

What's different about Darwin's weather and how it's changing

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Bureau of Meteorology
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- ✓ Darwin's unique weather
- ✓ Long term trends
- ✓ Observed changes

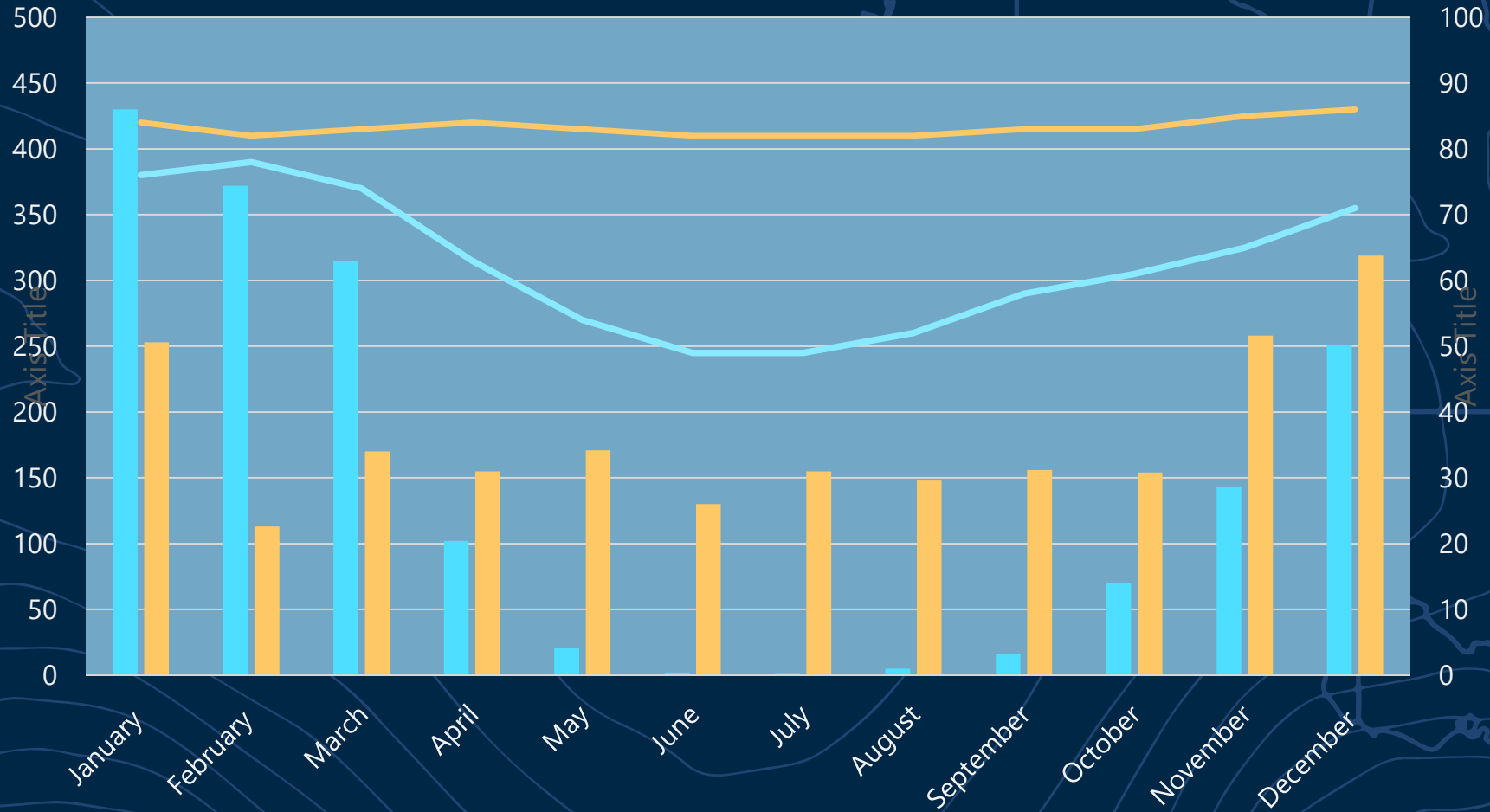
The Wet – Dry Tropics



- ✓ Dry and warm 'winter' months
- ✓ Hot and rainy 'summer' months

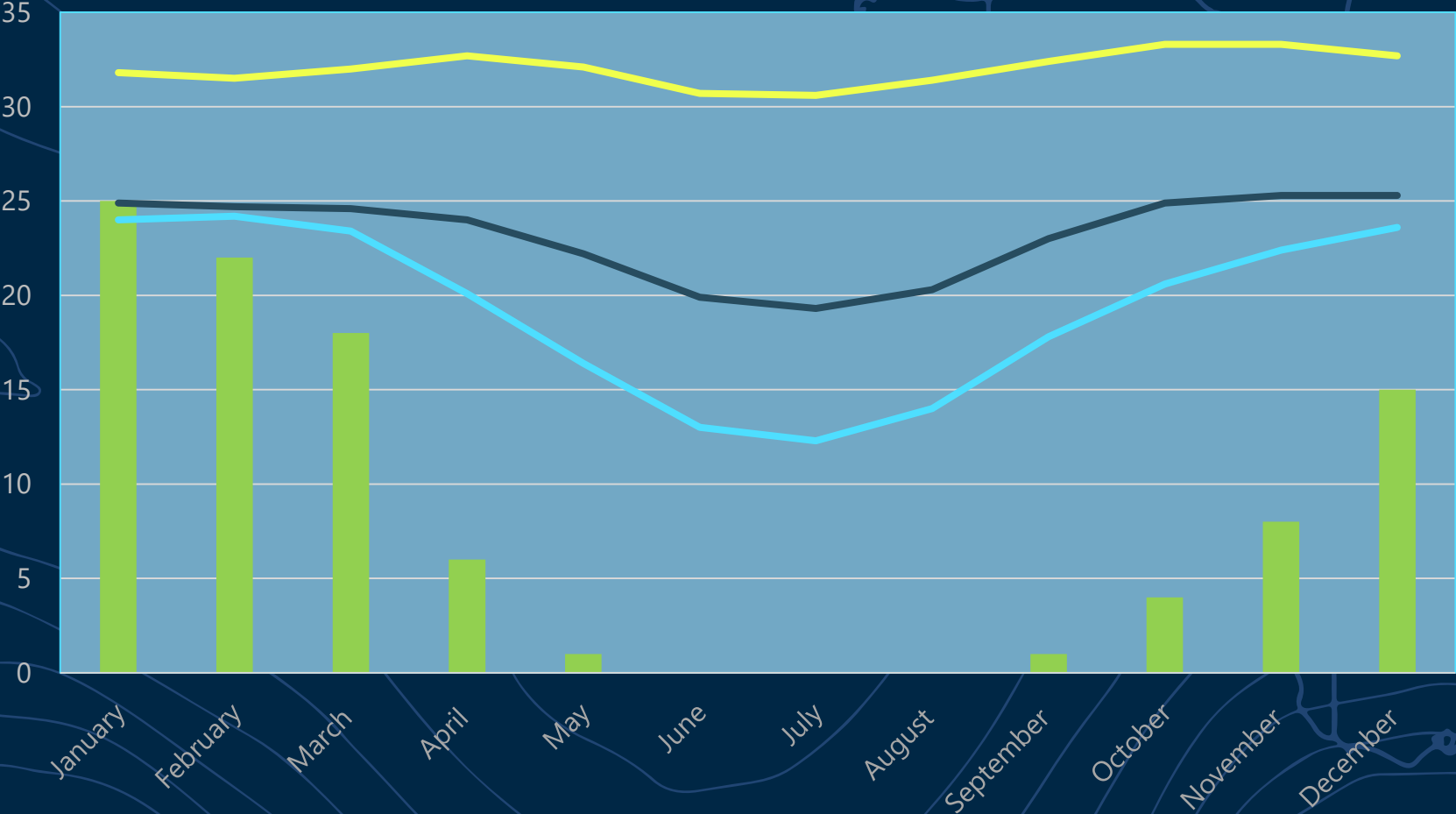
Darwin and Singapore averages

Darwin Rainfall Singapore Rainfall Darwin Av RH Singapore Av RH



Darwin weather by month

% Annual Rainfall Av Max Temp Av Min Temp 3pm Dew Point



What is dew point?

$\varphi = U_w \div 100\%$	[]	φ	Relative Humidity
$p_s = C_1 * \exp \frac{C_2 * t}{C_3 + t}$	[mbar]	U_w	Relative Humidity in %
$p_d = p_s * \varphi$	[mbar]	p_s	saturated water vapour pressure
$tp = \frac{-\ln \frac{p_d}{C_1} * C_3}{\ln \frac{p_d}{C_1} - C_2}$	[°C]	t	temperature in °C
		$C_{1,2,3}$	Magnus coefficient from table
		p_d	partial water vapour pressure
		tp	dew point temperature

Definition 1: the atmospheric temperature (varying according to pressure and humidity) below which water droplets begin to condense and dew can form

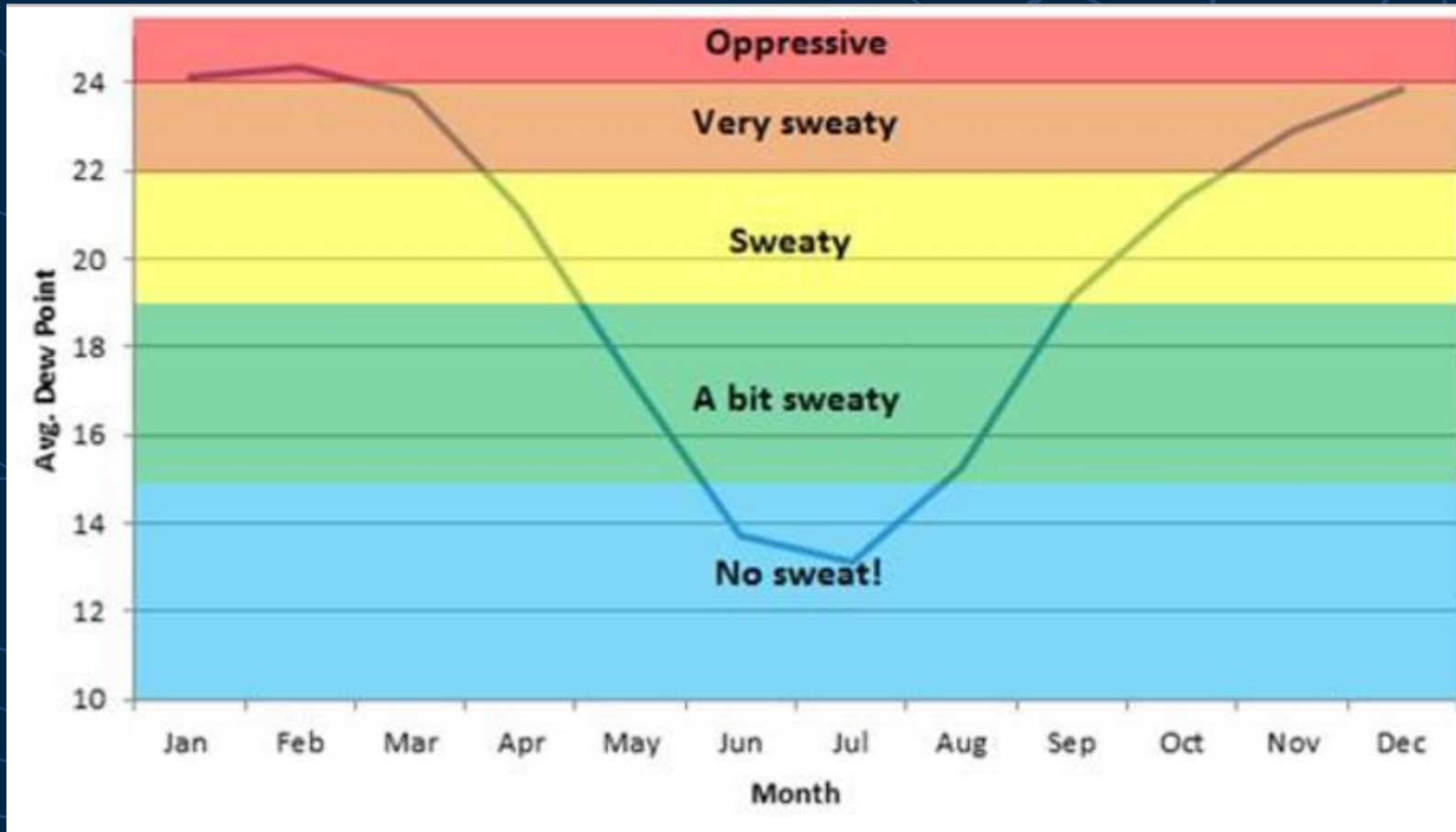
Definition 2: measure of atmospheric moisture. It is the temperature to which air must be cooled in order to reach saturation (assuming air pressure and moisture content are constant). A higher dew point indicates more moisture present in the air.

Why dew point matters

- ✓ Warmer air can hold more moisture than cooler air
- ✓ Warm air is saturated with moisture day and night for many months of the year
- ✓ Reduced ability for sweat to evaporate to cool body temperature
- ✓ Air movement enables higher evaporation rate



The BOM Sweat-o-meter



Long-term trends



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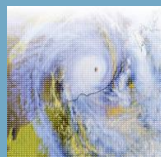
Changes in climate



Increased frequency of large-scale heatwaves and record-high temperatures



Longer fire season with more extreme fire danger days



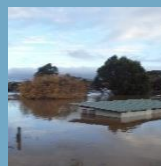
Decreased frequency of tropical cyclones but high variability



Prolonged high ocean temperatures, increasing acidity



Reduced average rainfall and more time spent in drought in southern Australia



An increase in heavy rainfall events, wet season variability



Increased frequency of coastal storm surge inundation

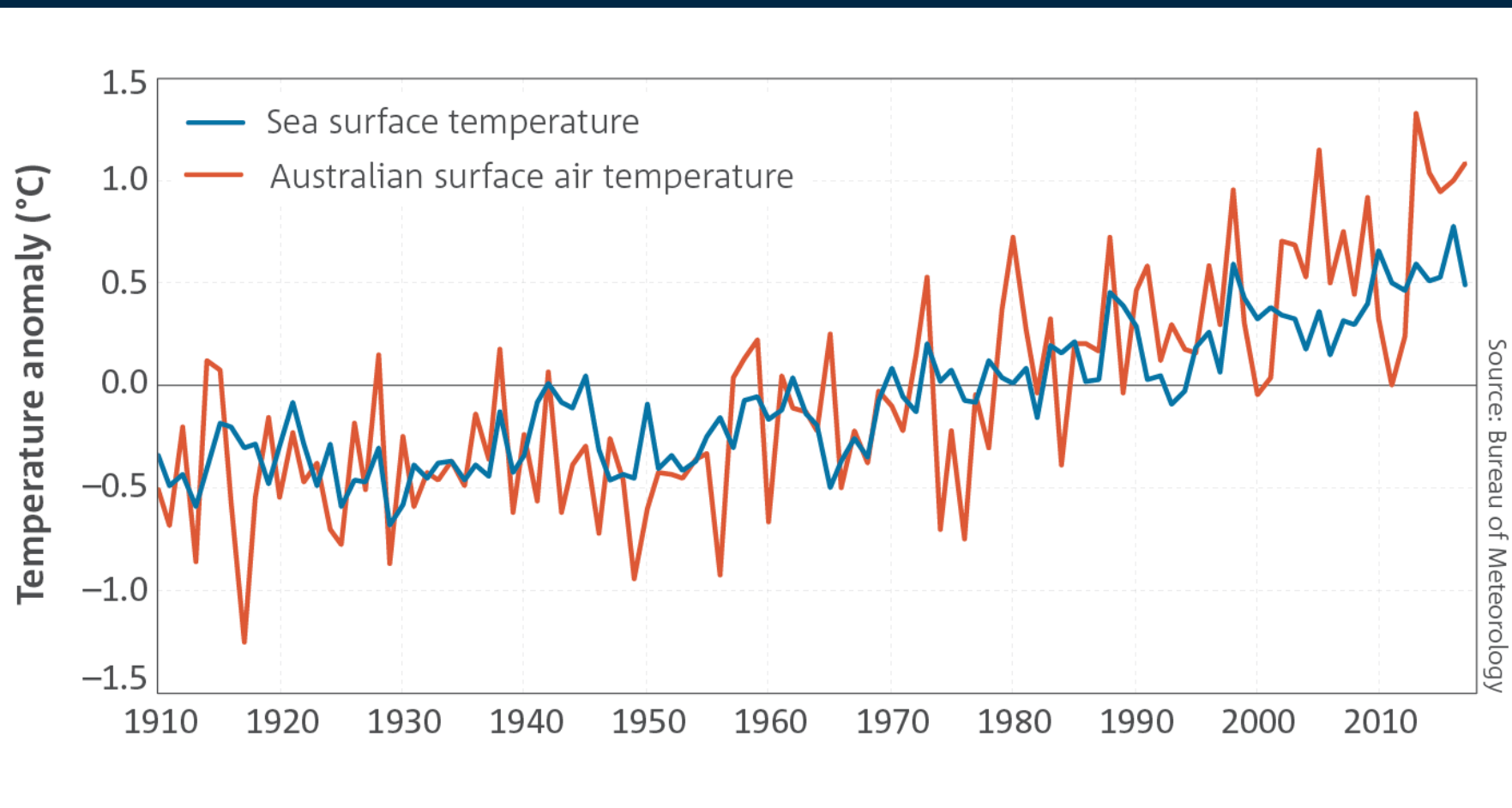
occurring now

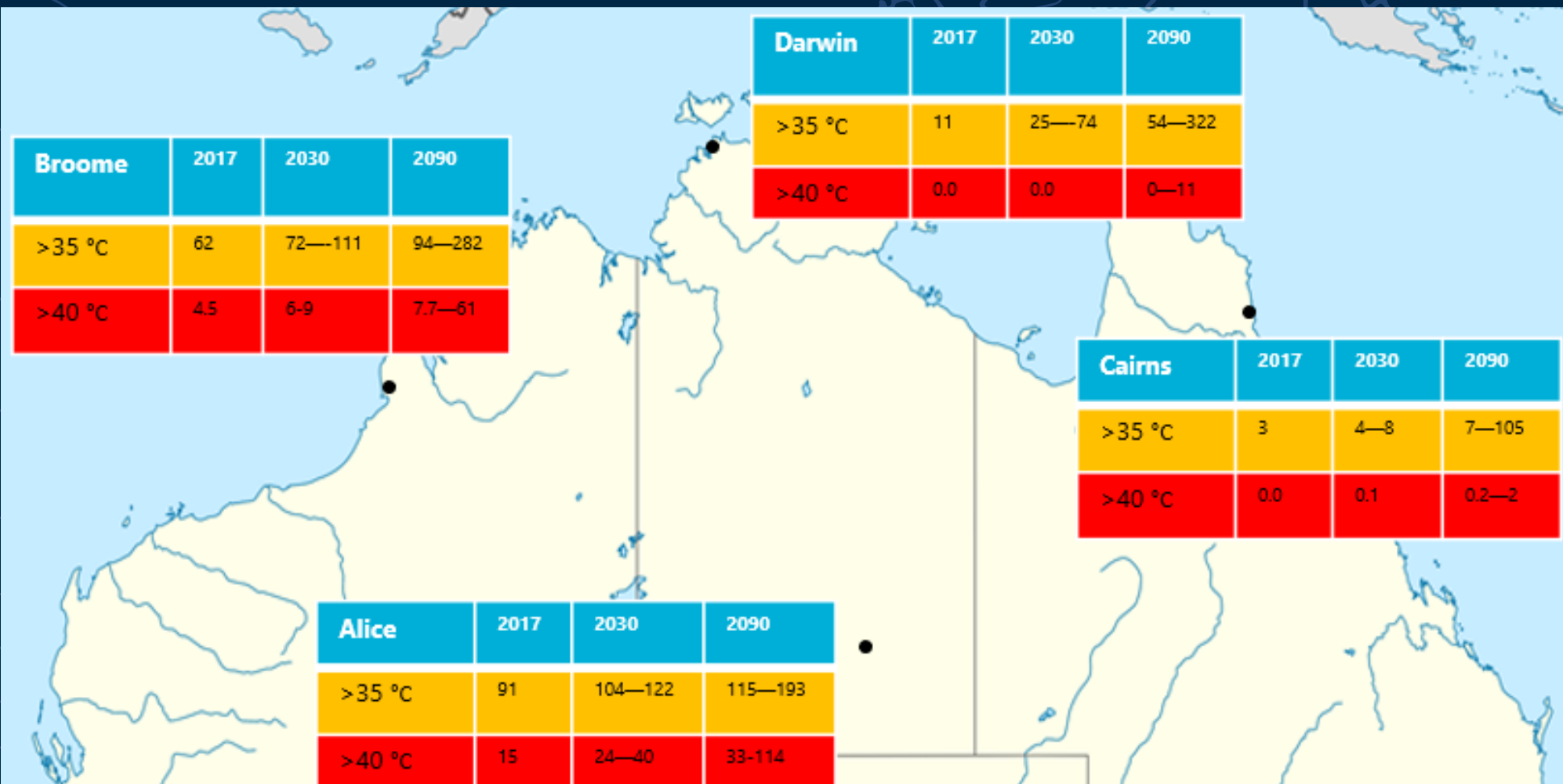


emerging threat



A Changing Climate





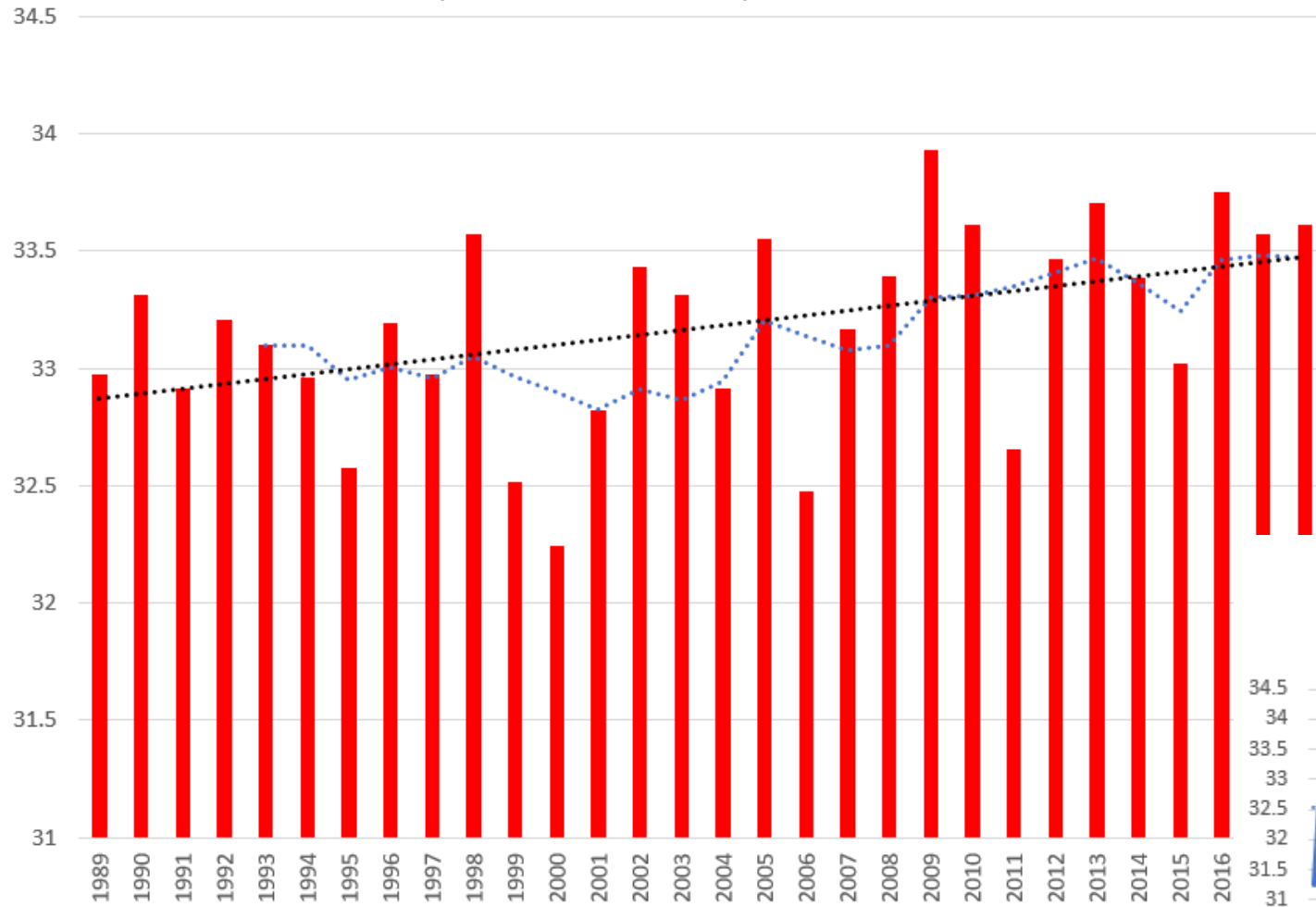
Observed changes



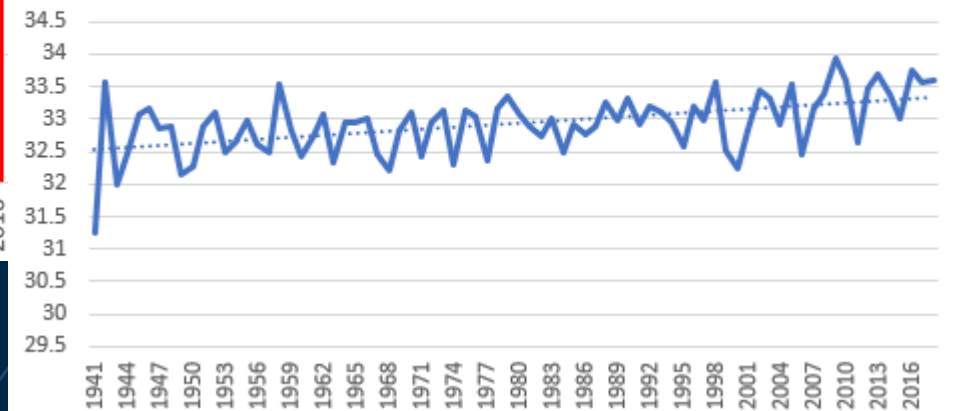
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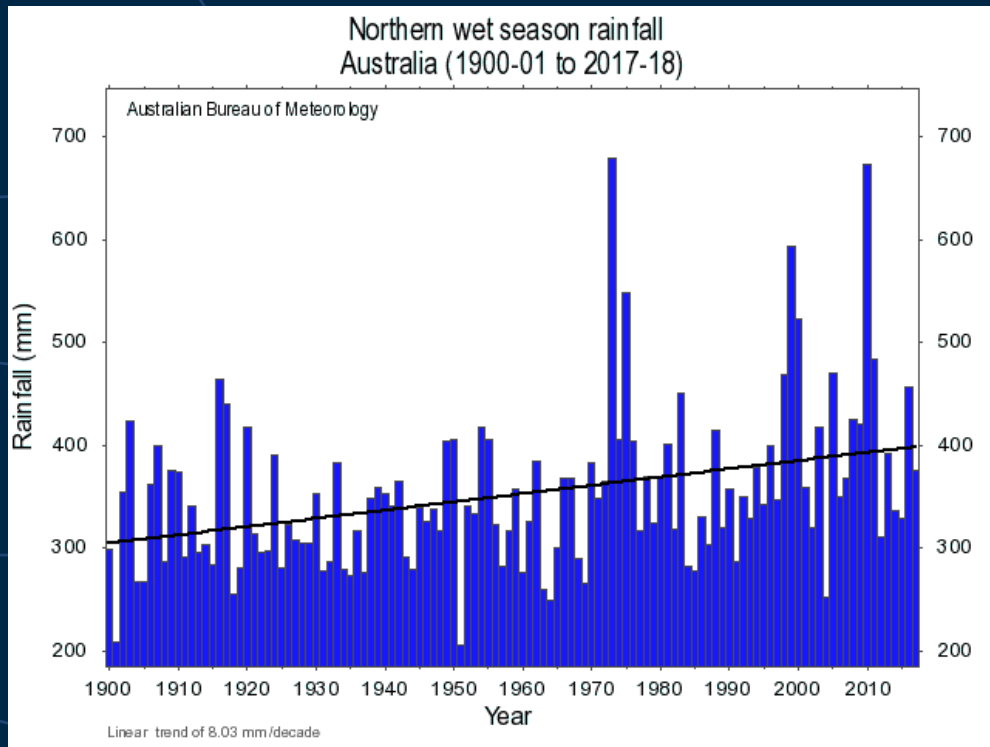
@ChrisKentPhotography

Darwin Airport Maximum Temperature, 1989-2018

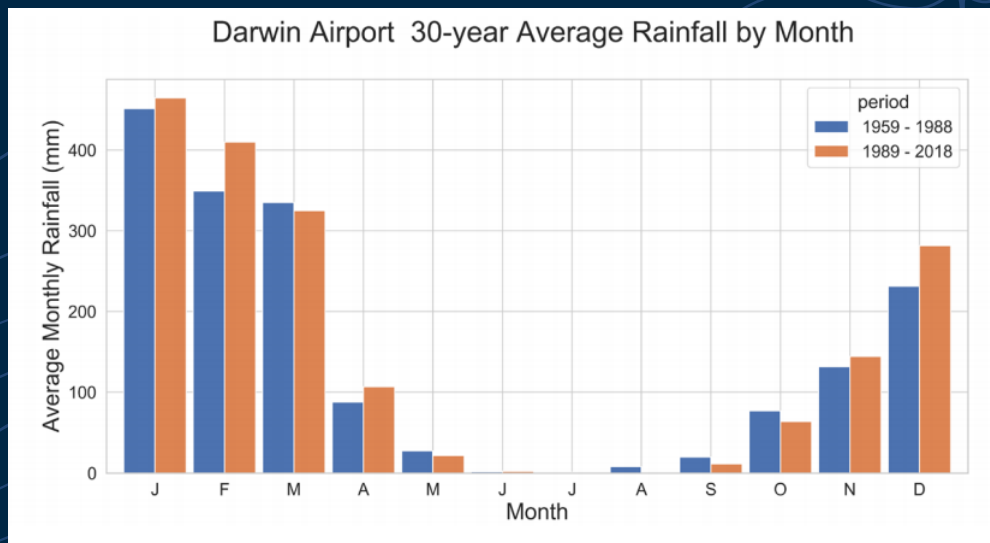


Darwin Airport Maximum Temperature, 1941-2018

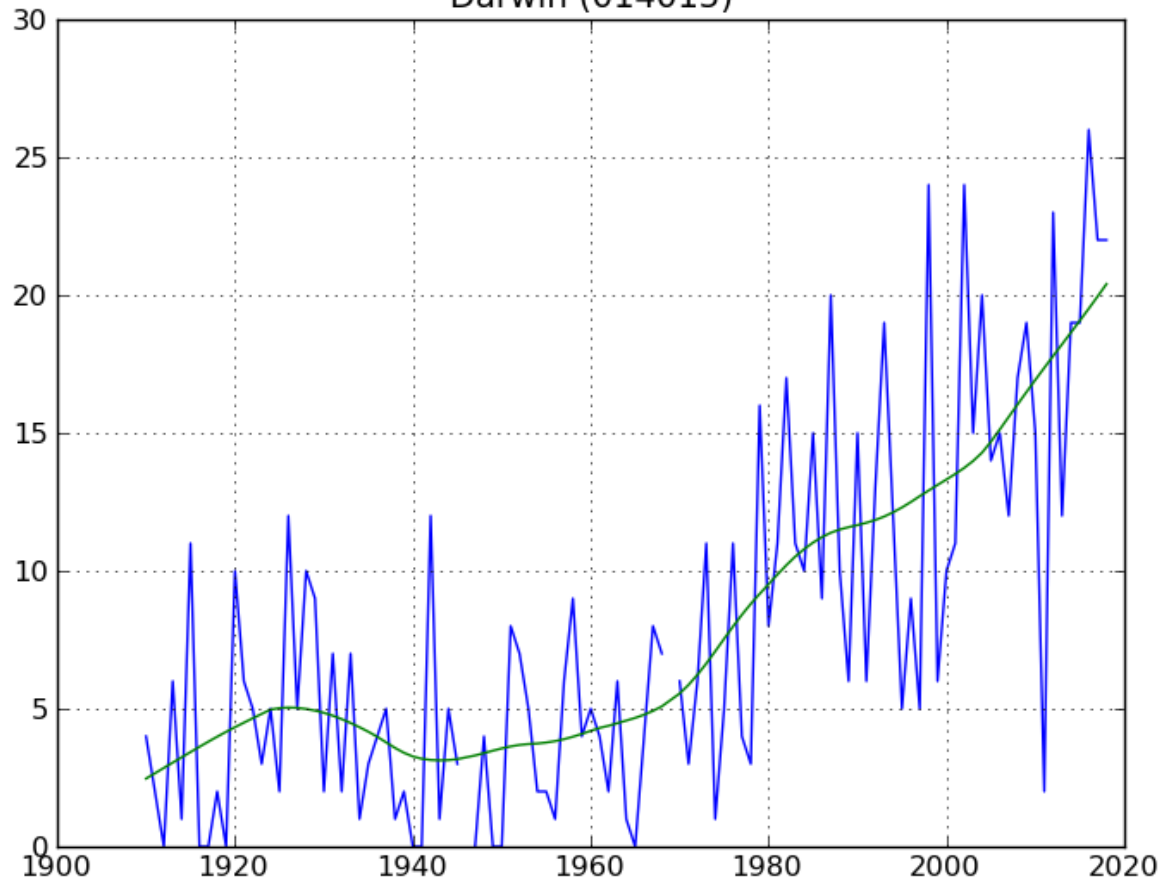




- ✓ Annual rainfall in the Top End has increased by around 110 mm (11%) during the past 30 years
- ✓ Over the past 30 years, wet season rainfall for Darwin was 146 mm higher than the average for the previous 30-year period (1959–1988)



Annual number of days with tmax above 35.0 °C
Darwin (014015)



- ✓ 2019 to date: 32 days soaring to 35°C or more
- ✓ Exceeding 2030 heat predictions

A stylized map of Australia is shown in a light blue color against a dark blue background. The map includes a grid of latitude and longitude lines. The text "Thank-you" is centered on the map in a white, sans-serif font.

Thank-you

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