

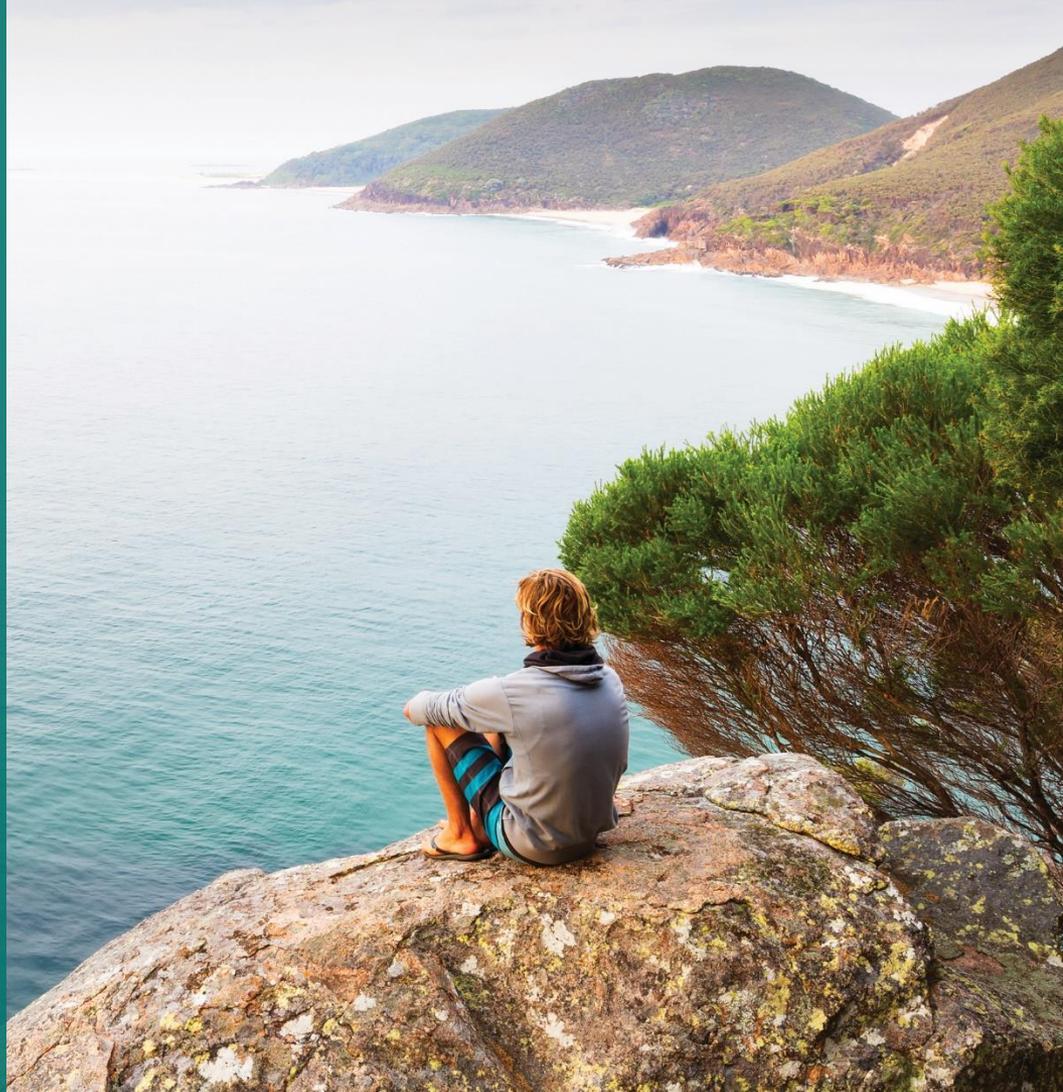
State of the Climate 2018

Implications for northern Australia

Dr David Jones
Bureau of Meteorology



Australian Government
Bureau of Meteorology



Why State of the Climate?

- Biannual update on climate science, focusing on the observations

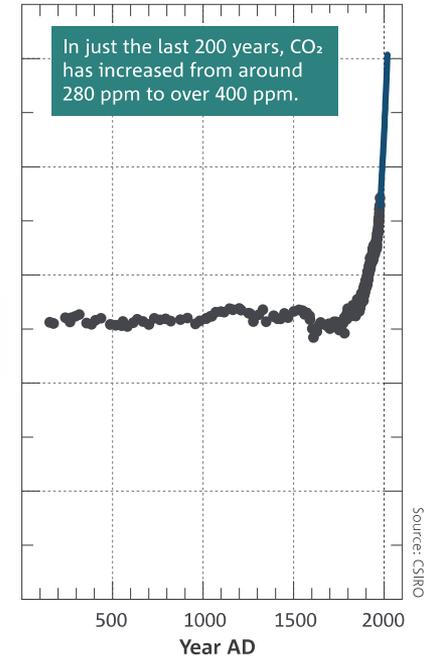
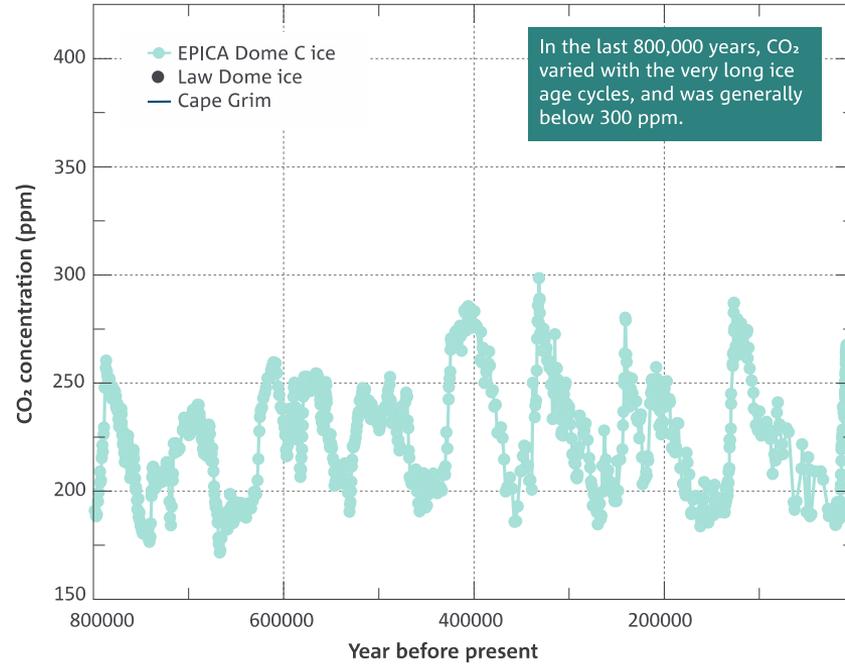
Many respond to observed changes better
Augments projections available elsewhere

- Conversation starter – government, business, NGOs, public & media
- Assist with, and motivate, adaptation
- Establish consistent and reusable material that represents the view of BoM and CSIRO

Greenhouse gases



Atmospheric carbon dioxide concentrations



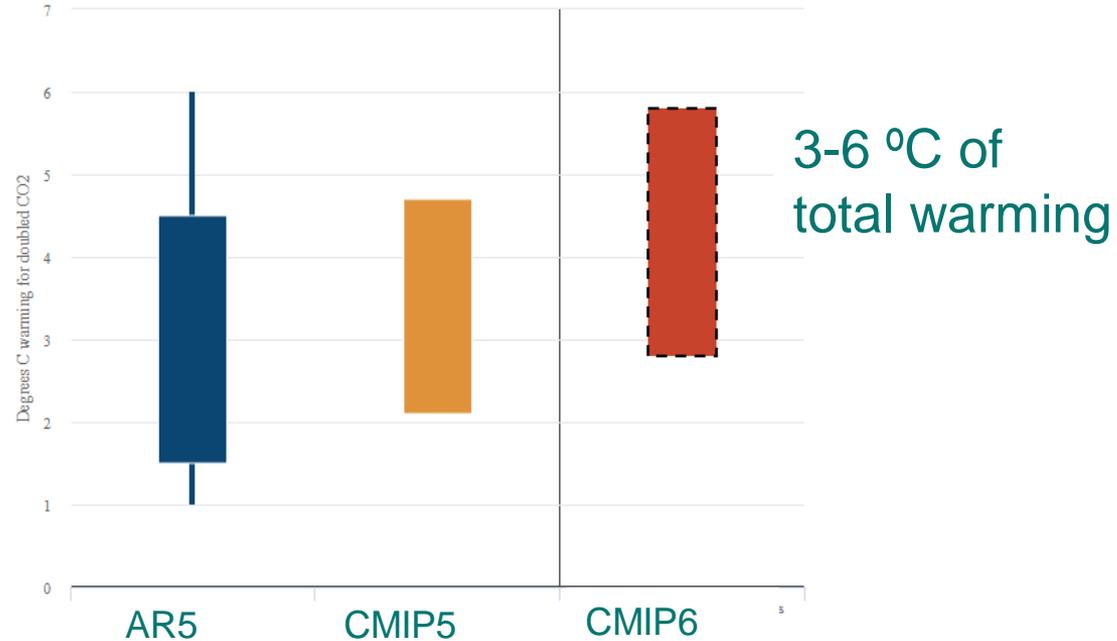
Current CO₂ levels probably unprecedented in >10M year

Greenhouse gases



CO₂ at 410ppm, and rising ~4ppm per year (~30 years to doubling)

Equilibrium climate sensitivity estimates

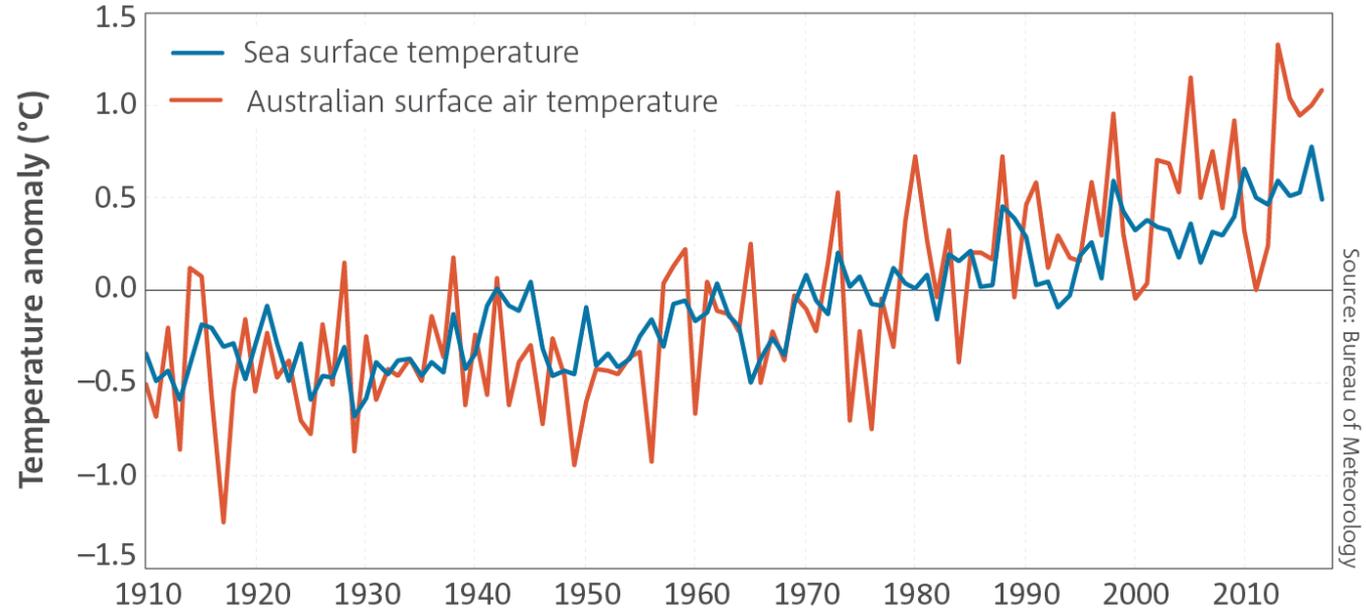


Total equilibrium warming when CO₂ doubles

Australia's changing climate

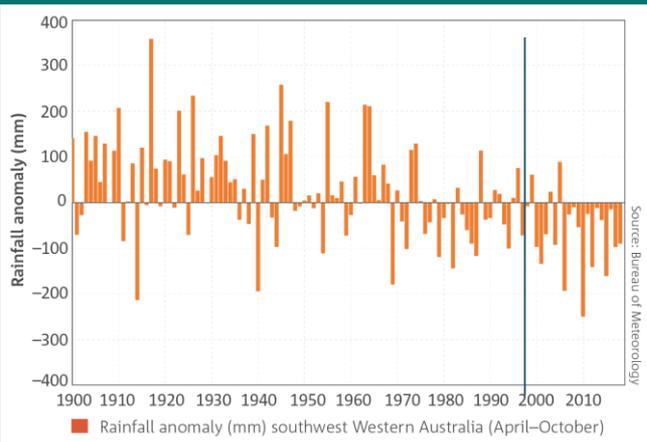


Temperature

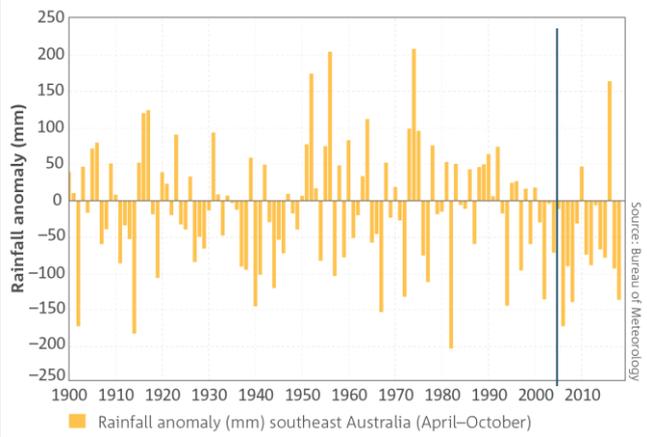


Rise of 1.4°C in Australian land surface temperatures

IOCI

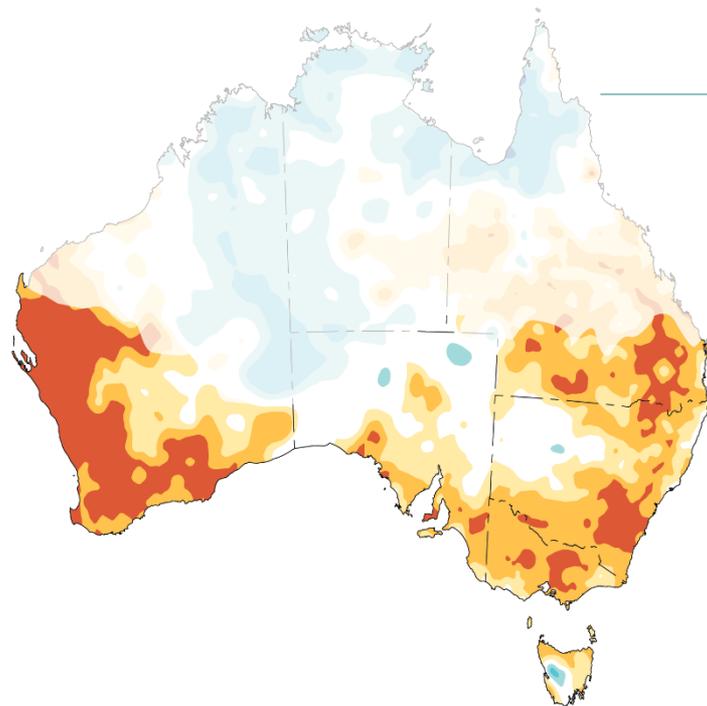
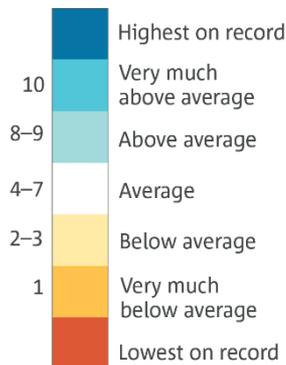


SEACI



Rainfall

Rainfall decile ranges



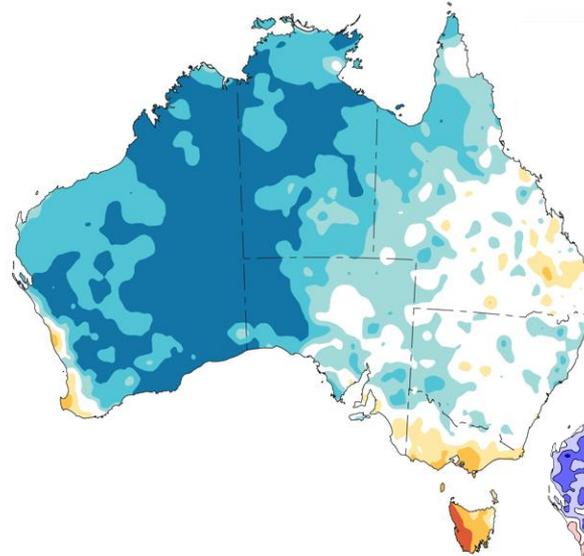
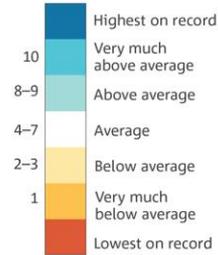
20 year April–October rainfall
deciles: declines in south

Wetting over northern Australia and increasing heavy rain events

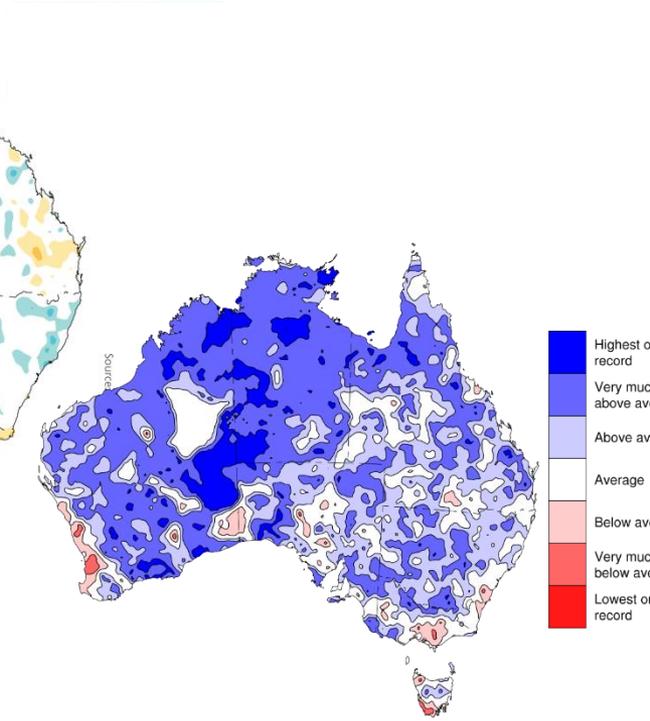


Rainfall

Rainfall decile ranges



20 year October-April rainfall deciles: Increases in north



20 year decile of heavy rainfall days (>25mm)



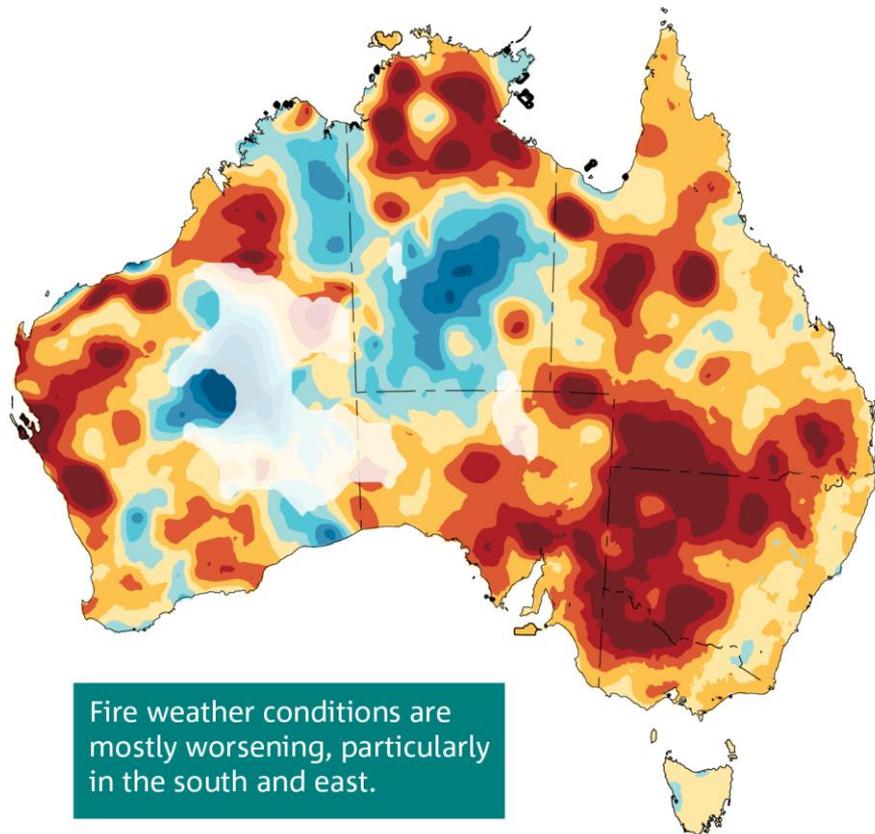
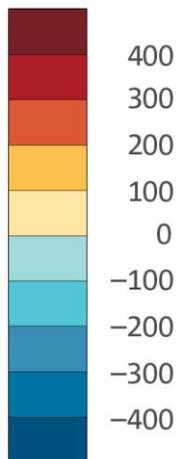
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Australia's changing climate



Fire weather

Forest Fire
Danger Index
points/decade



Fire weather conditions are mostly worsening, particularly in the south and east.

Source: Bureau of Meteorology



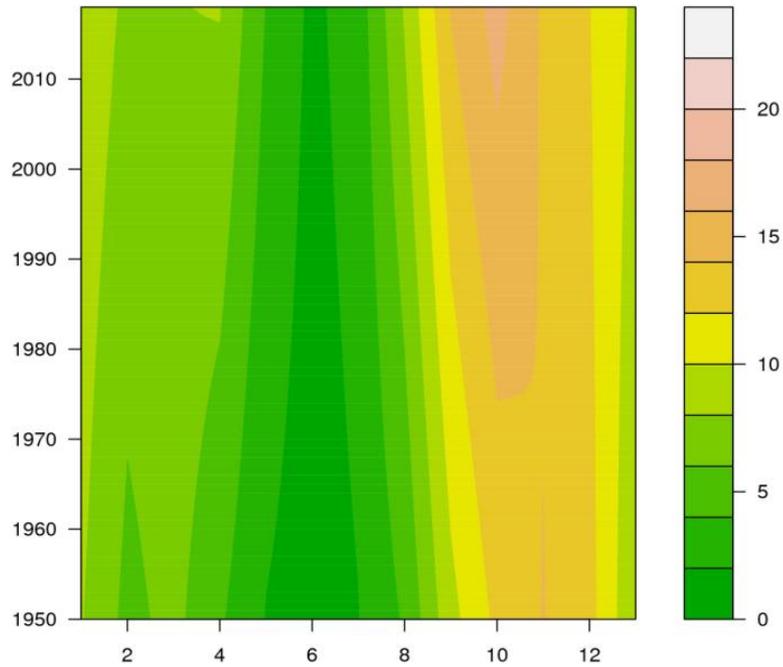
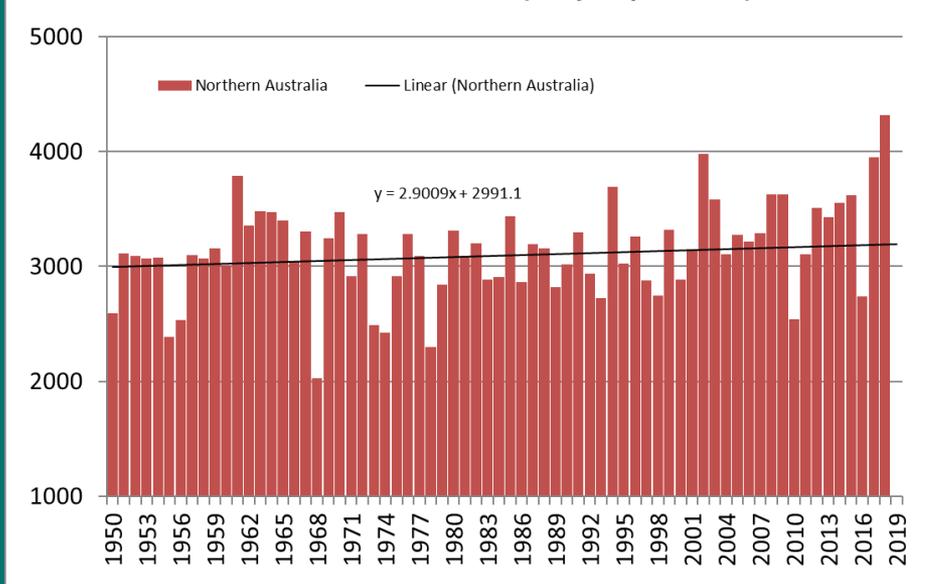
Australian Government
Bureau of Meteorology

Fire weather

Northern Australia dry season FFDI

Queensland days with FFDI>25
Season expanding. Losing wet
and cool off season

Northern Australia FFDI (May-September)



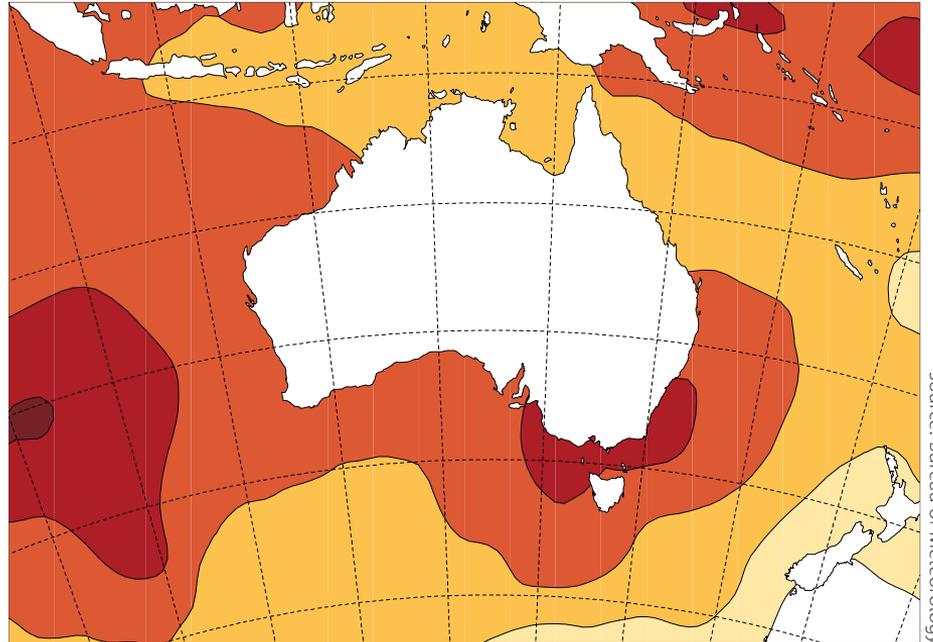
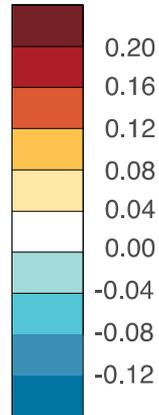
Oceans



Sea surface temperature

The ocean surface around Australia has warmed, especially to the southeast.

Sea surface temperature
(°C/decade)



Source: Bureau of Meteorology

Oceans



Collaroy Beach, 2016



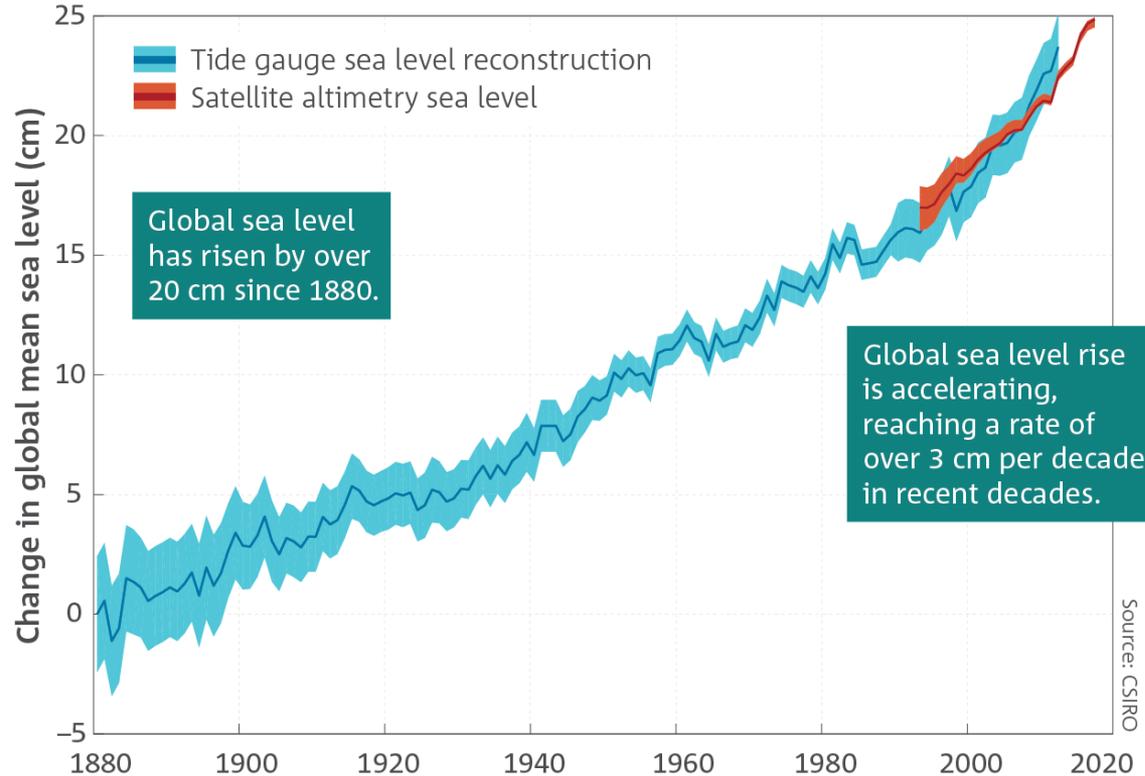
Altona Beach, 2014



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Sea level



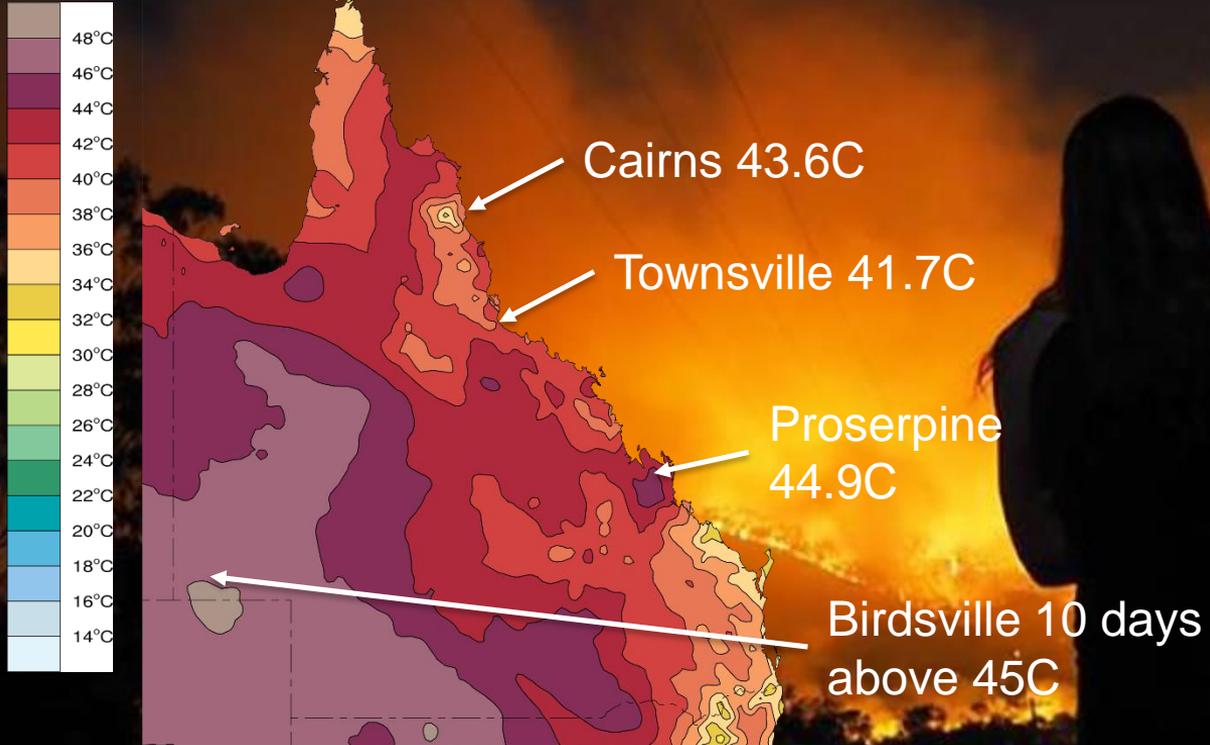
**Summer
2018/19: New
normal or
glimpse of
the future?**

**Summer 2018/19
Queensland fires
Record heat
Southeast fires
Queensland floods**



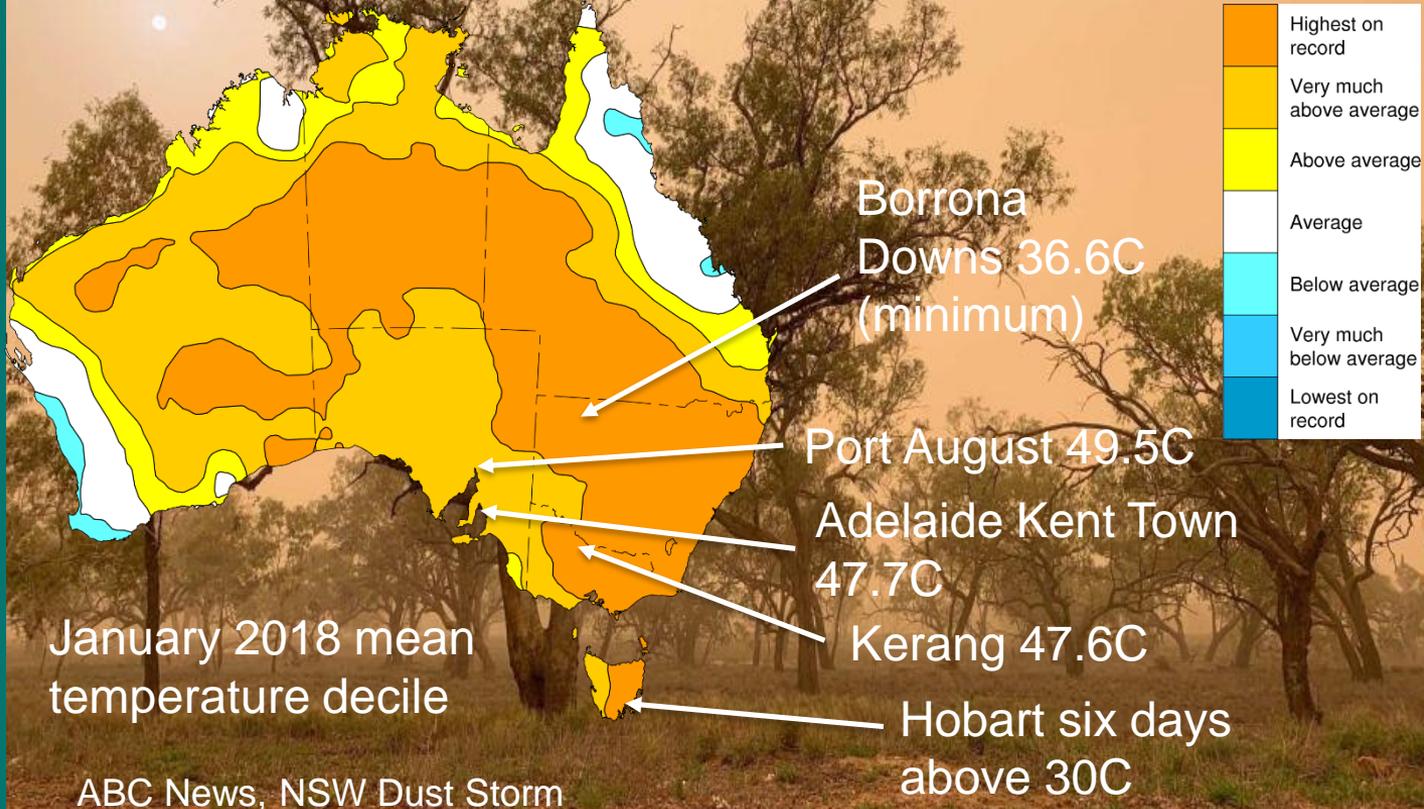
Record -
breaking heat
the new
normal?

Queensland heatwave and fires Highest temperature observed in November- December 2018



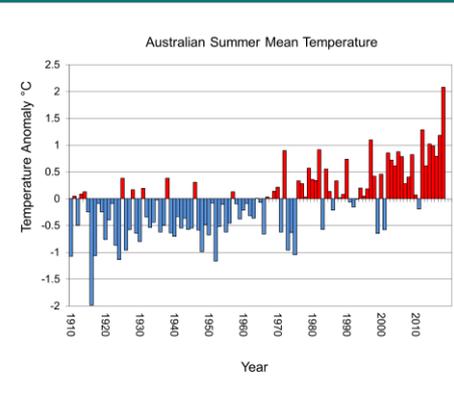
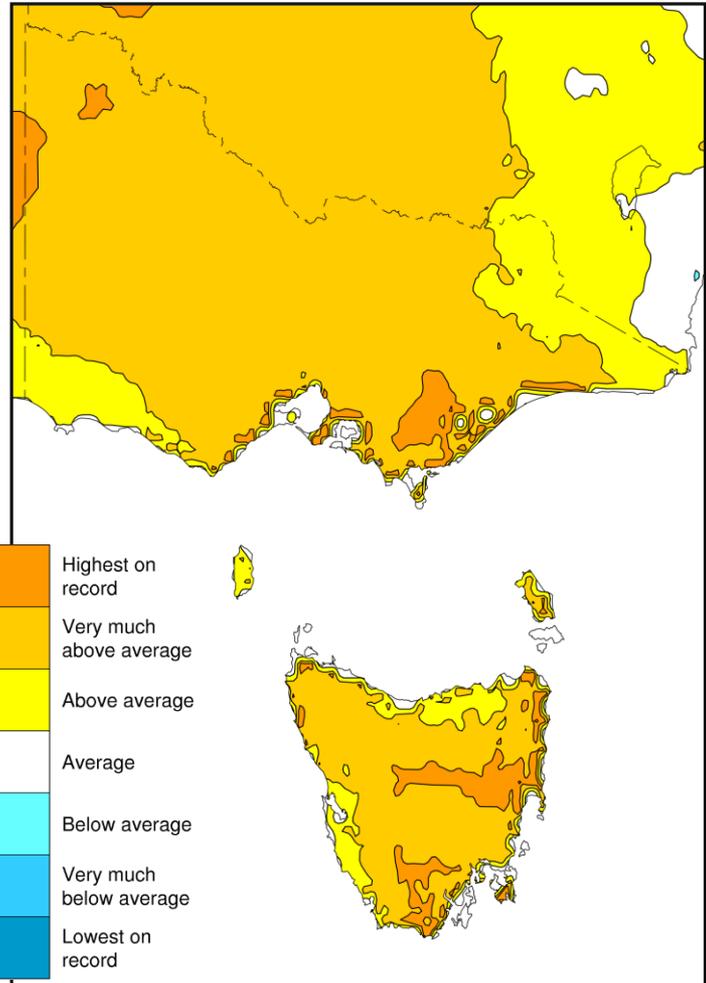
January 2019: Australia's hottest month on record

Averaged across the country, 8 of the 10 warmest days occurred during January 2019



Recent events in the east

January/February Fire Danger



Bunyip fire, ABC News

Bunyip State Park fire destroyed 29 houses, Victorian authorities confirm

Updated 8 Mar 2019, 8:32pm



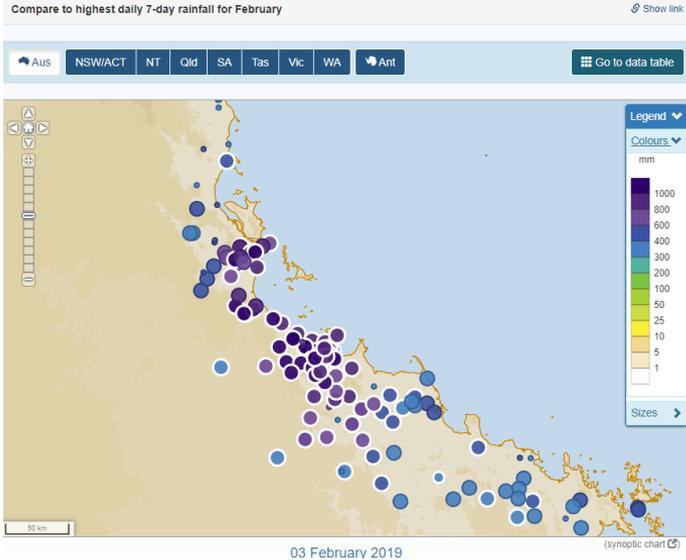
Recent events in the east



Monsoon low over Queensland, 4 February 2019

Record high multi-day rainfall widespread

Record flooding in coastal Queensland



Flooding in Townsville and Mt Isa
ABC News



Impacts?

Human health
Agriculture
EM sector
Need for cooling
Cost of power
Tourism

Queensland flying fox species decimated by record heatwave

'As far as we know, [the spectacled flying fox] has never suffered heat deaths before,' ecologist says



▲ Conservationists estimate more than 4,000 spectacled flying foxes have died this week in the heatwave. Photograph: Marc McCormack/EPA

Brisbane tidal flooding



Mass fish die-off in Darling River could impact fish numbers in other states

ABC Riverland. By Sowabeh Hanife and Nadia Isa
Updated 15 Jan 2019, 4:13pm



PHOTO: Experts believe the mass die-off of Murray cod in NSW will impact fish numbers in other states. (Facebook: Rod Mackenzie)

Climate change costs will have knock-on effect on interest rates, Reserve Bank warns

7:30 By Laura Tingle
Updated Tue at 10:50pm

The Reserve Bank has warned it will have to take the impact of climate change into account when setting interest rates.

"The economy is changing all the time in response to a large number of forces," Guy Debelle said in a keynote address to the Centre for Policy Development.

"Monetary policy is always having to analyse and assess these forces and their impact on the economy.



PHOTO: Reserve Bank Deputy Governor Guy Debelle delivering his speech to the Centre for Policy Development. (ABC News)

"But few of these forces have the

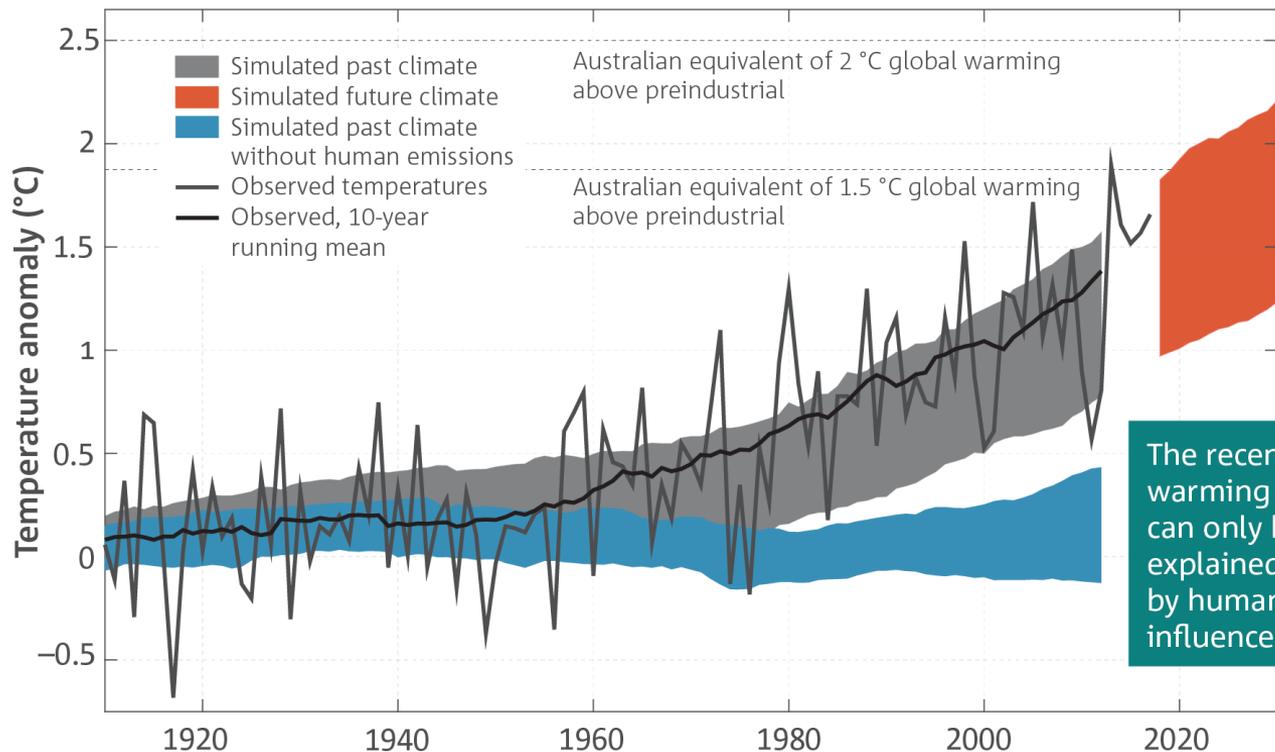


What are our options?

"belief in climate change is optional, but participation is mandatory"

*Jim Beever,
southwest Florida
Regional Planning
Council*

Climate change is with us and impacts will accumulate



Australian Government
Bureau of Meteorology

Thank you



More information

www.bom.gov.au/state-of-the-climate

www.csiro.au/state-of-the-climate



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