# Assessing patterns of future hydrological change for Australia: Insights from the National Hydrological Projections

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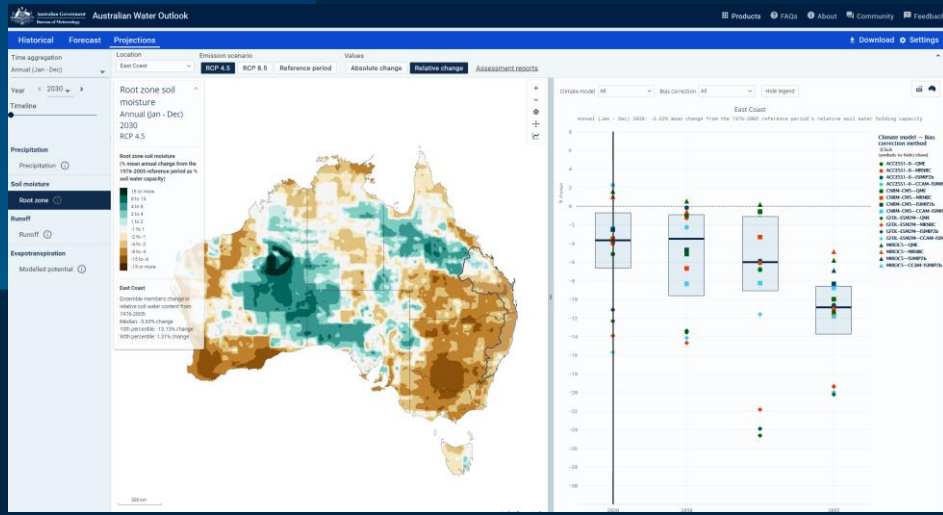


Australian Water Outlook
Near seamless water service: Historical, forecast and projections

Australian Government
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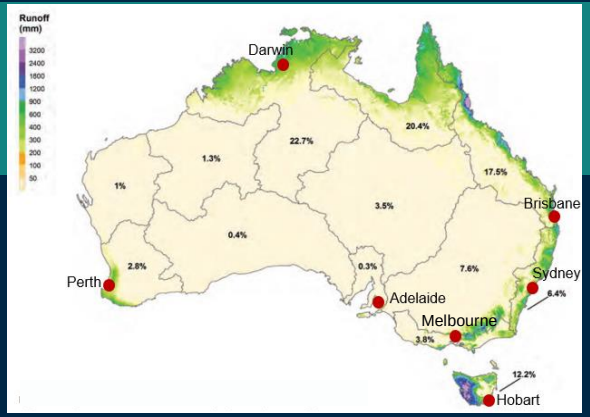
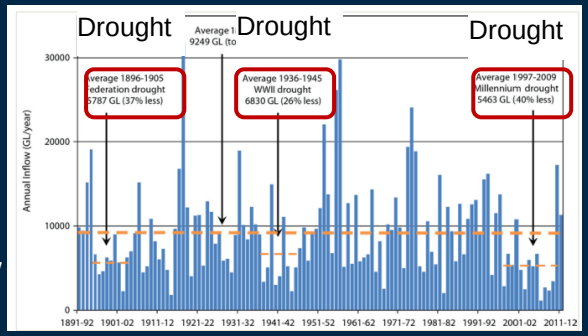
# Introduction

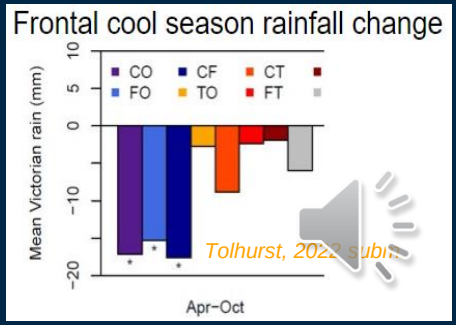
- Australia - one of the driest inhabited country:
  - Large variability in climate zones
  - Runoff - proportional low (~12% of annual rainfall)
  - Multiple climate drivers - large year to year variabilities
    incl. frequent multi-year droughts and floods

- S /SE Australia drying trends since 1970s & Millennium drought (2001 - 2010) :
  - disproportional larger reduction in runoff
  - Some catchments have not recovered - yield remained below average (Saft et 2018, Peterson et al. 2022)
  - less rainfall (fronts) but more extremes (thunderstorms)

- Securing water supply in a future drying climate:
  - Less inflows into storages? By how much?
  - Less reliable in the future?



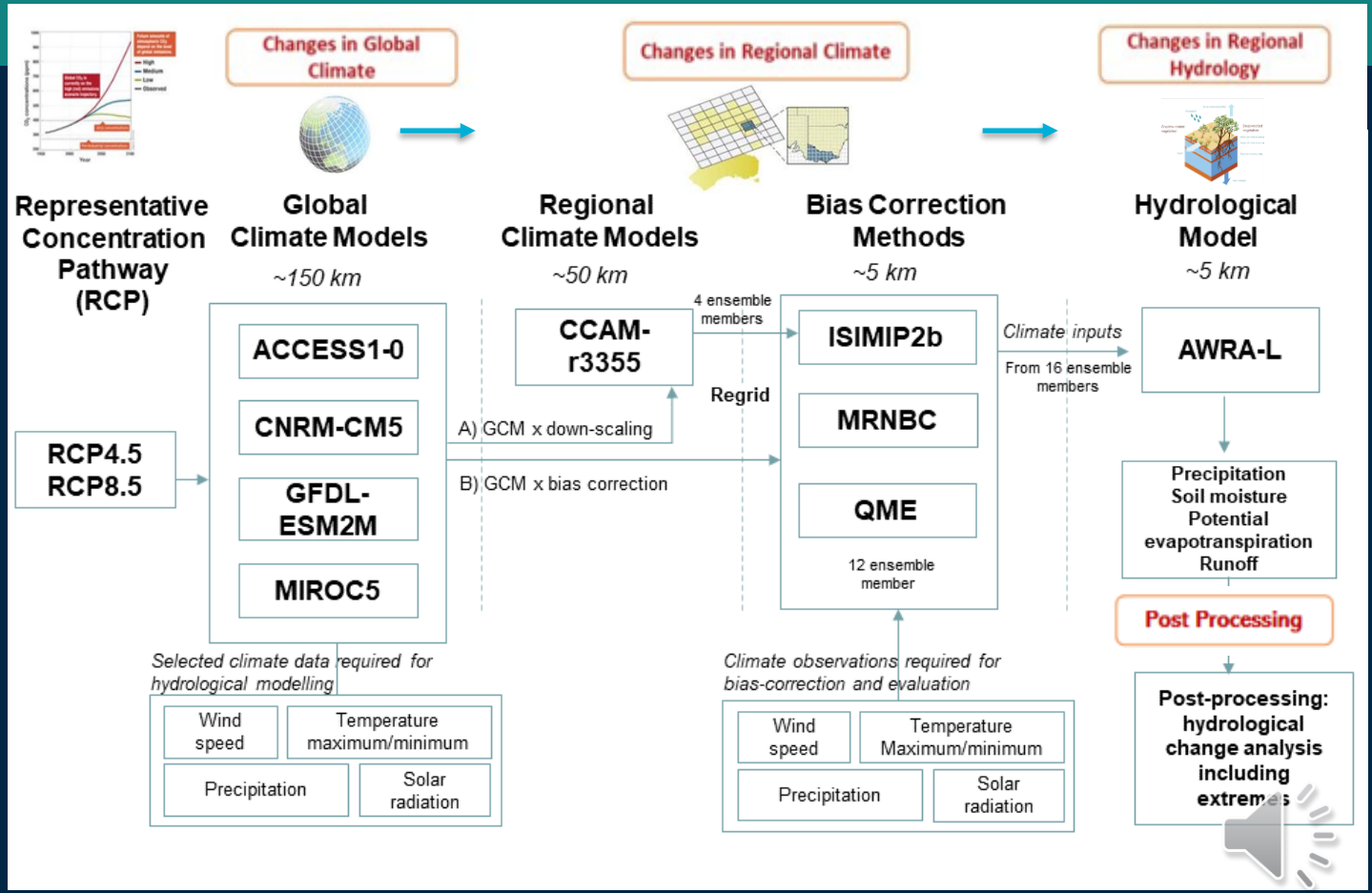



# Method

**32-member ensemble:**

- 2 RCPs
- 4 CMIP5 GCM
- 1 RCM
- 3 Bias-Correction
- AWRA-L hydro model
- Post-processing suite

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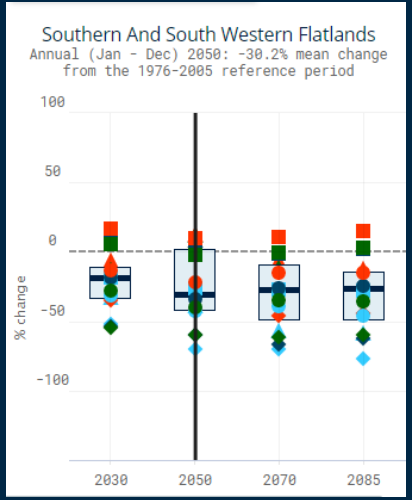
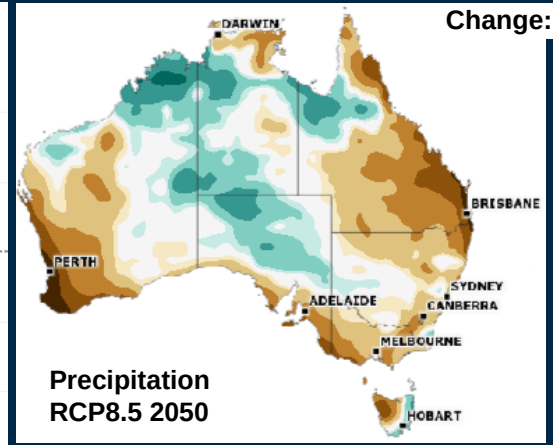
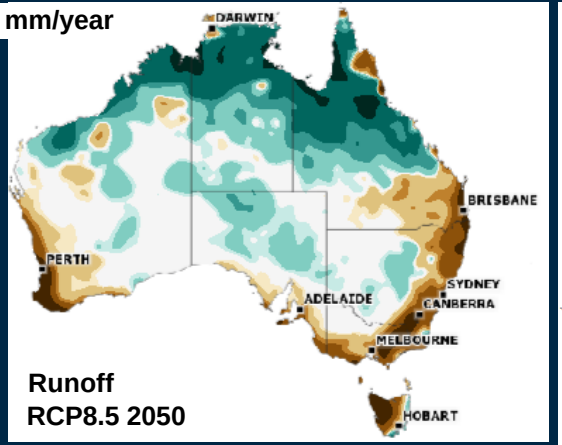
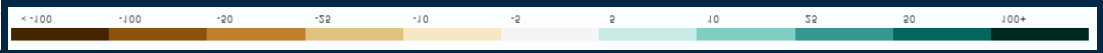
# (Some) …. Key findings

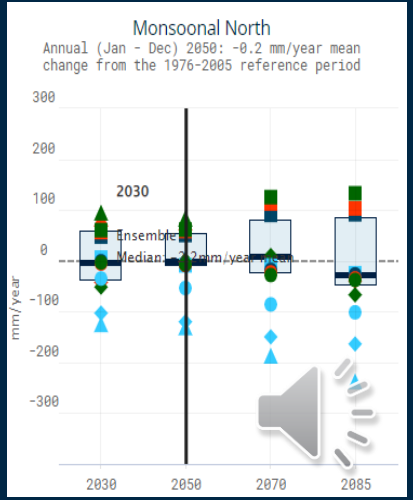
- Southern, South Eastern and Eastern Australia continued drying projected:
  - Both RCPs - most models but stronger drying under RCP8.5 – hotspots in runoff projected
    - SW WA: between 17% (2030) to 42% (2050) and 62% (2085)
    - Alps/East Coast: between 10% (2030) to >15-25% (2050) and >25-50% (by 2085)
  - Winter runoff most affected
- Northern Australia large ensemble spread both drying and wetter futures plausible



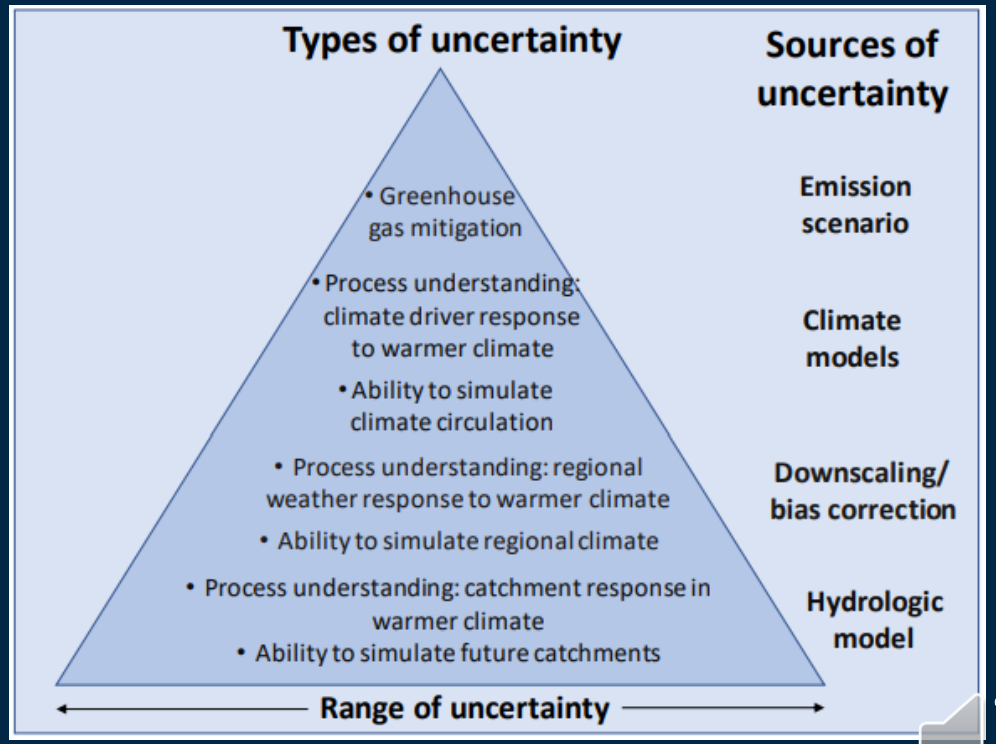



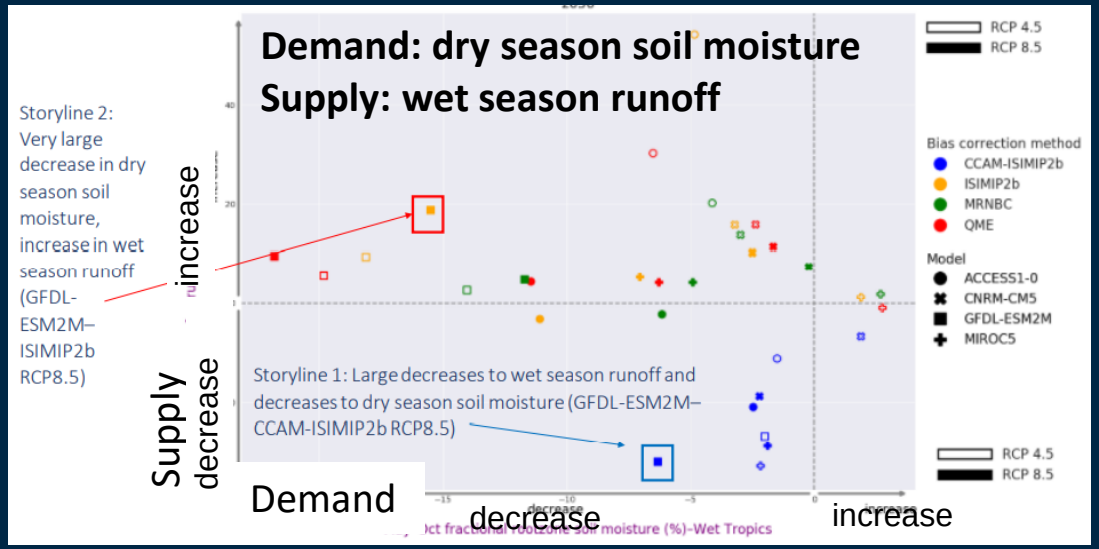
# Working with Hydrological Projections

- Many sources of uncertainty
- Increasingly difficult to account for all sources of uncertainties + its probabilistic representation
- Alternative: use of storylines (Shepard, et al. 2019)
- To characterise a range of plausible futures and planning for all of these



# Working with Hydrological Projections

- Storylines focus on impacts in the decision making process by selecting a combination of variables
- Lake Morris – Future water security (supply/demand)

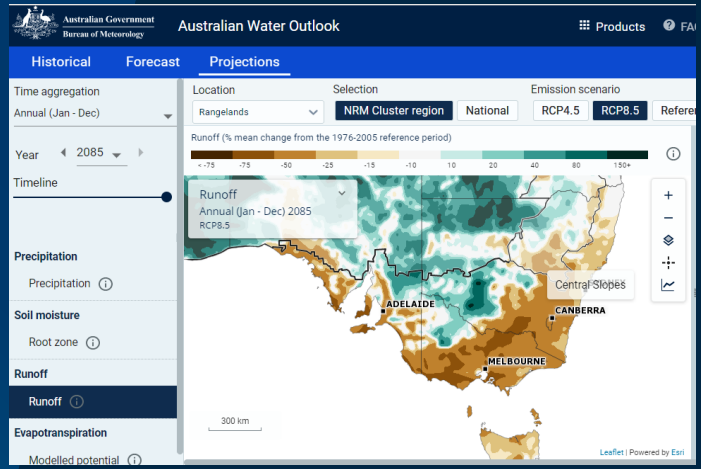




Storyline results

1) Vulnerability to water security increases as supply decreases and demand increases
2) Increased runoff does not equal more supply – vulnerability via increased demand

# Thanks

- A near seamless water service is available
- Monitor & assess Australia's variable hydrology
- Plausible future impacts on water resources can be explored by projections storylines




Australian Water Outlook https://awo.bom.gov.au/

NCI Data Collection Foundational dataset https://dx.doi.org/10.25914/6130680dc5a51

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