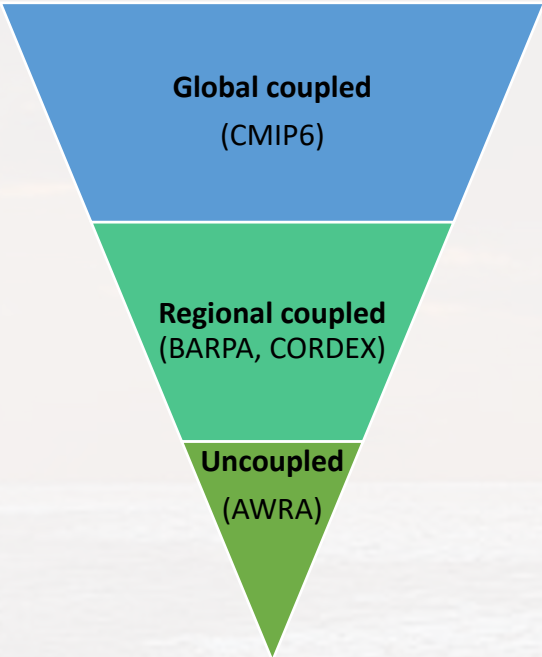


# A hierarchy of drought projections for Australia

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Q1: Is there agreement across different future projections of drought available for Australia?  
Q2: Are projections consistent across different types of drought?

## METHODS



- Global coupled:**  
**CMIP6**  
All available models, ensembles and scenarios
- Regional coupled:**  
**BARPA**  
Regional ACCESS forced with three CMIP6 GCMs, two scenarios (15km)

**CORDEX**  
CCAM and WRF, ten forcing GCMS, two scenarios (50km)
- Uncoupled:**  
**AWRA**  
Forced with four downscaled and bias-corrected CMIP5 GCMs, two scenarios (5km)

**Drought definition:** months below 15<sup>th</sup> percentile (calculated from 3-month running means analogous to SPI at 3-month scale)

**Metric shown here:** time under drought (% of time)

**Variables:** Precipitation, (total) runoff and (deep) soil moisture

**Baseline:** 1970-2005 (droughts defined relative to this baseline)

**Warming levels:** 1 and 2 degrees of warming relative to baseline (using Australia wide mean temperature)

## RESULTS

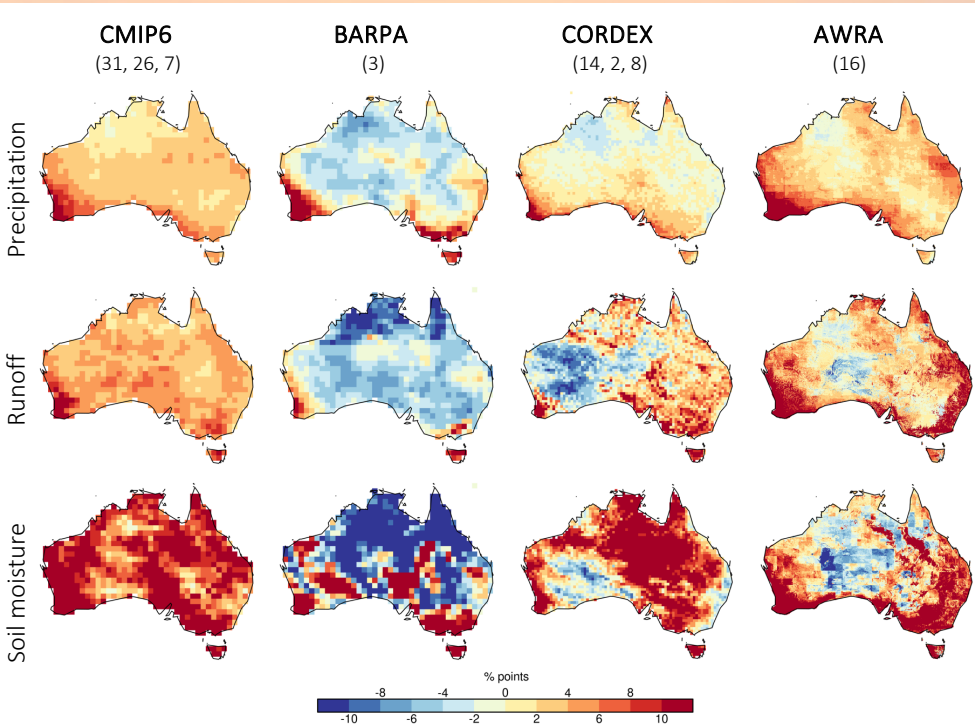
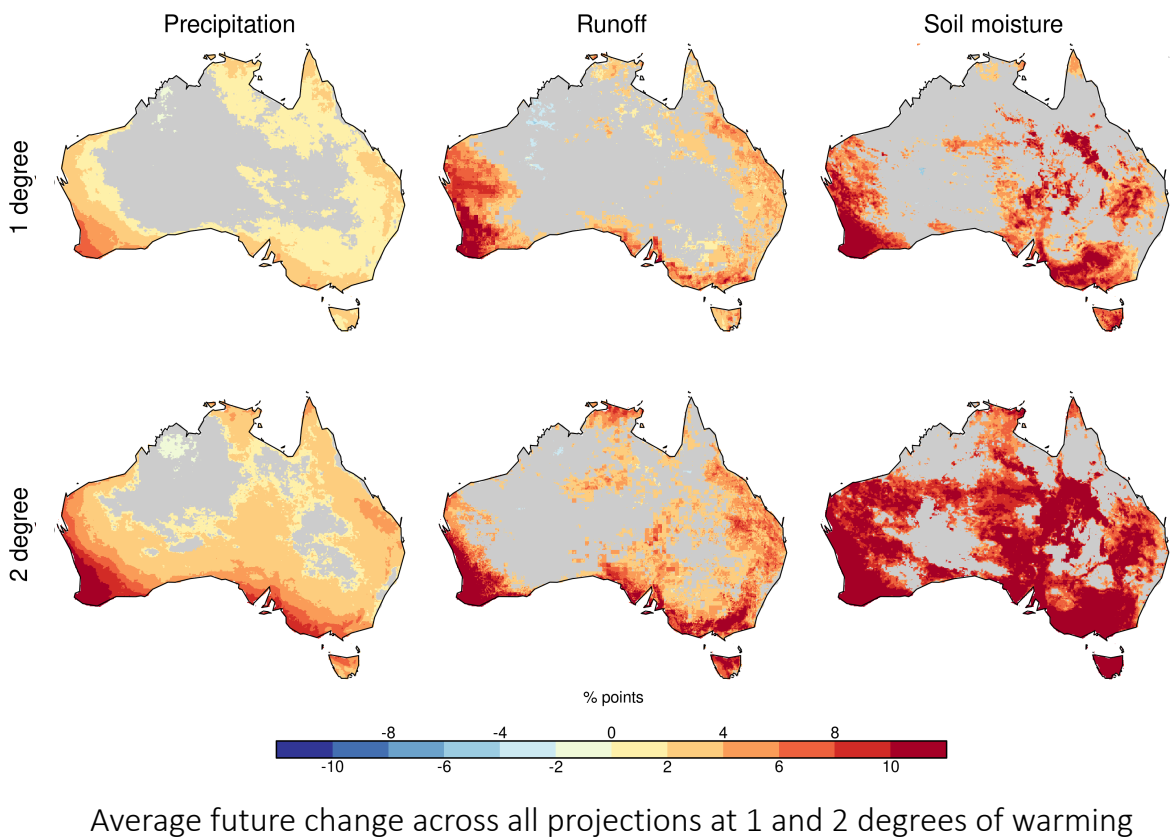
### Ensemble mean future changes

Weighted t-test for significance

More time spent under drought at two degrees of warming

Where model agreement, all variables point to more drought

Stronger changes in runoff and in particular soil moisture (caveat: models differ)



### Range of projections across datasets and variables

CMIP6 consistently indicates drying

Other projections have more mixed changes, BARPA looking very different (but only 3 models)

Some hot spots across all projections: SWWA, Tasmania, parts of Victoria and southern Queensland

Ensemble median future change across each projection and variable at 2 degrees of warming