



My Country

I love a sunburnt country,
A land of sweeping plains,
Of ragged mountain ranges,
Of drought and flooding rains.
I love her far horizons,
I love her jewel-sea,
Her beauty and her terror –
The wide brown land for me!



https://en.wikipedia.org/wiki/Dorothea_Mackellar

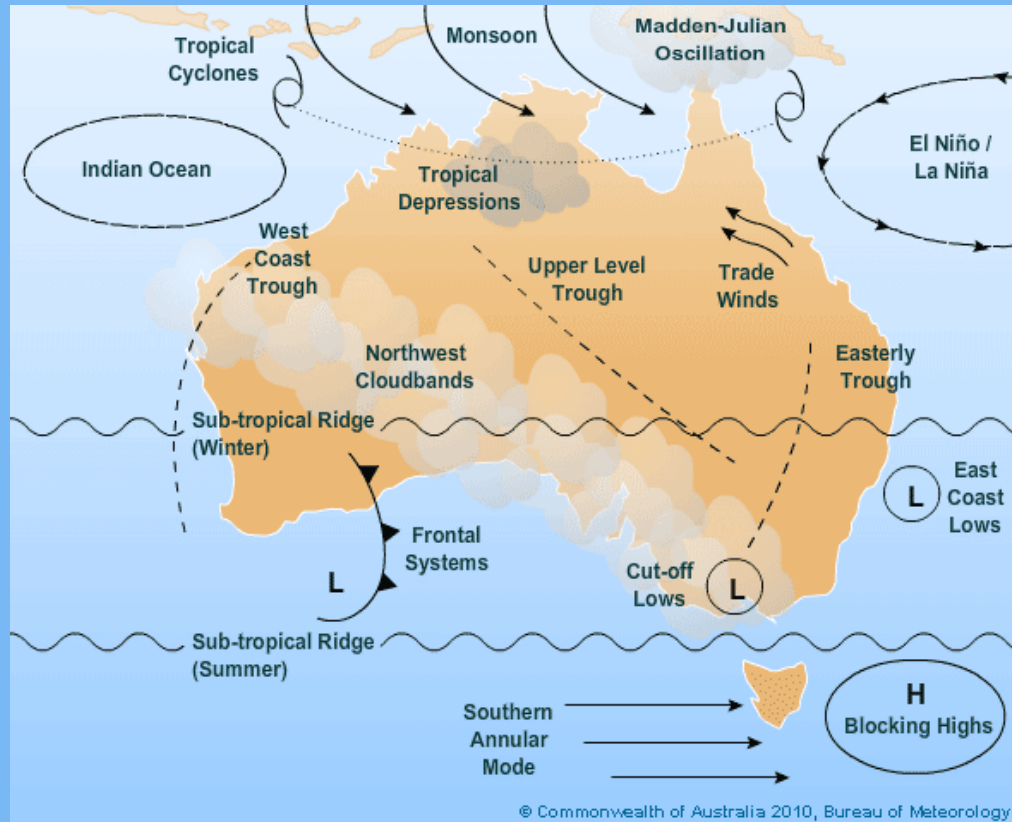
Dorothea Mackellar



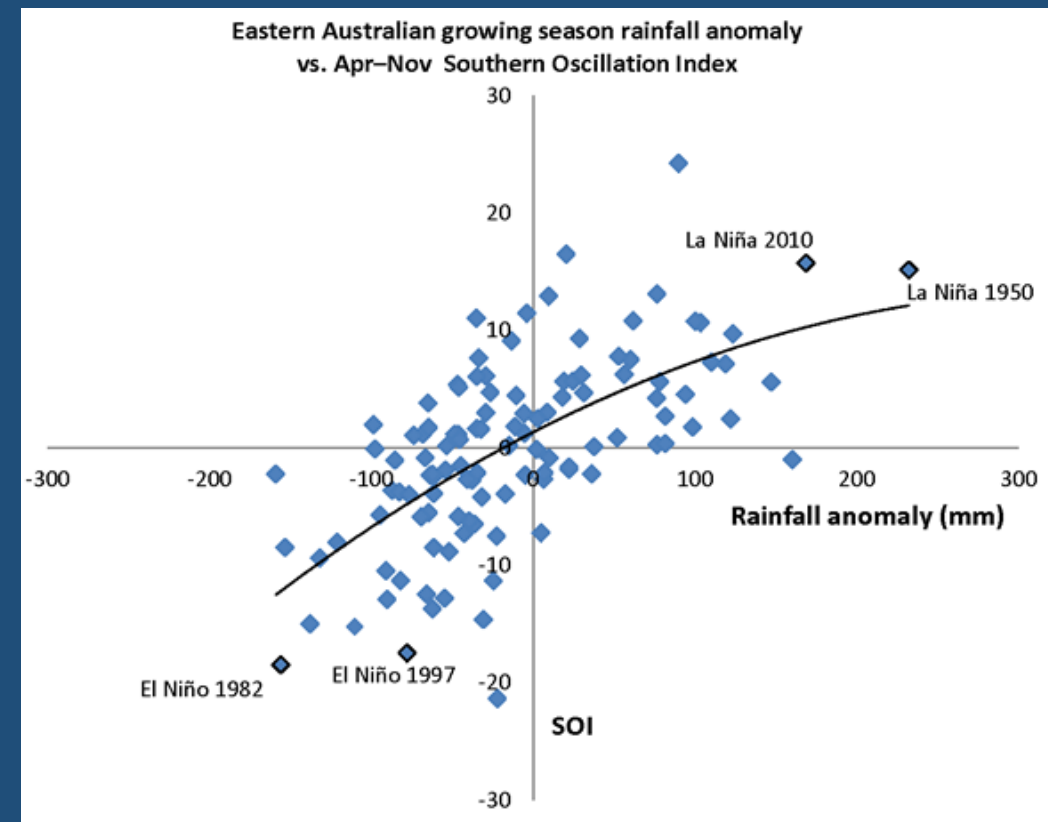
What do extremes in Australia look like?

- Australia is prone to drought partly because of its geography
- Over most of the country rainfall is low and erratic - dry years, typically driven by El Nino events, lead to water shortages
- Major droughts, such as the Millennium drought of 1997–2010 have had a significant negative impacts
- Floods are the most costly natural disasters in Australia
- Floods have always been a part of Australia's ecology with La Nina events bringing increased rainfall across much of Australia
- Major floods, such as the series of floods which hit Queensland, beginning in November 2010 resulted in forced evacuation of hundreds of thousands of people

Climate drivers

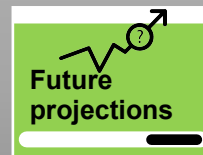


Rainfall anomalies





Australian Water Outlook

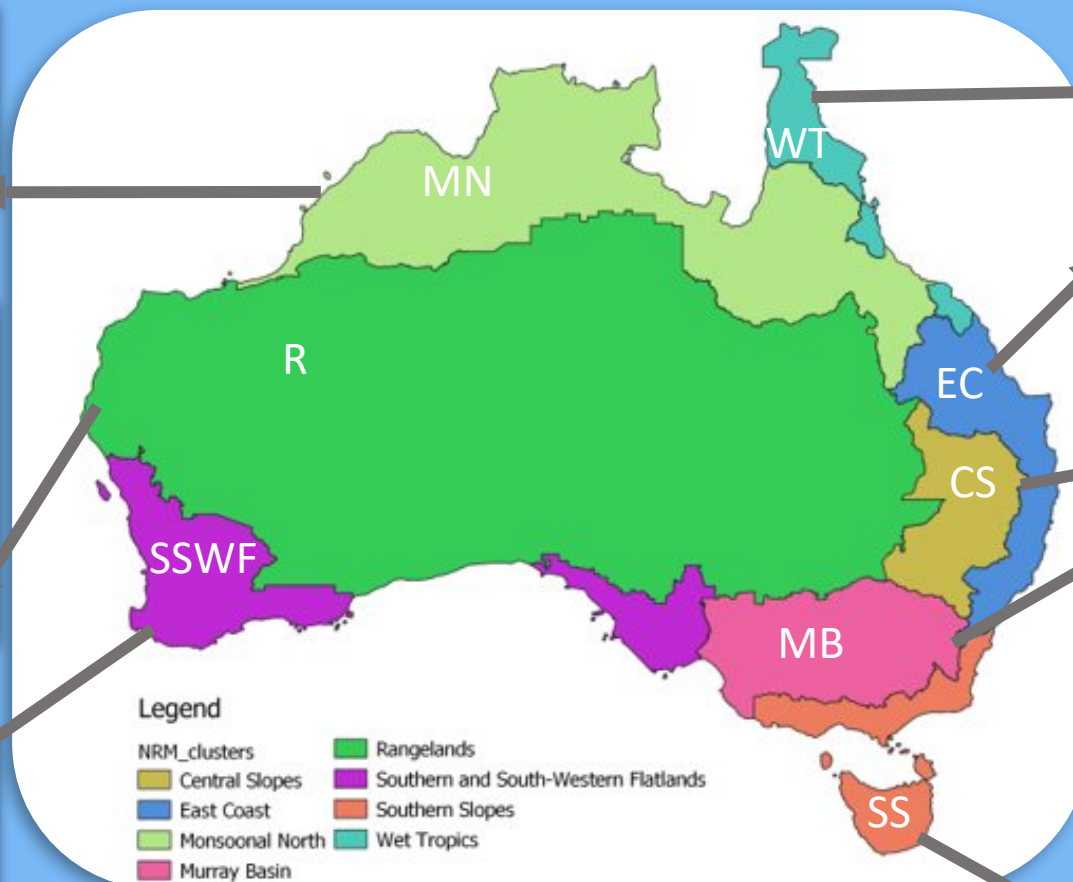


awo.bom.gov.au

Monsoonal wet and dry seasons, with differences in the timing between eastern and western parts.

Rainfall systems vary from seasonally reliable monsoonal influences in the far north through to **very low and variable rainfall patterns** in much of the centre and south.

Predominantly Mediterranean climate, with high winter rainfall and little summer rainfall.



Two seasons: wet season (Dec-Apr), dominated by **north-westerly winds**, and **dry season** (May-Nov) by **south-easterly trade winds**.

Some **tropical** influences in the **north** and some **temperate** influences in the **south**.

Sub-tropical in the **north**, through to **temperate** in the **south**, with a typically drier winter and wetter summer.

Relatively dry and temperate, with a warm and dry grassland climate in the north-west ranging to temperate with hot summers further east.

The dominant **rain-bearing weather** systems are cold fronts and troughs coming from the west.

Hydrological extremes

Australian Water Outlook

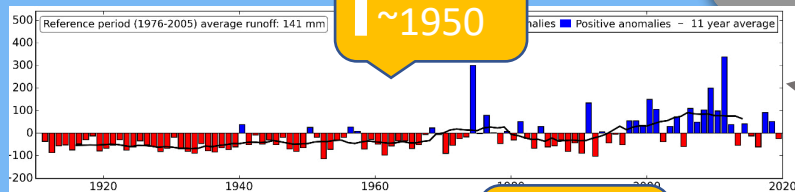
Historical

Seasonal
forecast

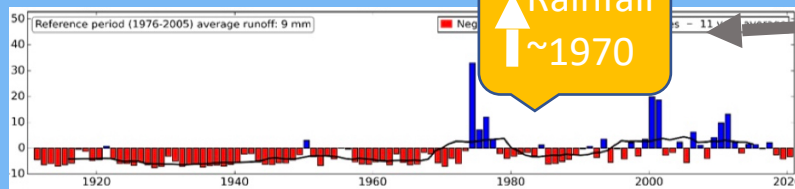
Future
projections

ENSO
influenced

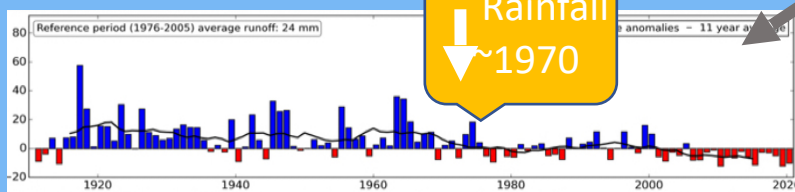
Rainfall
↑ ~1950



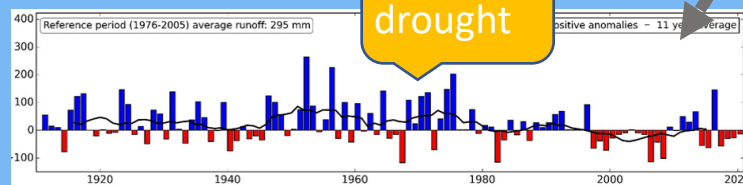
Rainfall
↑ ~1970



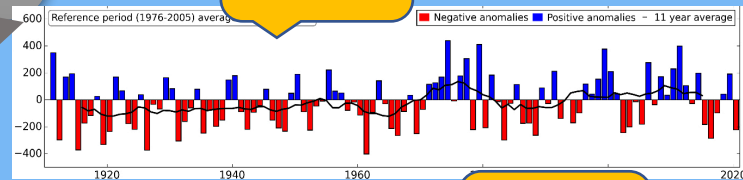
Rainfall
↓ ~1970



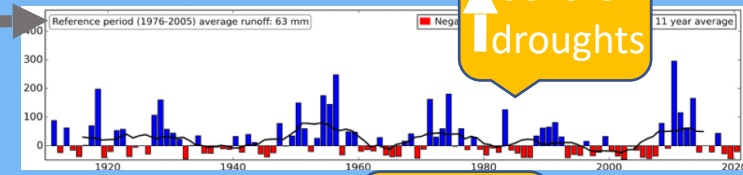
Millennium
drought



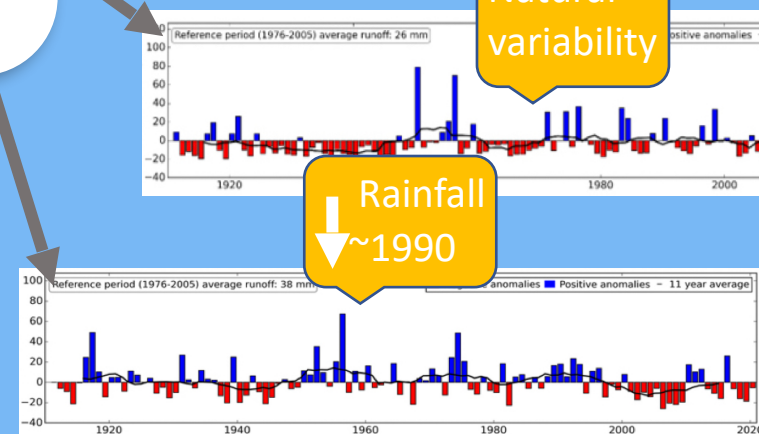
Severe
droughts



Natural
variability



Rainfall
↓ ~1990

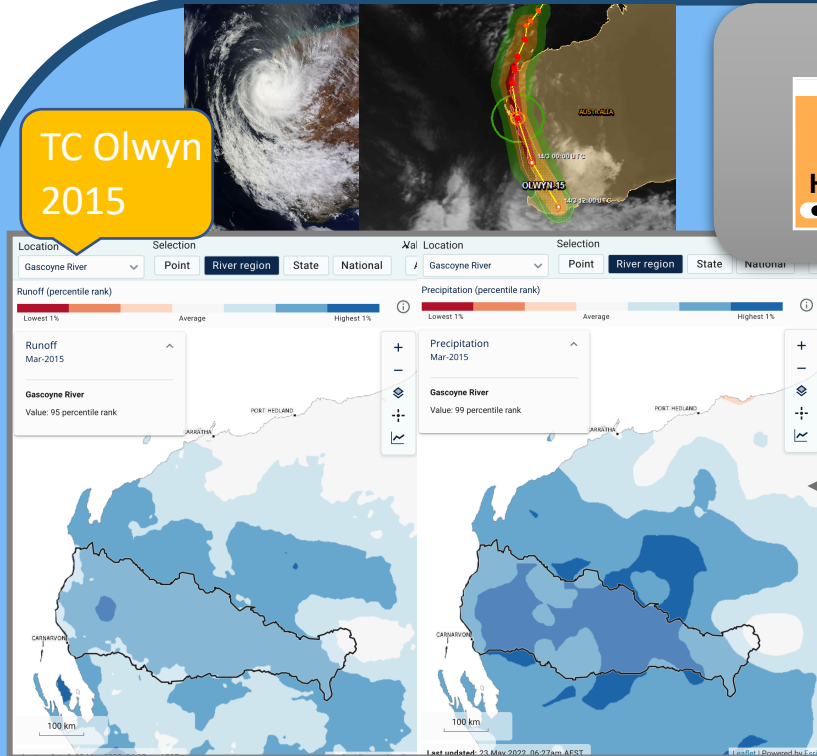


Hydrological extremes

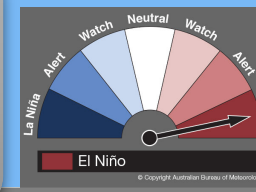
Australian Government
Bureau of Meteorology



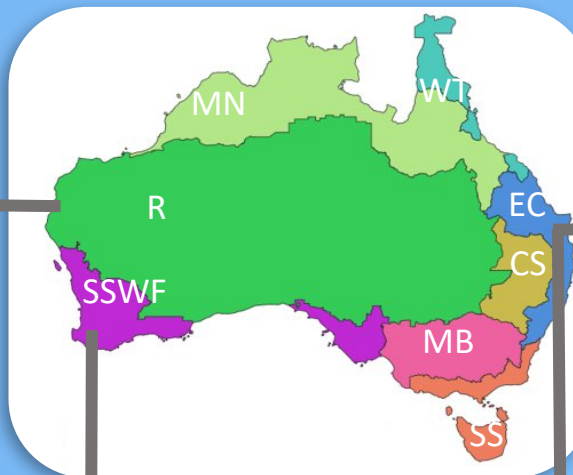
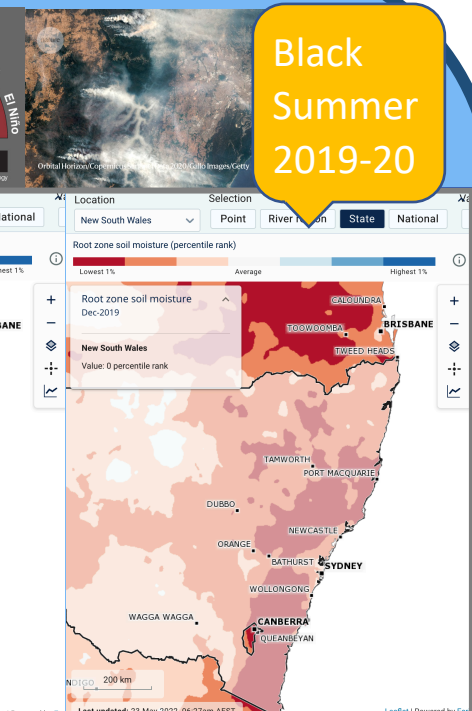
TC Olwyn
2015



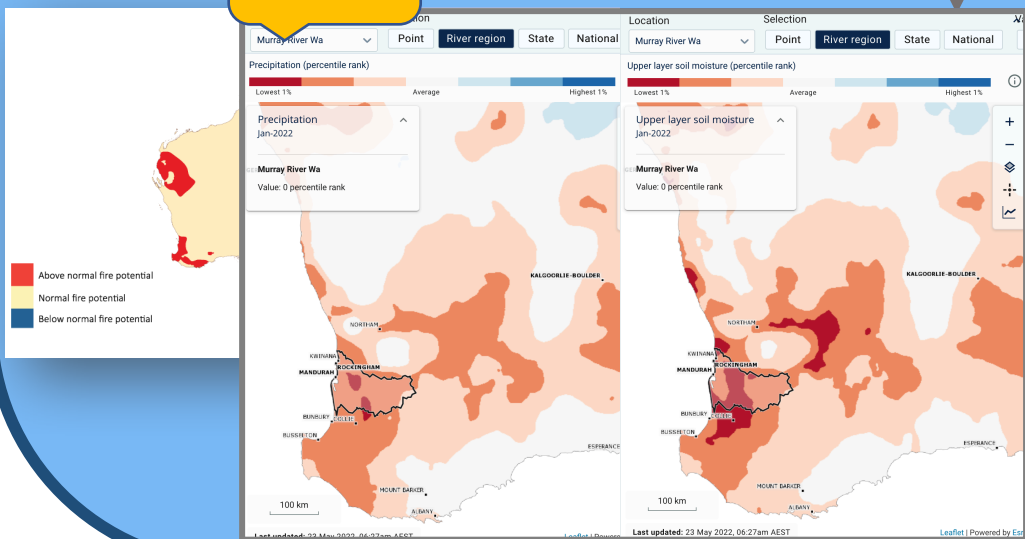
Australian Water Outlook



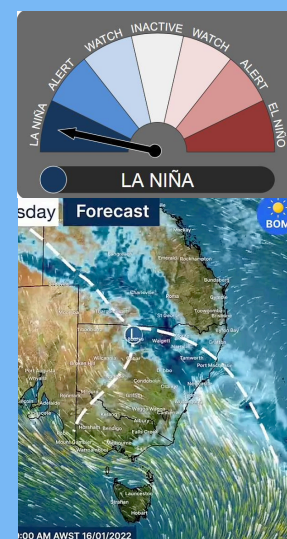
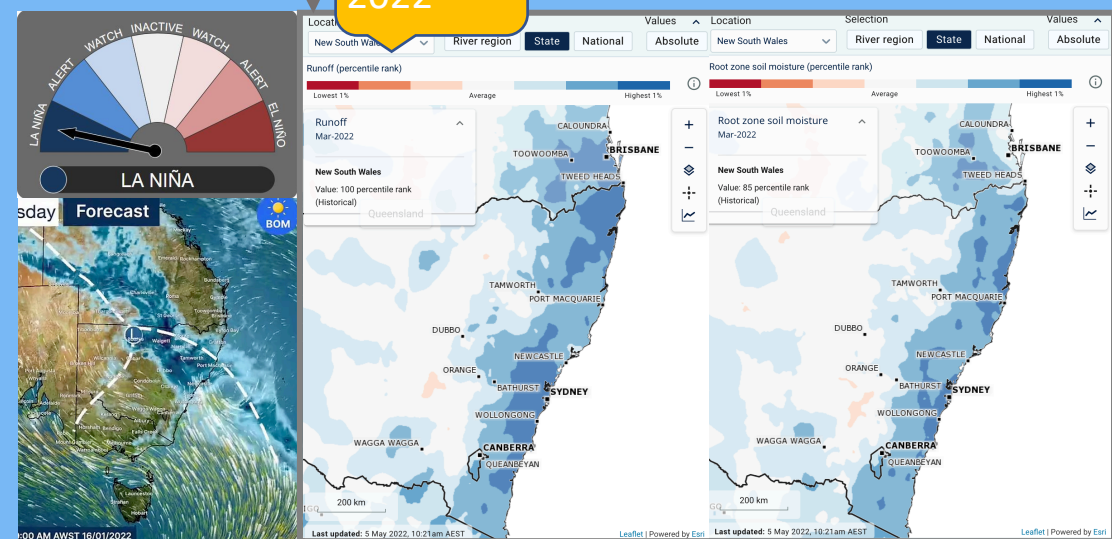
Black
Summer
2019-20



Bushfires
2022



EC Floods
2022



Hydrological extremes

Future - Droughts



Rainfall - meteorological

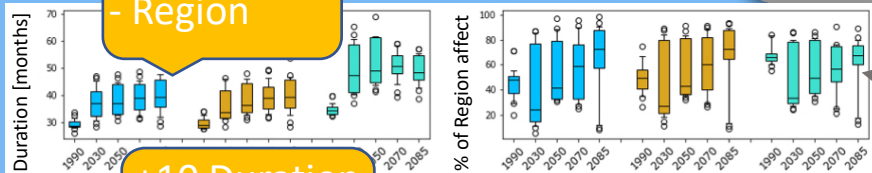
Soil moisture – agricultural

Runoff - hydrological

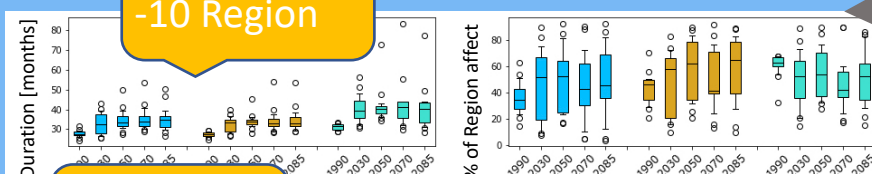
Australian Water Outlook



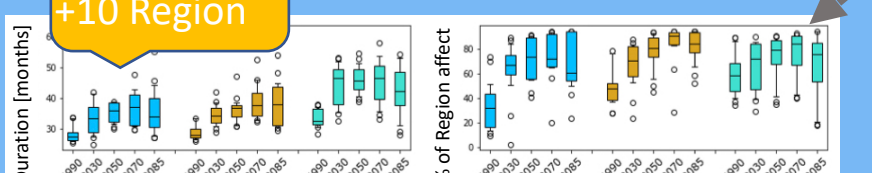
+15 Duration
- Region



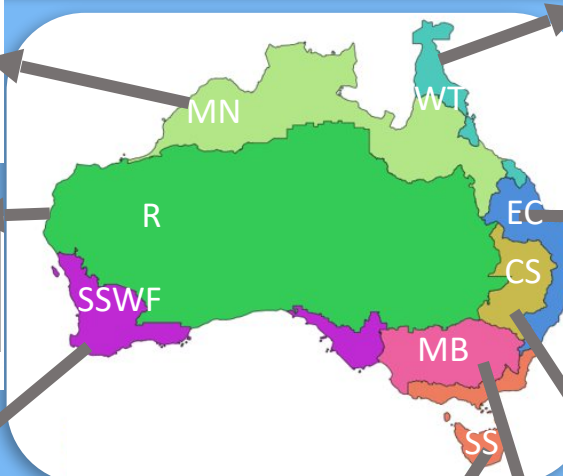
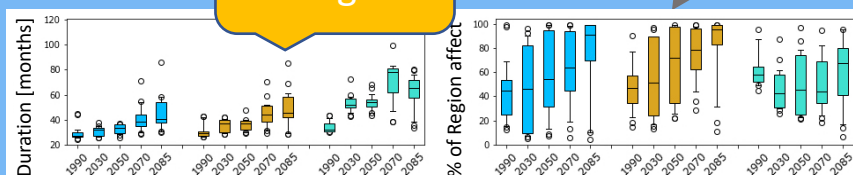
+10 Duration
-10 Region



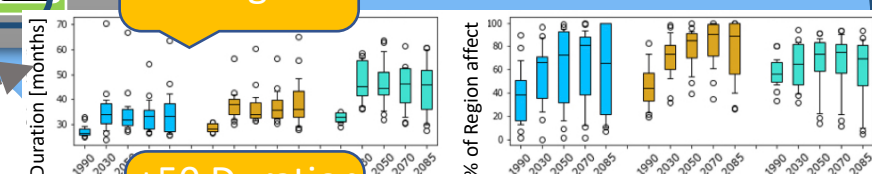
+10 Duration
+10 Region



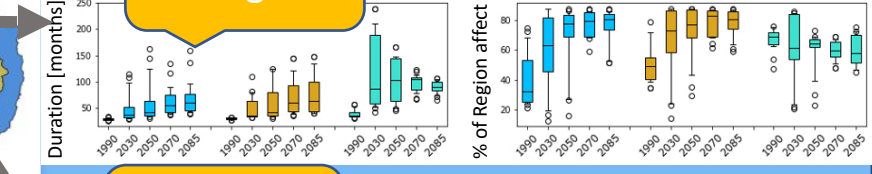
+30 Duration
+10 Region



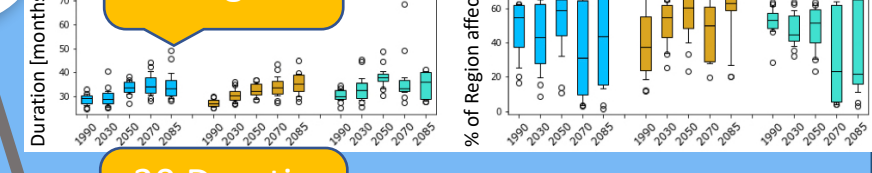
+10 Duration
+15 Region



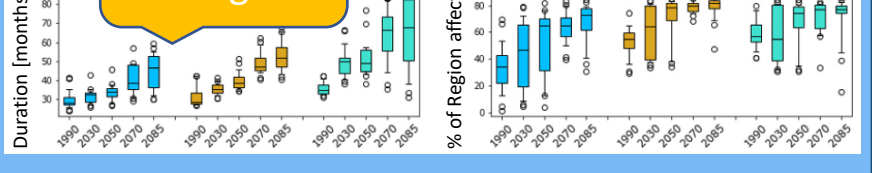
+50 Duration
-10 Region



+5 Duration
-30 Region



+30 Duration
+20 Region

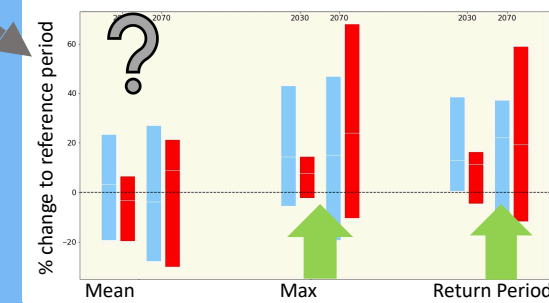
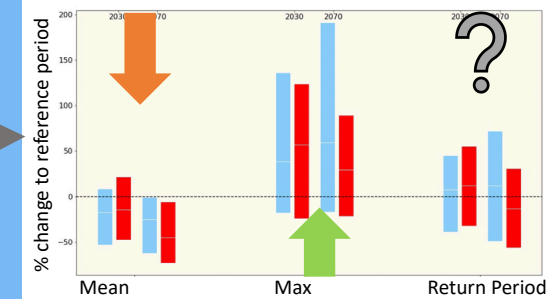
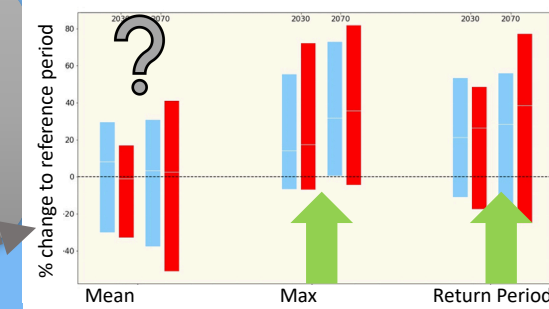
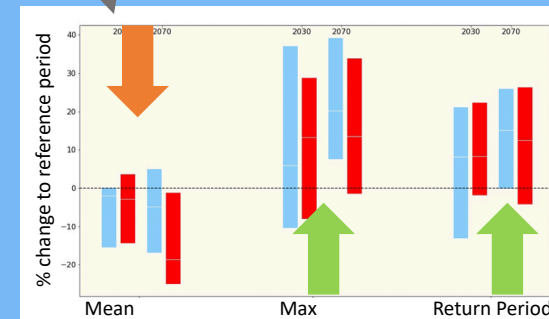
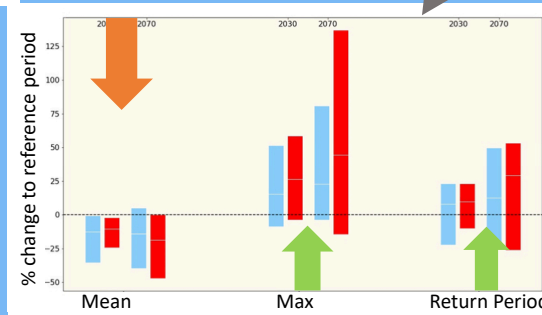
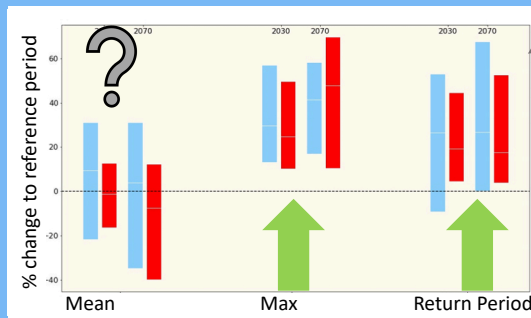
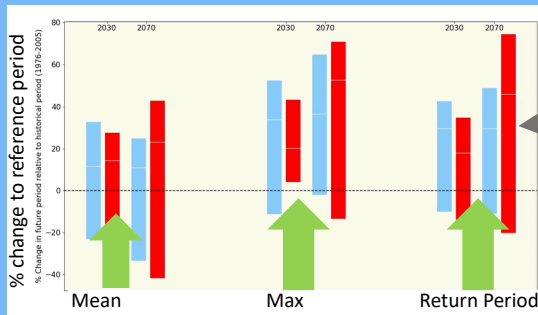
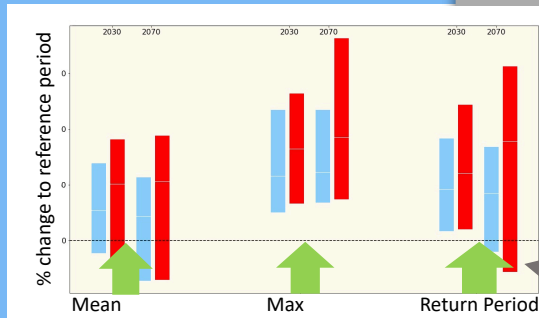
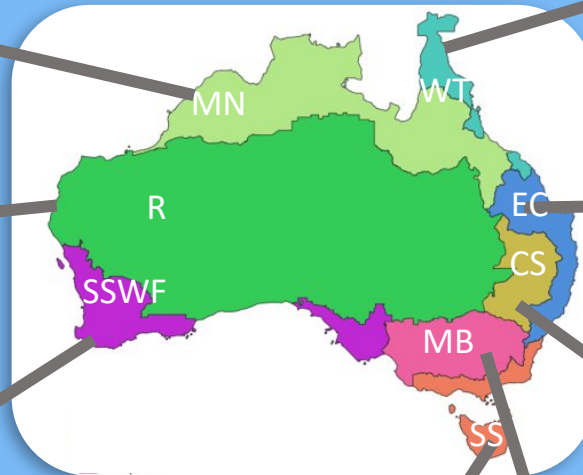


Hydrological extremes

Future - Floods



Australian Water Outlook



RCP4.5
RCP8.5



So... What does this mean for Australia?



Longer fire season



More time spent in drought



Increase in floods

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KNOW YOUR WEATHER.
KNOW YOUR RISK.



Many thanks to my co-authors and collaborators
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