



# Climate change

## Darwin Climate futures

Dr Chris Chilcott | Lord Mayors Climate Emergency  
Roundtable | 4th December 2019

Australia's National Science Agency





# Top End climate

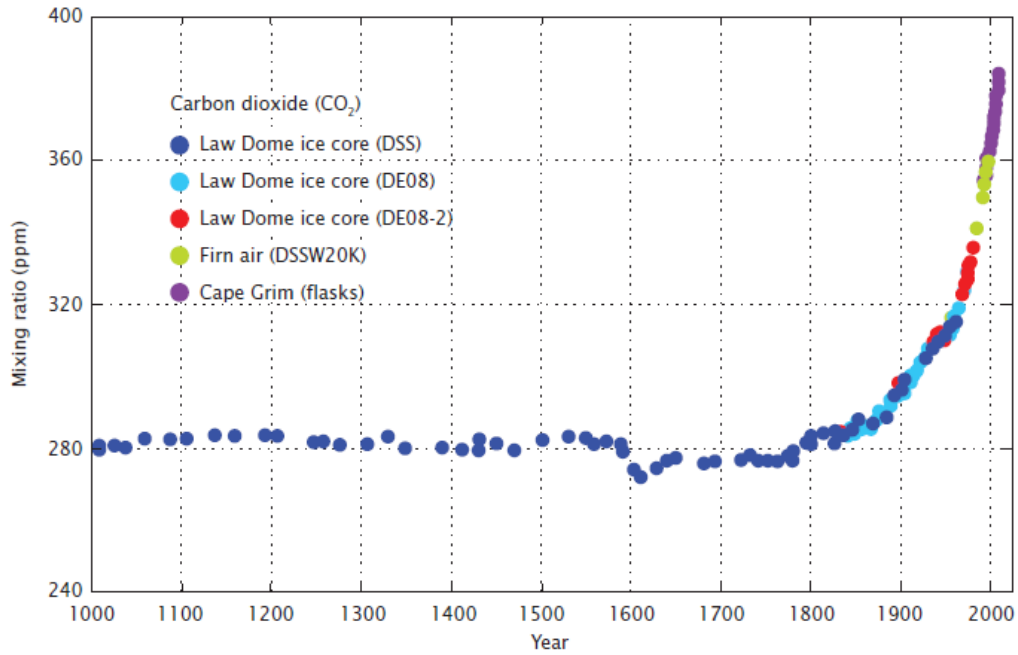
For a long time

- predictable wet season
- predictable dry season
- relatively stable min and max temperatures





# Driver of climate change

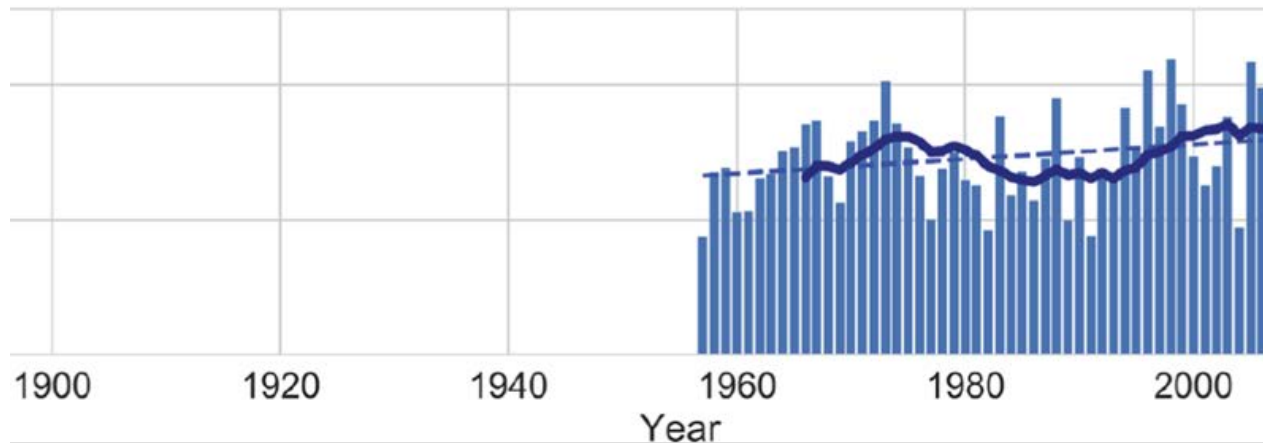


Southern Hemisphere atmospheric CO<sub>2</sub> levels over the past 1000 years (CSIRO 2011)



# Recent trends- Increasing rainfall

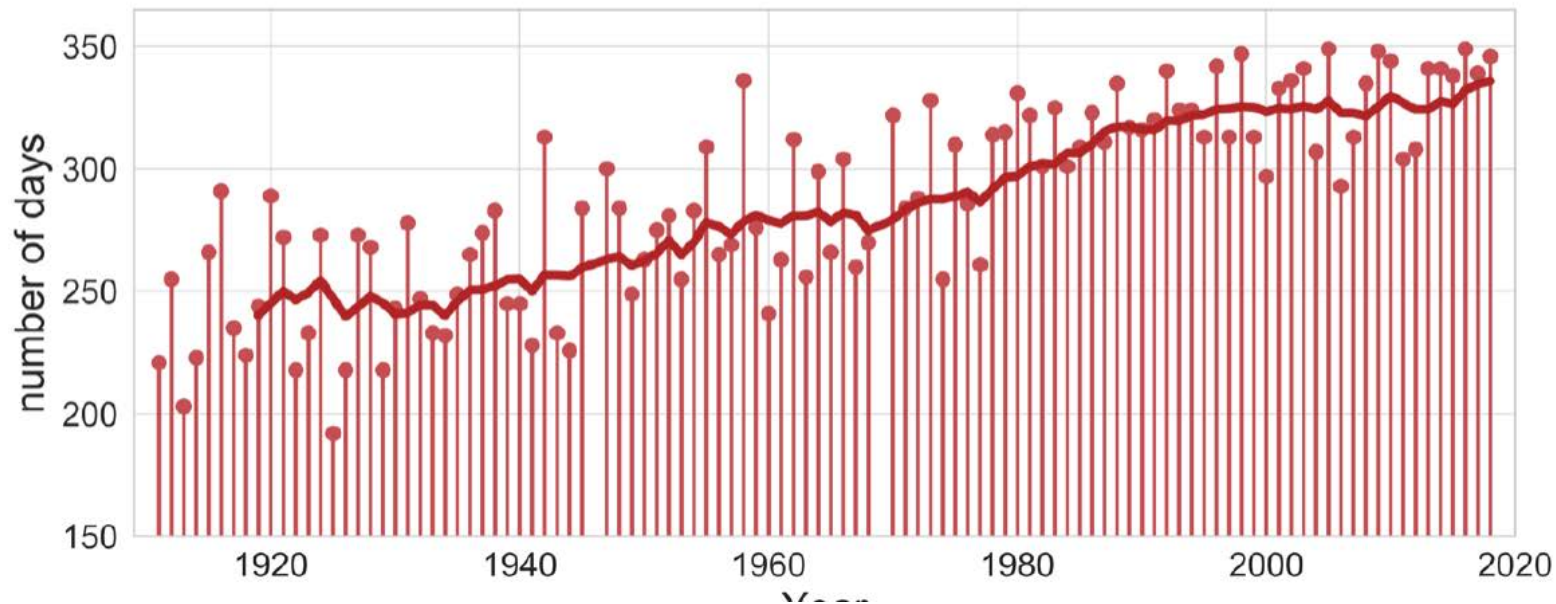
Middle Point Rangers  
Annual (July to June) Rainfall 1957/58 - 2018/19





# Recent trends- more warmer days

Darwin Airport Days Above 30 °C





# Future Top End climate

- Average temperatures will increase (v high\*)
- More hot days and warm spells (v high\*)
- Changes to annual/seasonal rainfall possible but unclear\*
- Increased intensity of extreme daily rainfall events (v high\*)
- Increased evapotranspiration (high\*)
- Mean sea level rise (v high\*)
- Fewer but more intense cyclones (medium\*)

\* confidence in prediction

Present and future climate projection scenarios for Darwin (Webb and Hennessy, 2015)

Metric	Present	2030 (mid)	2090 (mid)	2090 (high)
Annual temperature	27.8	28.8	29.6	31.5
Number of days over 35°C	11	43	111	265
Number of days over 40°C		0	0	1.3
Rainfall (annual, mm)	1726	0	-1	+4
Rainfall (Nov-Apr)		0	0	+4%
Rainfall (May-Oct)		-5%	-6%	-4%
Humidity (% - absolute)		+0.1%	-0.7%	-0.9%
Evapotranpiration (mm)		3.2	6.8	12.2
Sea level rise (m)		0.12	0.47	0.62

(mid) intermediate emissions scenario  
(high) high emissions scenario



# What happens if rainfall changes?

- Extreme events
- Storm surge
- Mangrove dieback
- Increased inundation



James Cook University

# What happens if temperatures changes?

- Temperature triggers for flowering and fruit formation







# Darwin Living Lab

- Register and attend Symposium next week:

<https://events.csiro.au/Events/2019/November/14/Darwin-Living-Lab-Symposium>

- Sign up for updates

[research.csiro.au/darwinlivinglab](https://research.csiro.au/darwinlivinglab)



# Thank you

For more information/contact details

**CSIRO CLIMATE SCIENCE CENTRE** [www.climatechangeinaustralia.gov.au/vcp19](http://www.climatechangeinaustralia.gov.au/vcp19)

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# Darwin's Climate

## Some definitions

# What is weather and what is climate?

## Weather

Current atmospheric conditions at a particular place and time – over a few **hours** to a few **days**

## Climate variability

Natural variation in climate that occurs between **months**, **seasons** and **years**

## Climate

Average pattern of weather for a particular place over **decades** (e.g. 30 years)

## Climate change

Long-term trend in climate over **decades** to **centuries**

# Australia's climate influences

Climate influences, or "**drivers**", modulate the occurrence of particular weather patterns.

Note: these change with season as well!

