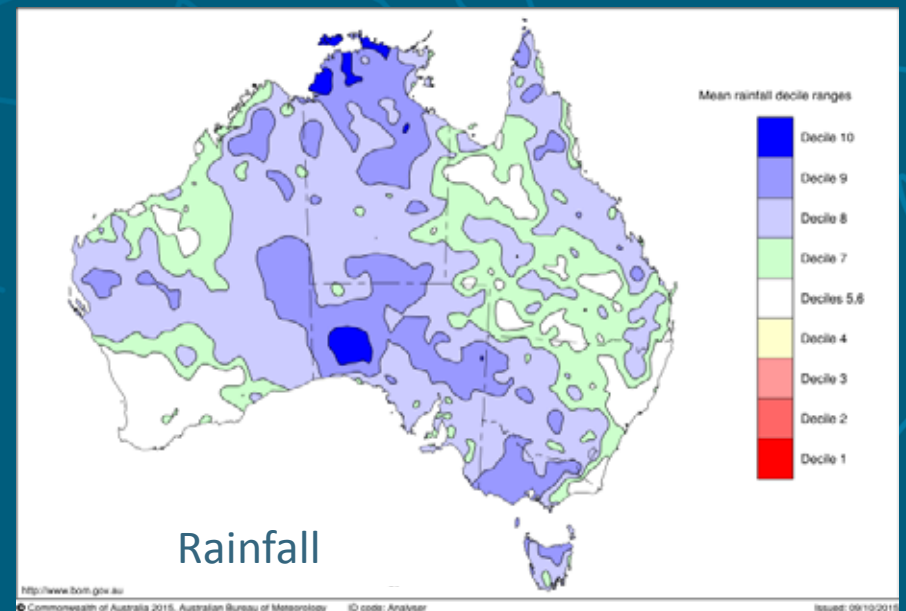
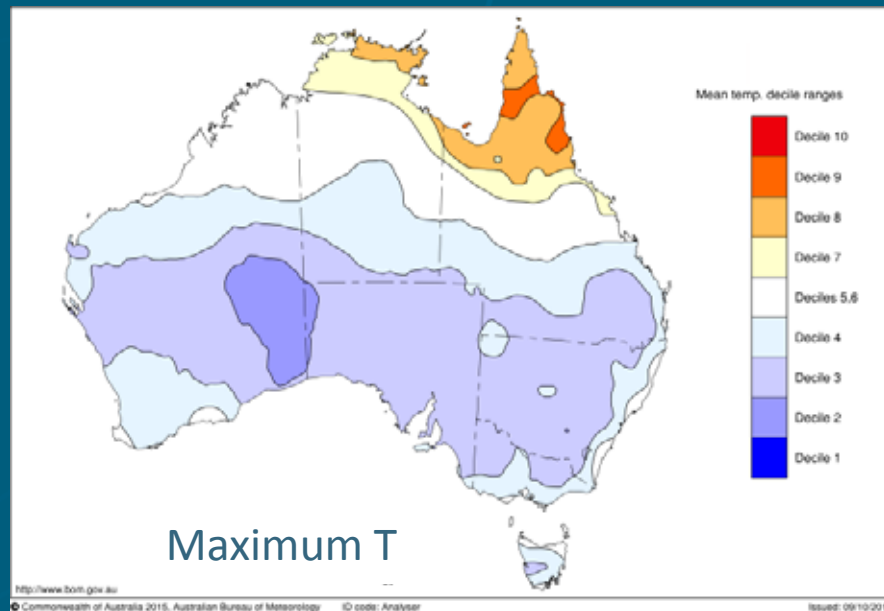
La Niña & Negative IOD impacts

June – November rainfall and temperatures

TYPICAL IMPACTS ON OUR CLIMATE

↑ **RAINFALL INCREASES** IN EASTERN, CENTRAL AND NORTHERN AUSTRALIA

↓ **TEMPERATURE DECREASES** SOUTH OF THE TROPICS (DAYTIME TEMPERATURES)



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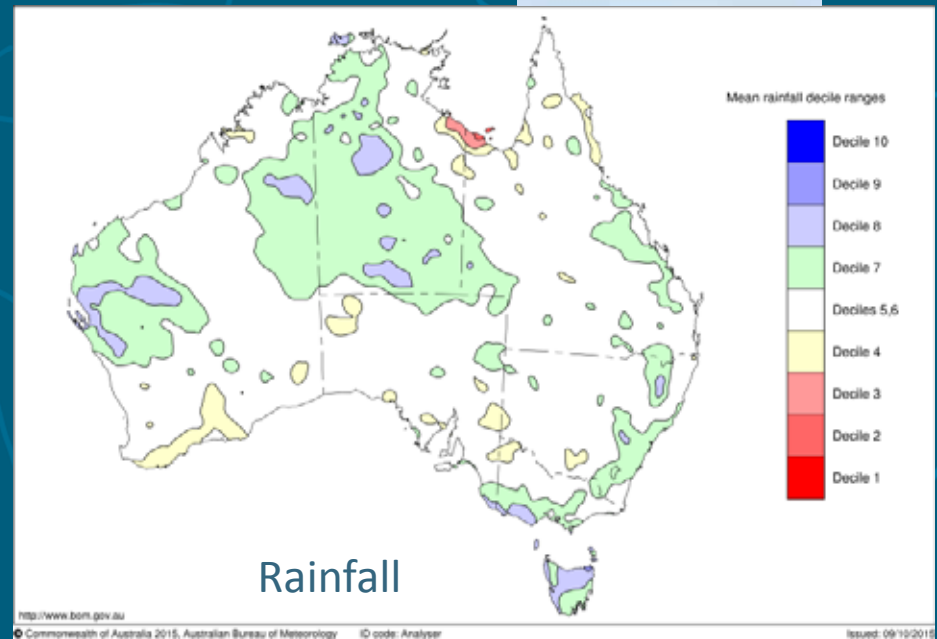
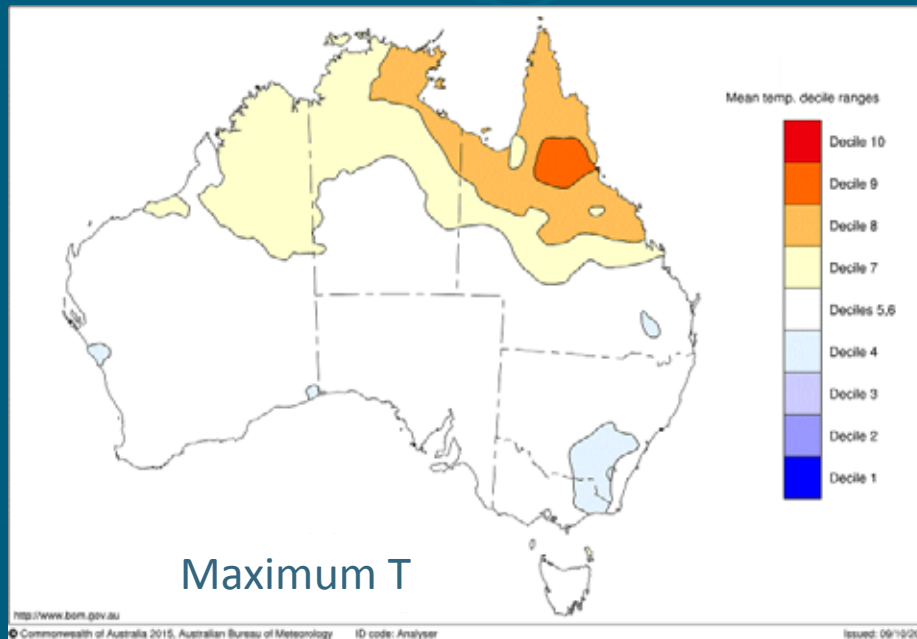
La Niña & Negative IOD impacts

June – August rainfall and temperatures

TYPICAL IMPACTS ON OUR CLIMATE

↑ RAINFALL INCREASES
IN EASTERN, CENTRAL,
AND NORTHERN AUSTRALIA

↓ TEMPERATURE
DECREASES (SOUTH OF THE TROPICS
(DAYTIME TEMPERATURES))



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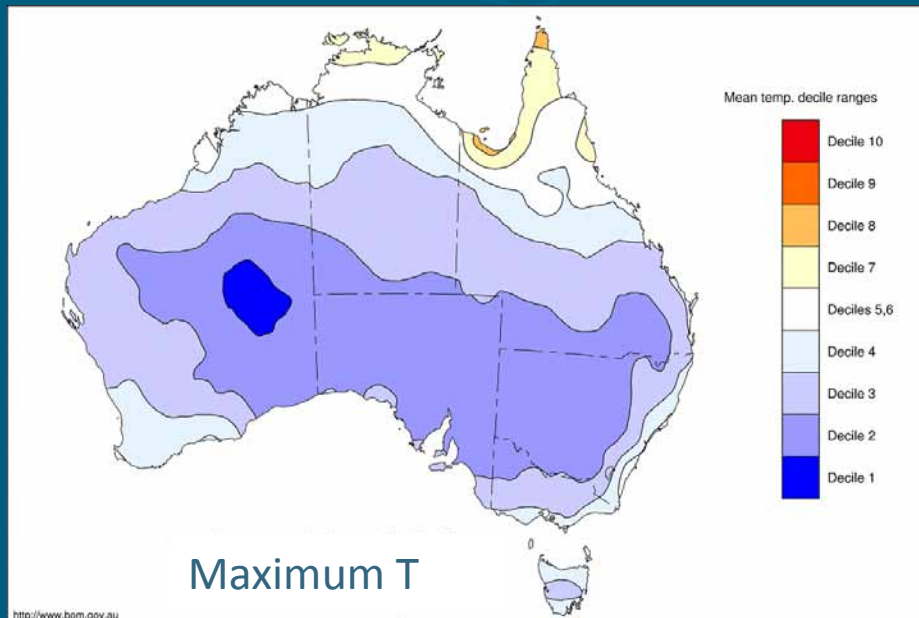
La Niña & Negative IOD impacts

September – November rainfall and temperatures

TYPICAL IMPACTS ON OUR CLIMATE

↑ RAINFALL INCREASES
IN EASTERN, CENTRAL
AND NORTHERN AUSTRALIA

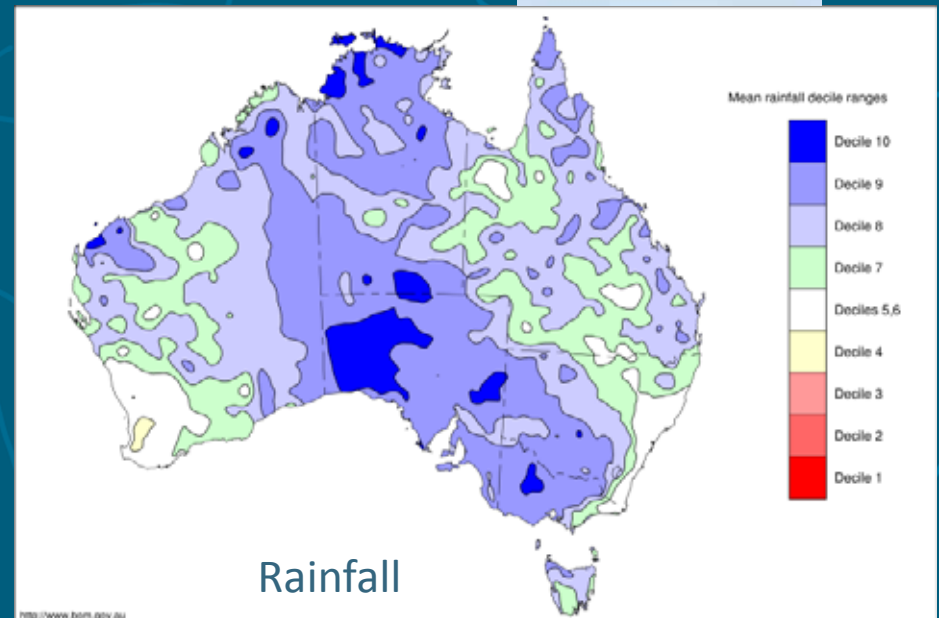
↓ TEMPERATURE
DECREASES SOUTH OF THE TROPICS
(DAYTIME TEMPERATURES)



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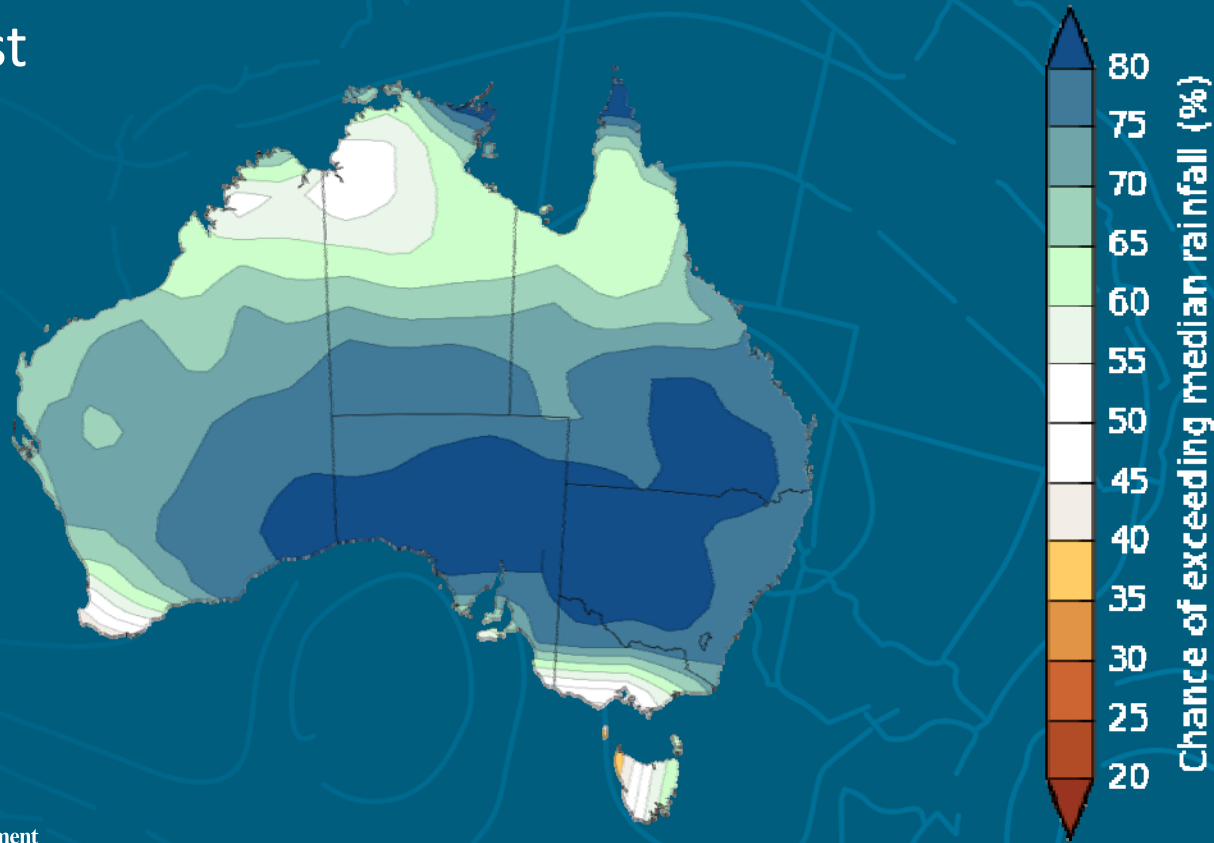
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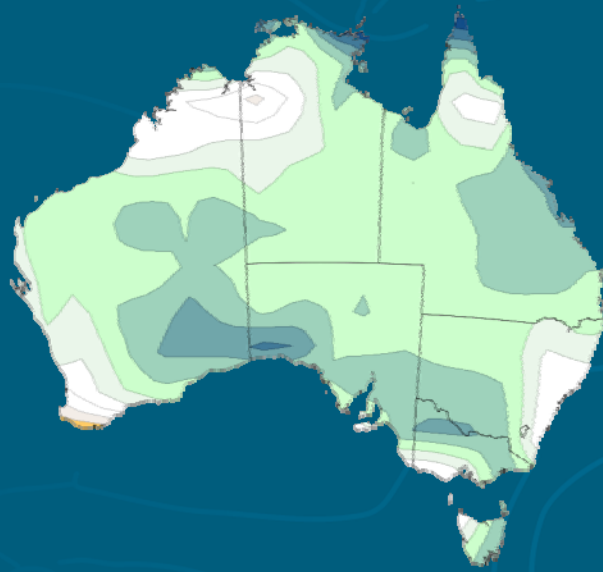
Chance of exceeding median rainfall

June-August

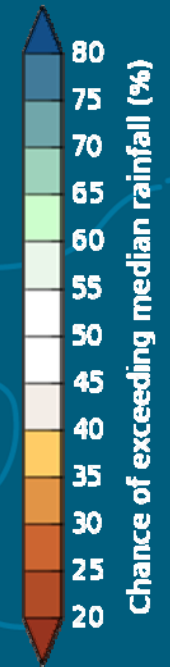
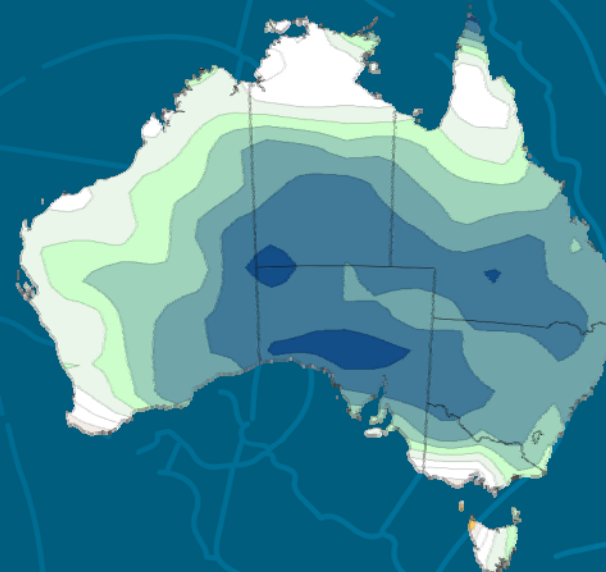


Chance of exceeding median rainfall

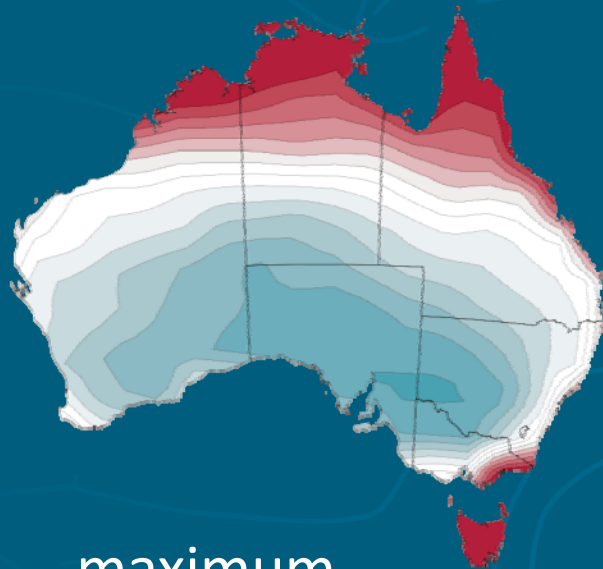
June



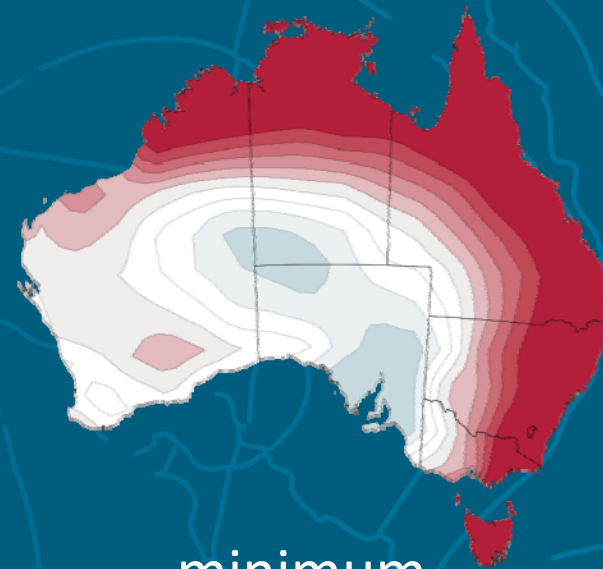
July



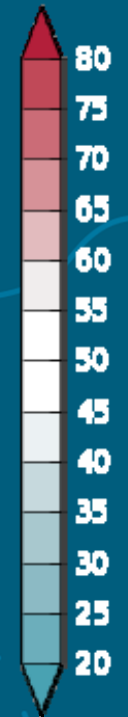
Chance of exceeding median temperature June to August



maximum



minimum



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Keeping updated

The screenshot displays the Australian Bureau of Meteorology website. The main heading is "Climate outlooks – monthly and seasonal", dated "Issued 24 July 2014". A navigation menu on the left includes "Overview", "Rainfall", "Summary", "Chance of above median", "Outlook scenarios", "Chance of at least", "Medians", "Past accuracy", and "Temperature". The "Rainfall" section is active, showing "Rainfall - Past accuracy for August - October". This section contains three small maps for "August", "September", and "August - October", and a larger map of Australia with a color-coded legend for "Past accuracy (%)" ranging from 45 to 75. Major cities like Perth, Adelaide, Melbourne, Sydney, Brisbane, and Hobart are labeled on the map.



Summary

- Recent conditions in Northern Australia: record warm with mixed rainfall – dry in far north nearer average further south
- Pacific currently neutral, with potential La Niña development over winter
- July - September Outlook:
 - Wetter than average most areas
 - Temperature above average in the north, near average to below average further south
 - New Climate Outlooks available 30 June, which includes *monthly and seasonal* rainfall and temperature outlooks, as well as new Northern rainfall onset.



Thank you

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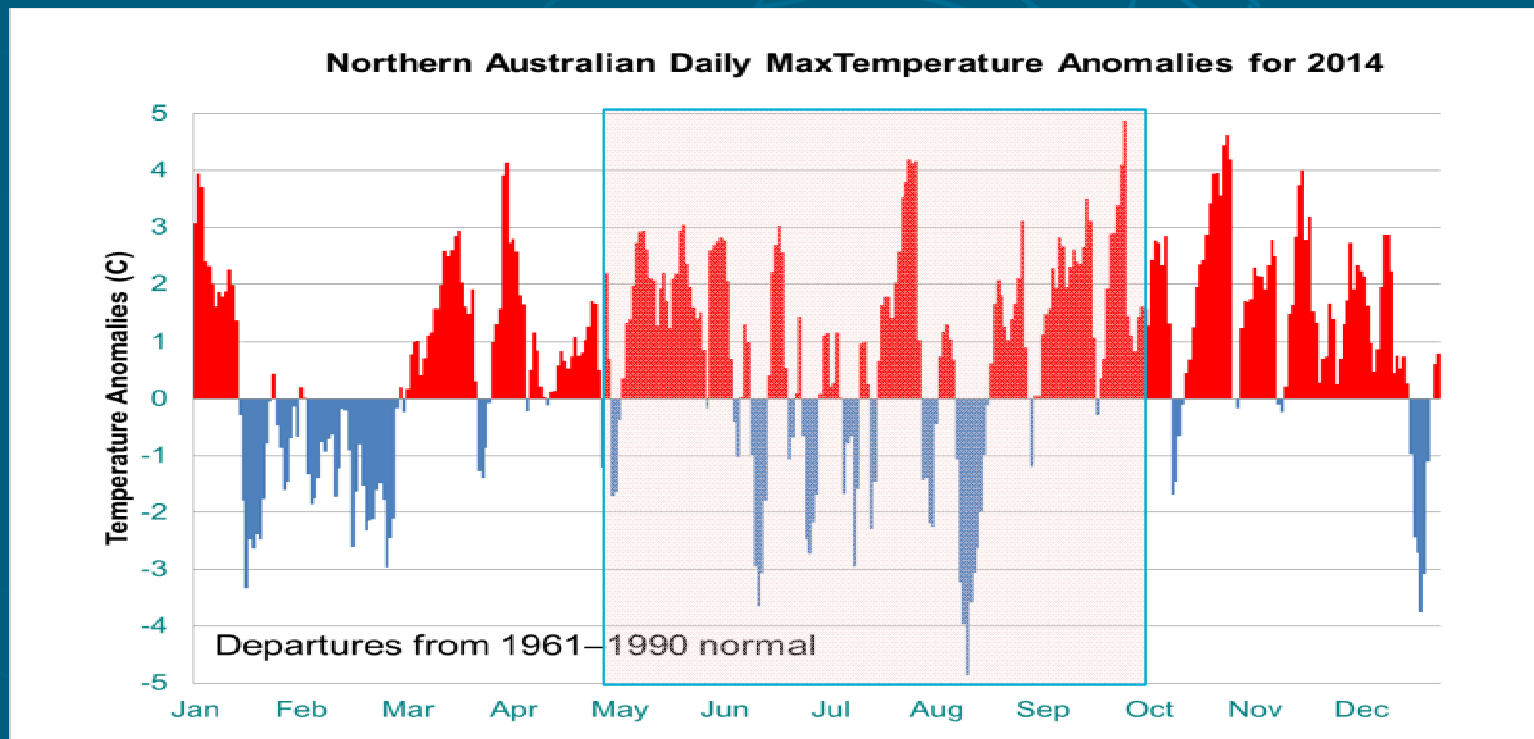


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2014 fire season: prolonged heat

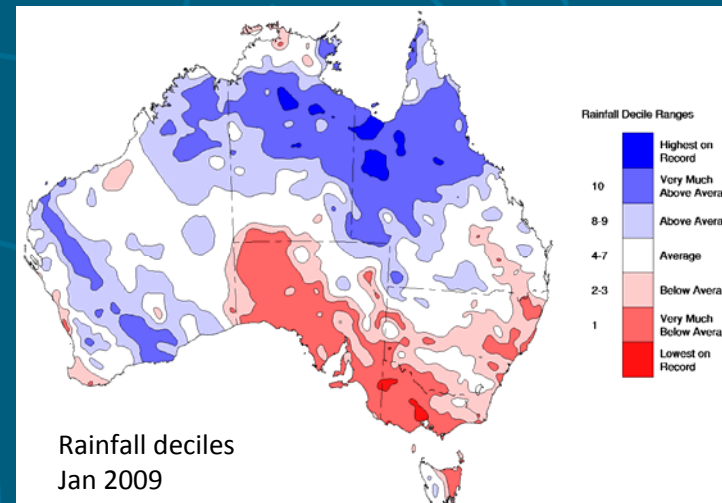
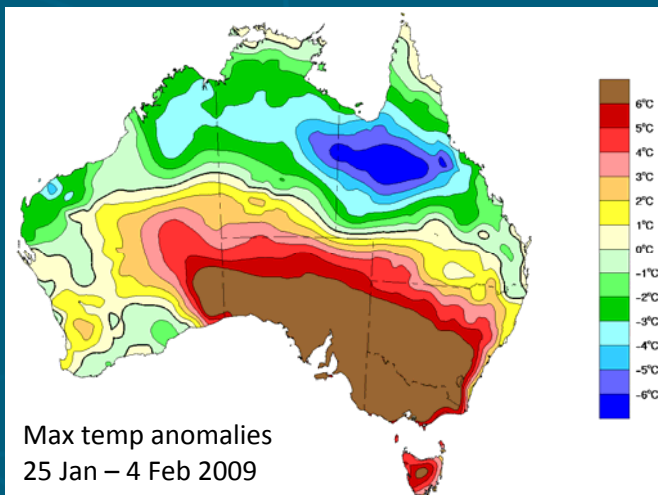


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Region north of the South Australia/NT border

Bushfire weather and a warming planet

- FFDI can increase rapidly over several intense hot, dry days – e.g. Black Saturday
- Likely increase in frequency of 'intense drying days' with climate change

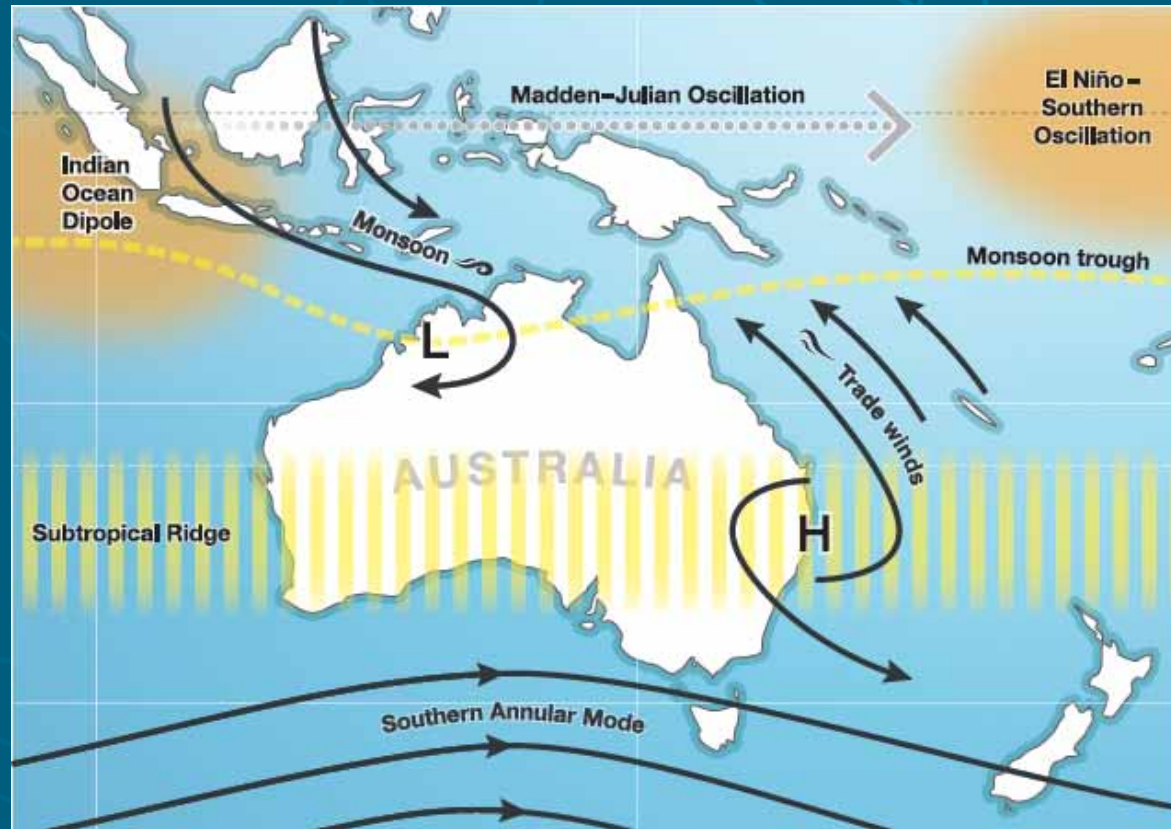


FFDI: Forest Fire Danger Index



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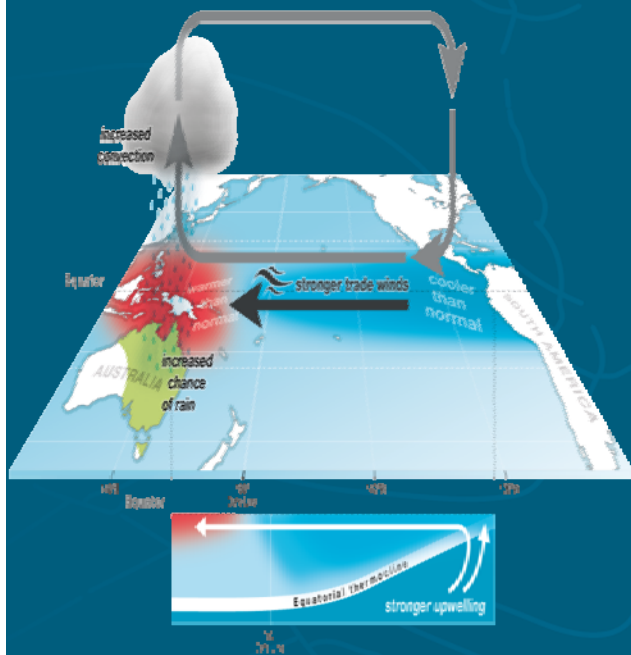
What influences Australian Climate?



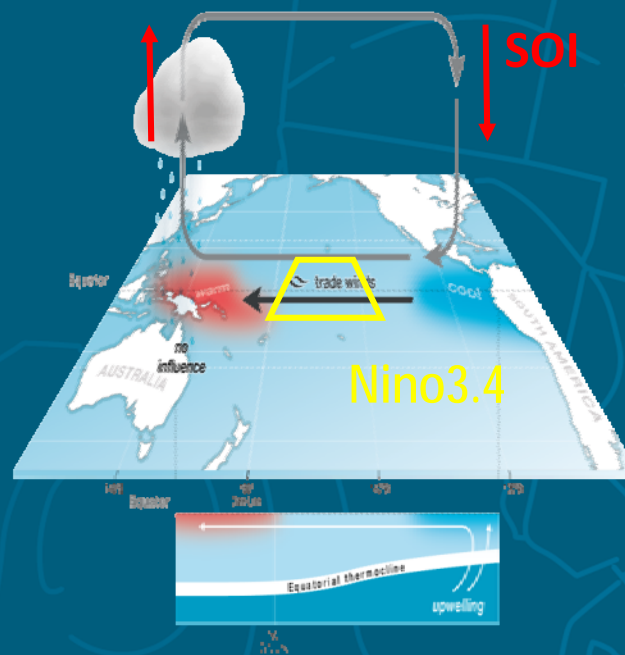
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What is El Niño?

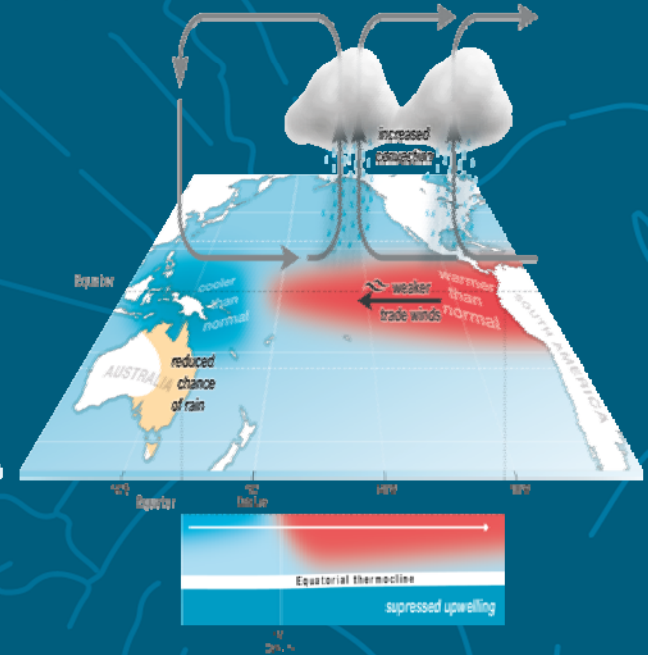
La Niña (2010/11/12)



Neutral phase



El Niño (this year)



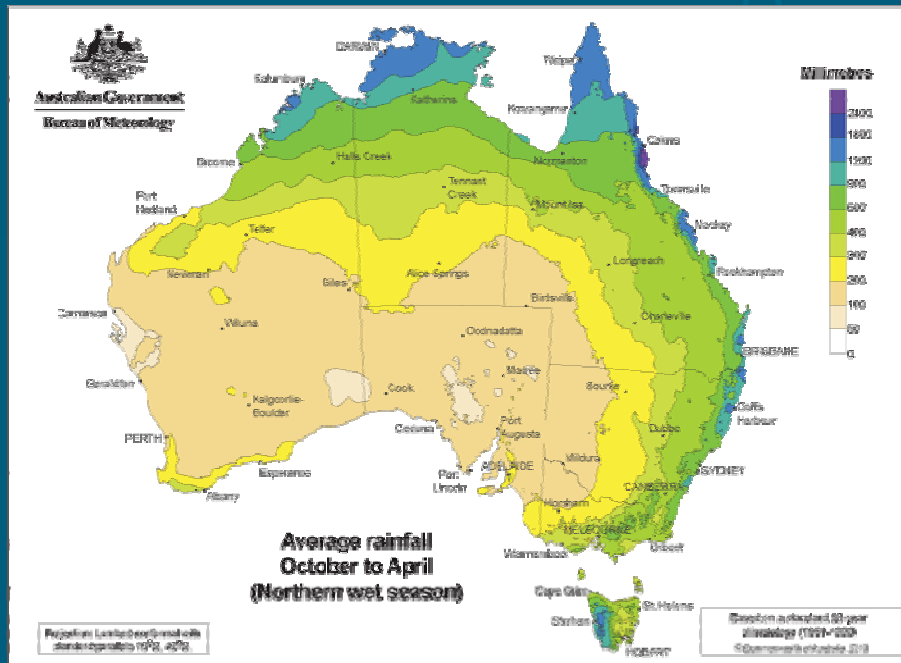
How do you define the beginning of the wet season?

From a climatological standpoint, the wet season always begins on 1 October to allow for correct comparisons from year to year.

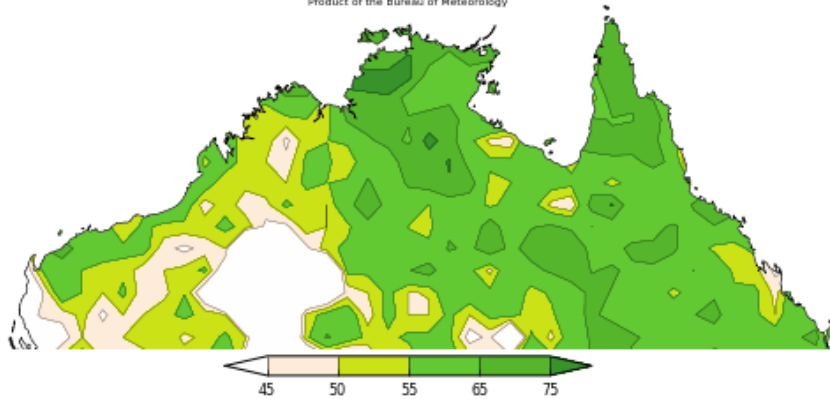
Rainfall does not begin on 1 October, but shows a gradual increase during the early wet season months, creating a forecasting challenge.

Defining the *northern rainfall onset*:

- Based on feedback from agricultural sectors
- **The date occurs when the rainfall total reaches 50 mm since the 1st of September**
- It is considered to be approximately the amount of rainfall required to stimulate plant growth after the dry season.



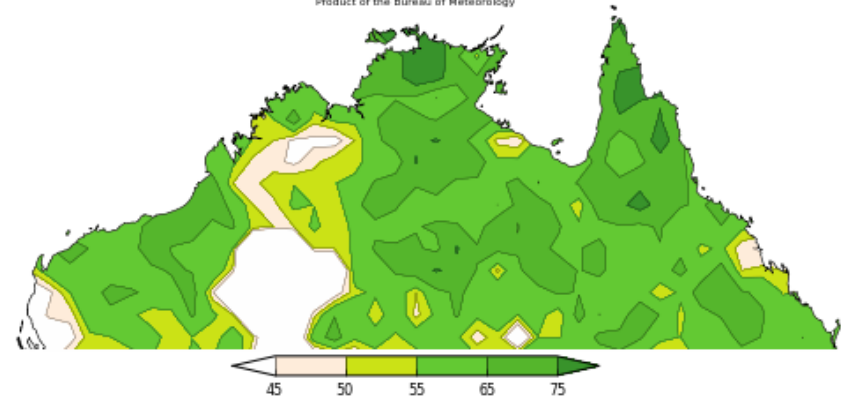
Northern Rainfall Onset (above/below median)
Percent Consistent - Jun01
Product of the Bureau of Meteorology



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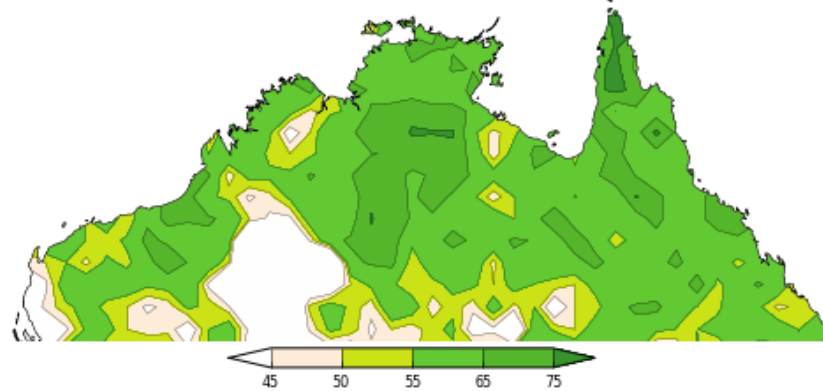
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Percent Consistent - Jul01
Product of the Bureau of Meteorology



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Northern Rainfall Onset (above/below median)
Percent Consistent - Aug01
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Moving towards 'seamless forecasting'

