Earth Systems and Climate Change Hub

National Environmental Science Programme

A first look at northern Australian rainfall in CMIP6

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Climate Change, Variability, and Extremes

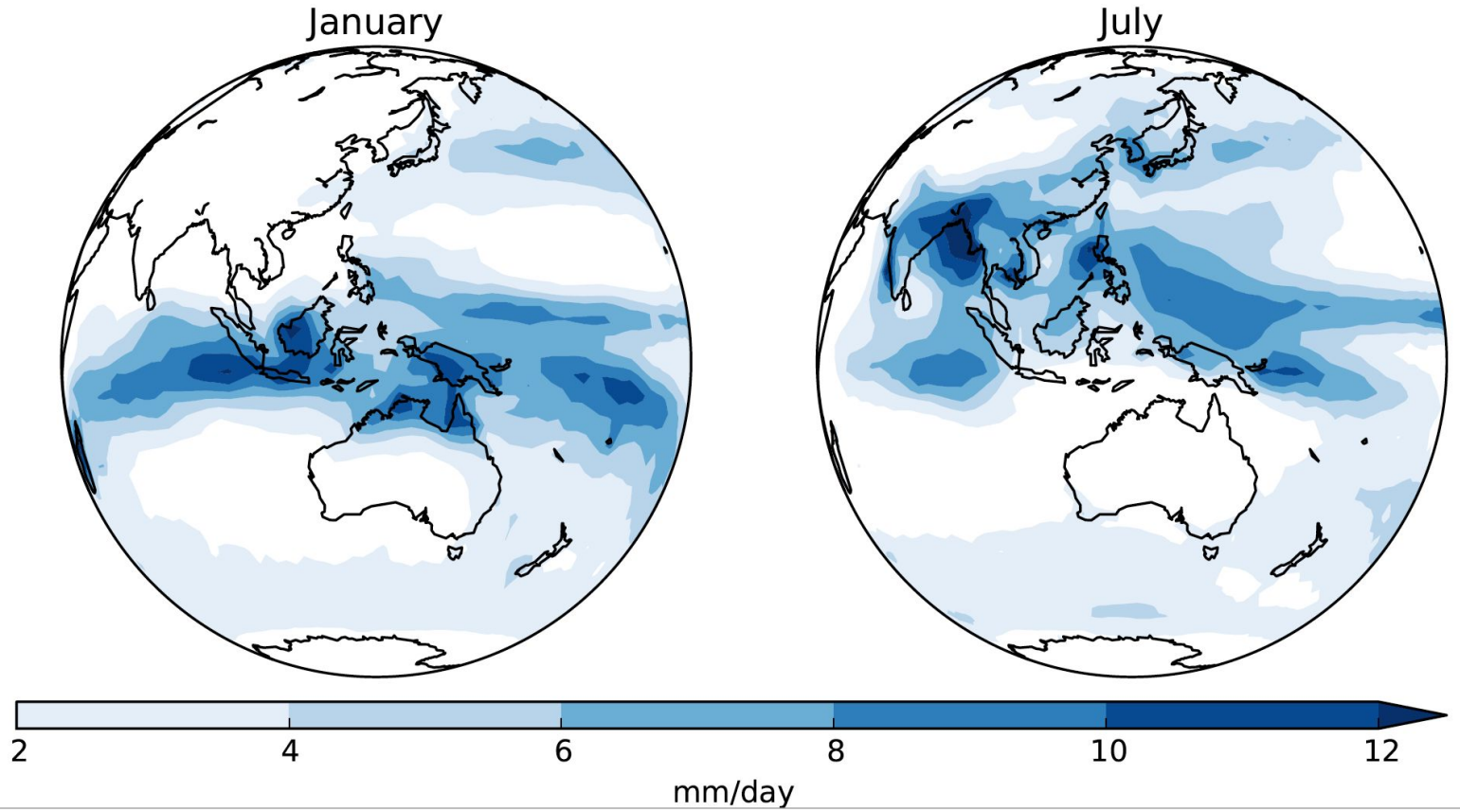
Science to Services

BOM

Overview of talk

- The Australian monsoon
- What did CMIP5 models tell us?
- Some CMIP6 results so far (11 models)
- Way-too-early conclusions

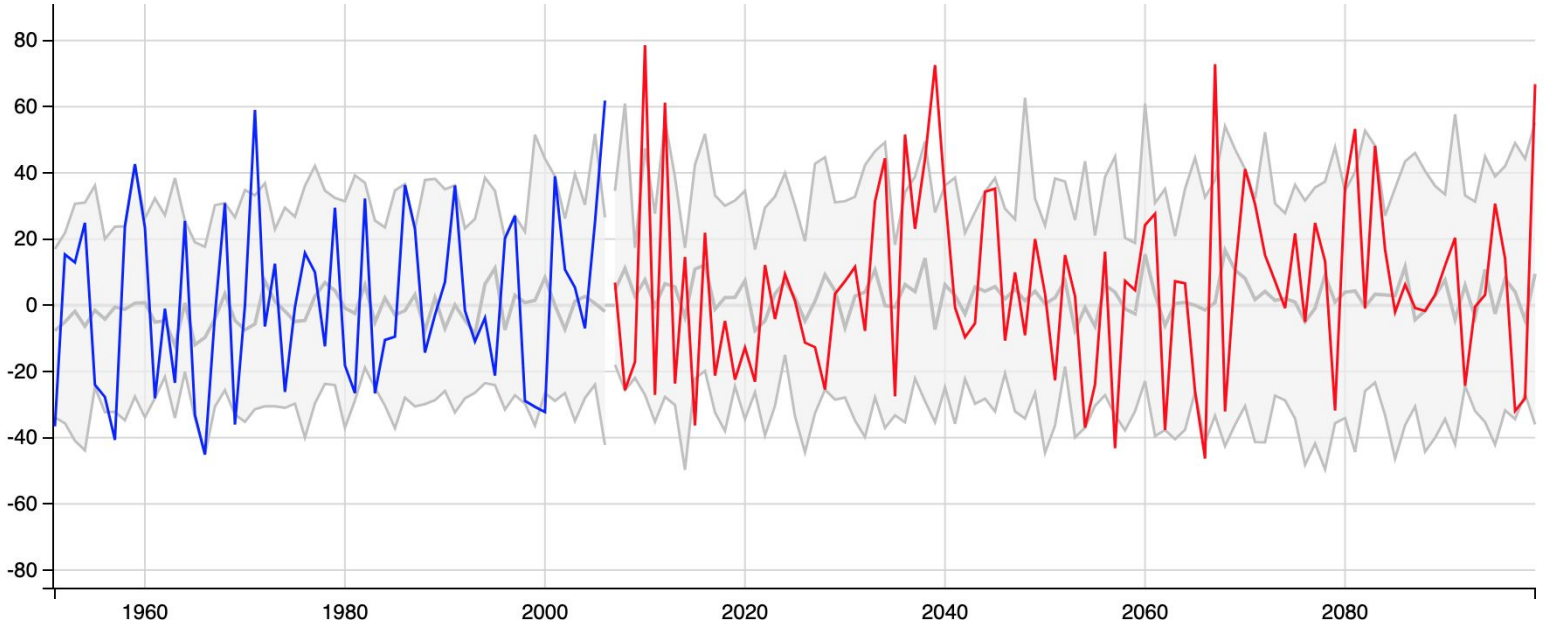
Australian monsoon



For simplicity, let's focus on DJF rainfall and changes under high emissions scenarios.

What did CMIP5 say?

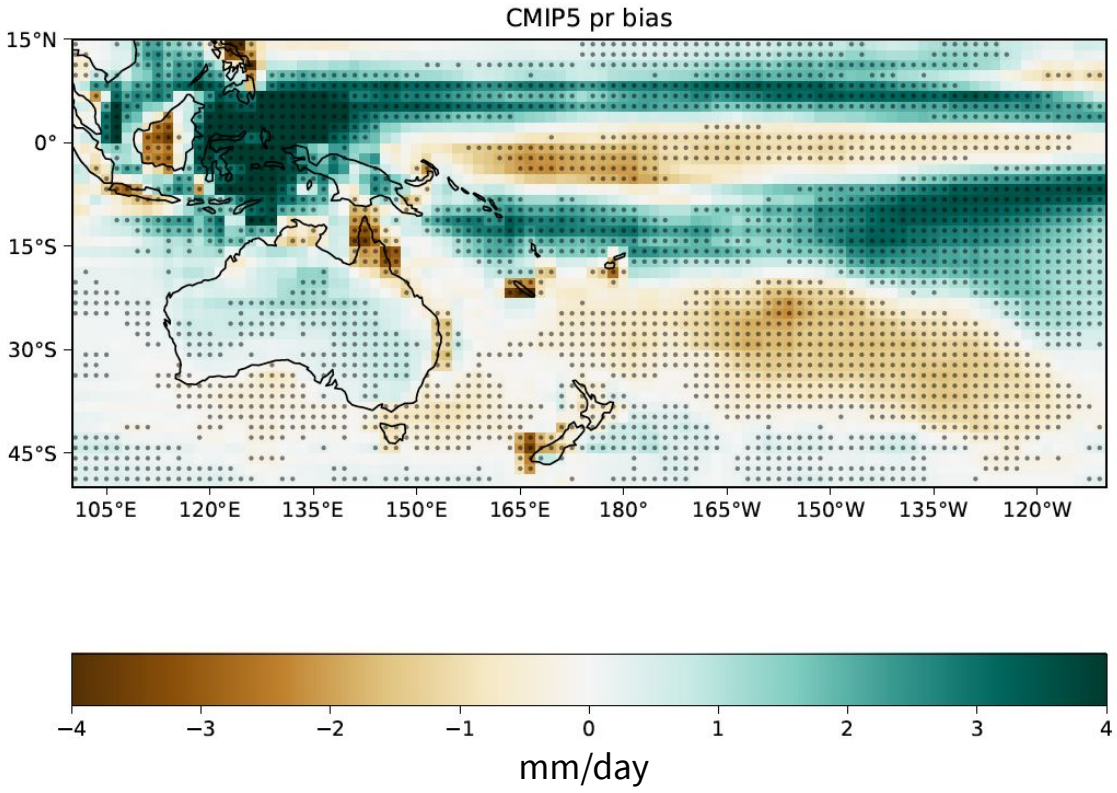
AWAP ACCESS1-0 CMIP5 RCP8.5 spread

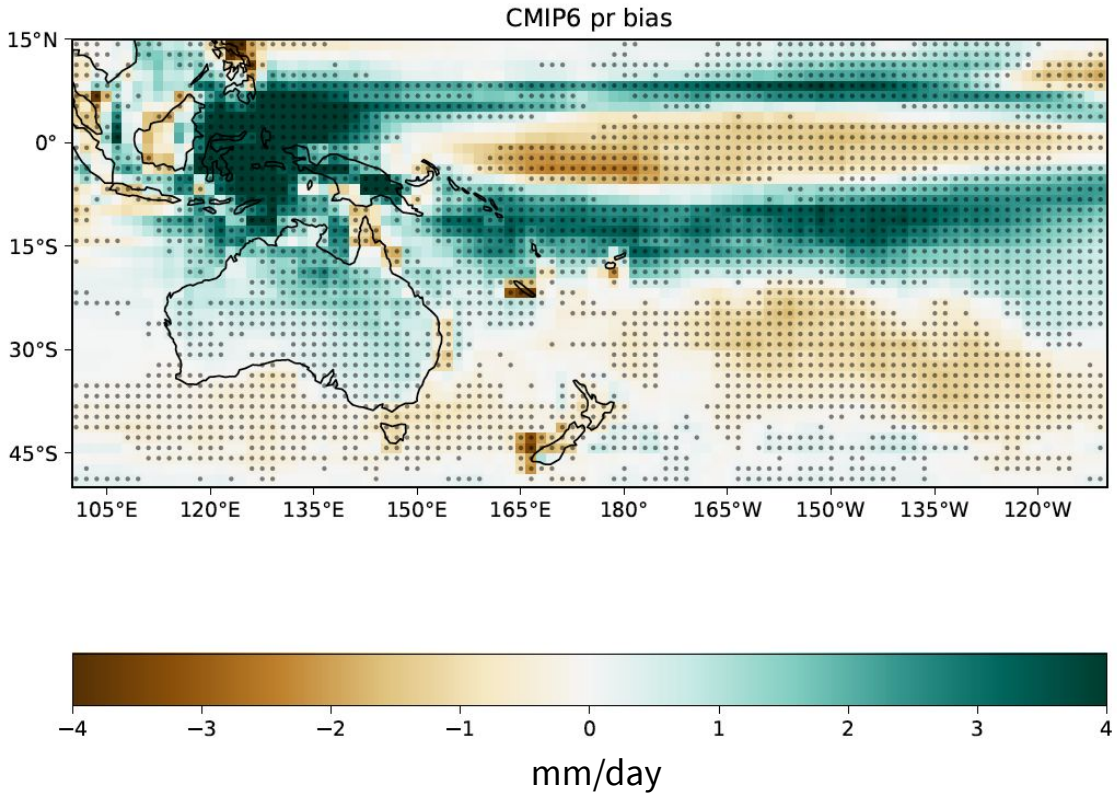


“Changes to rainfall are possible but unclear. ”

CLIMATE CHANGE IN AUSTRALIA

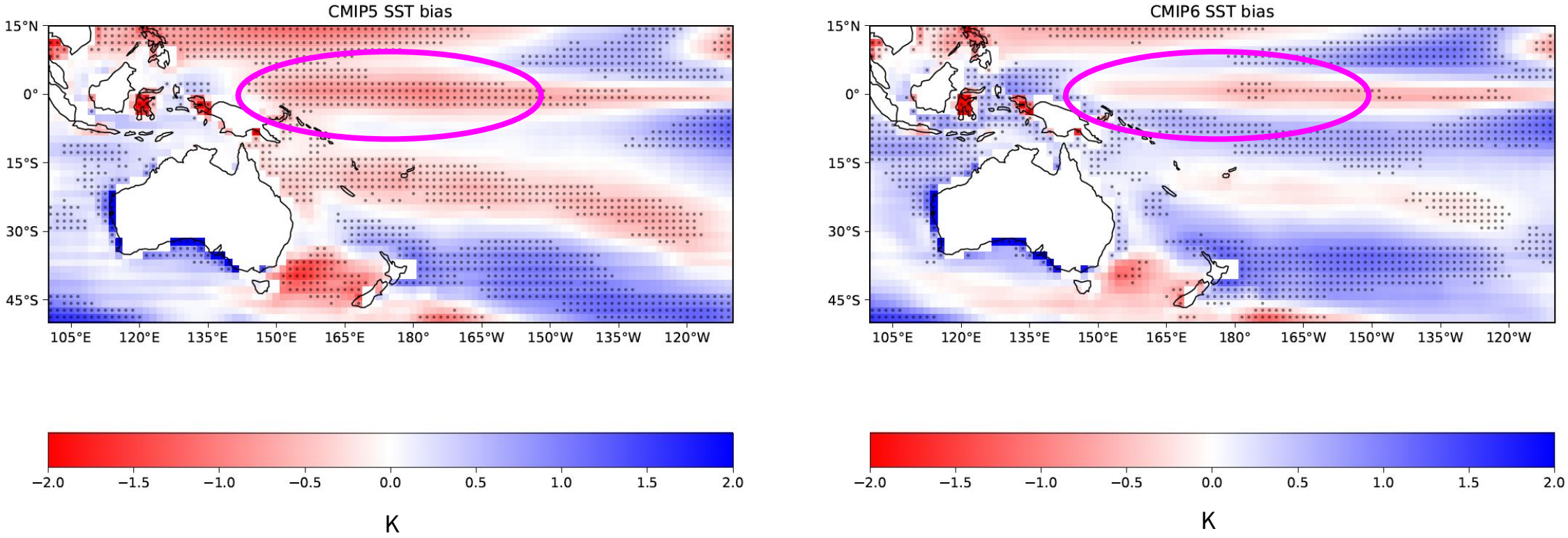
CMIP6 historical Pr bias





Maritime Continent and convergence zones precipitation biases remain.

CMIP6 historical SST bias



Western Pacific SST biases are greatly reduced (11 models…)!

Wet vs dry - decreasing uncertainty

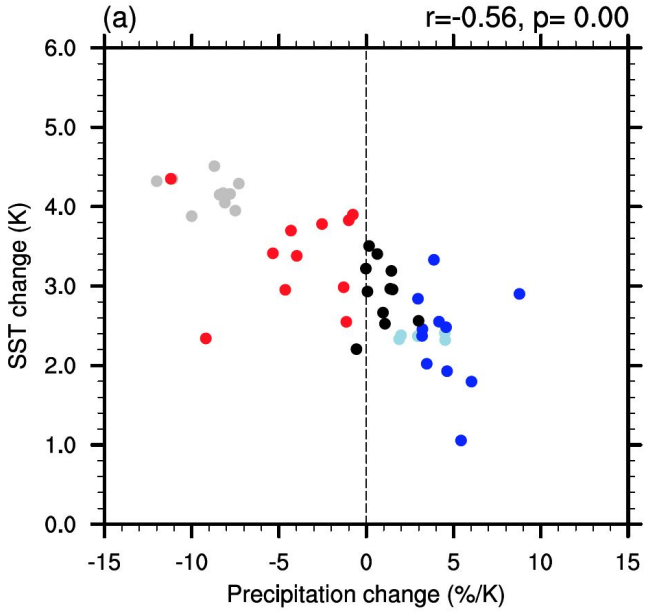
Will a Warmer World Mean a Wetter or Drier Australian Monsoon?

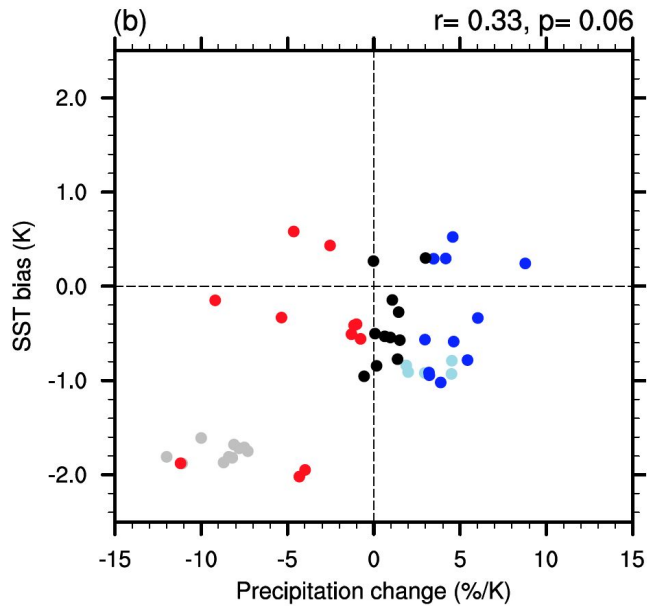
JOSEPHINE R. BROWN, AUREL F. MOISE, ROBERT COLMAN, AND HUQIANG ZHANG

Bureau of Meteorology, Melbourne, Victoria, Australia

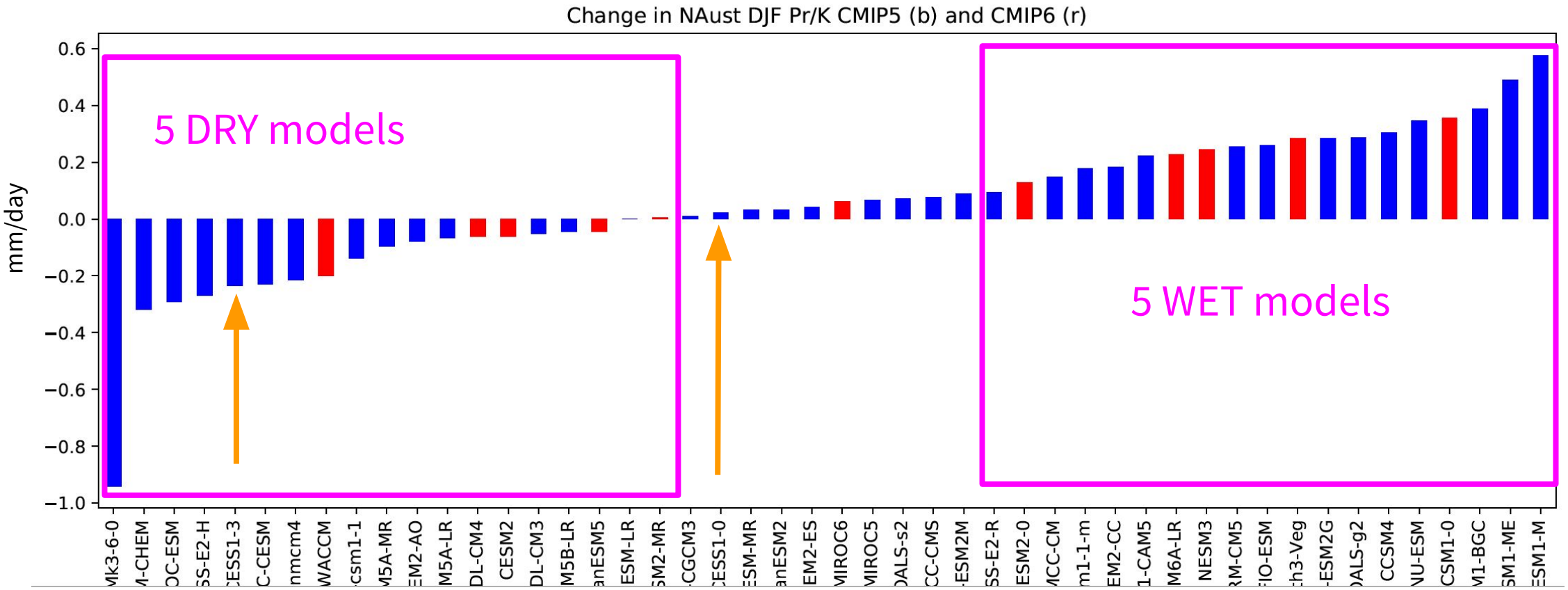
(Manuscript received 1 October 2015, in final form 7 March 2016)

- Models that dry seem to have larger bias/change in the western equatorial Pacific





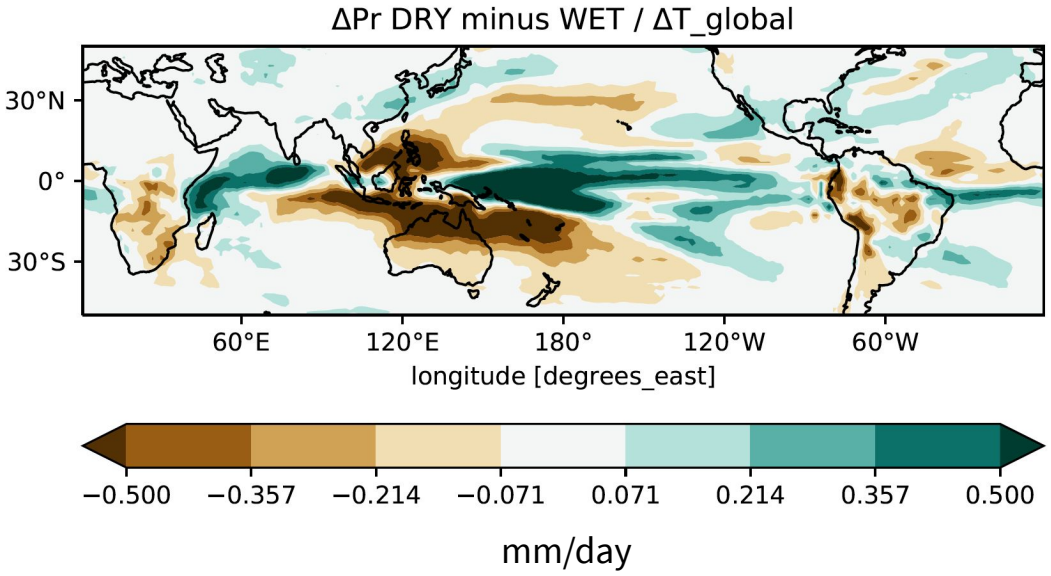
CMIP6 projections



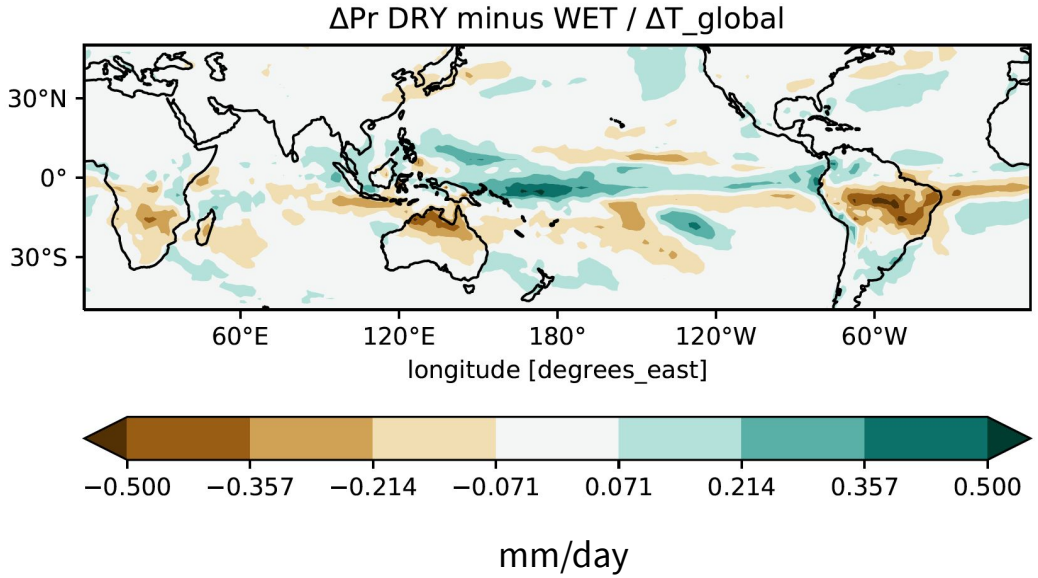
The projections will likely be uncertain yet again.

Precipitation changes

CMIP5



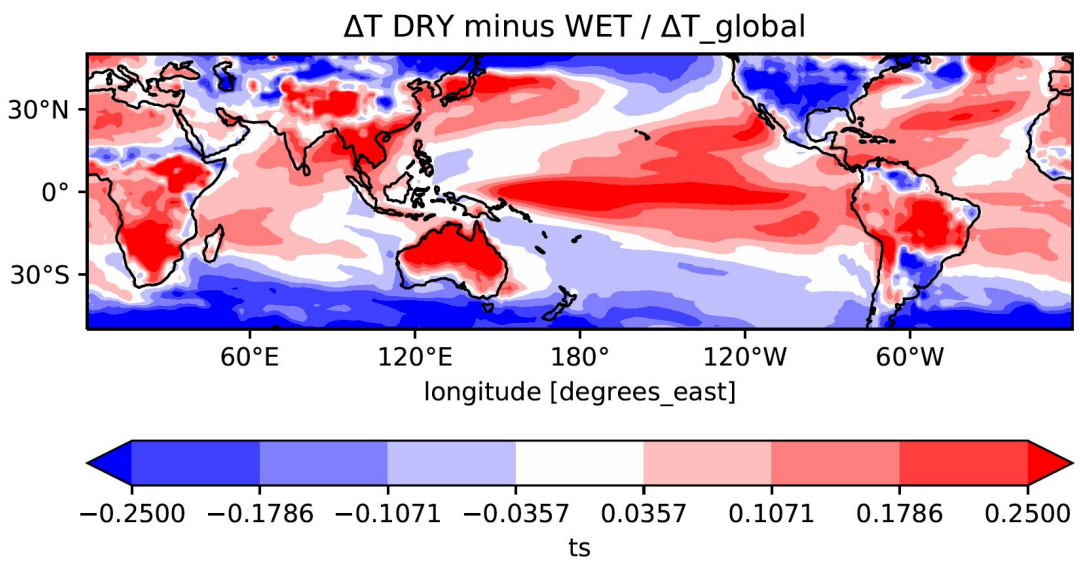
CMIP6



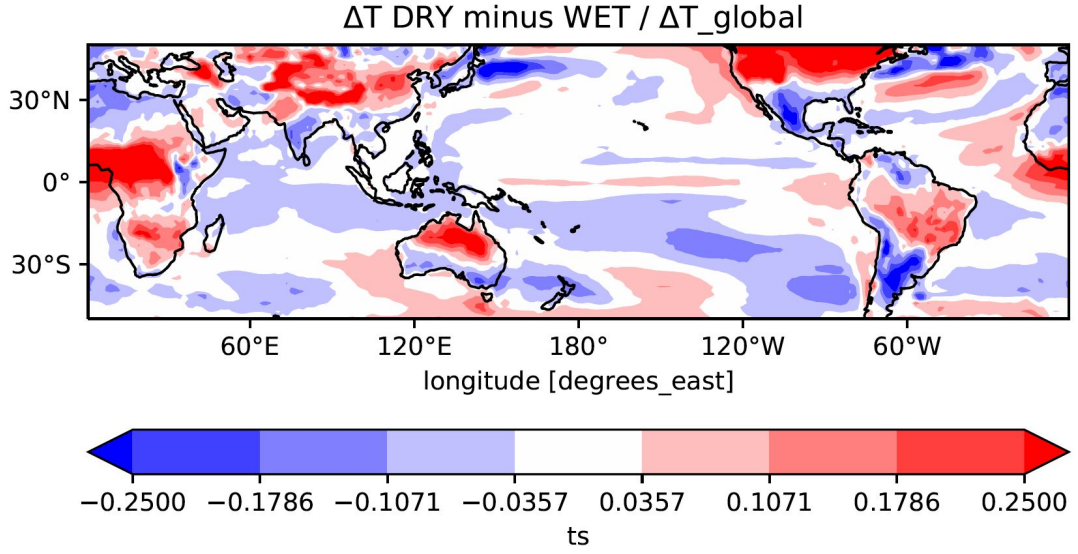
So far the difference between drying and wetting groups is much smaller for CMIP6.

SST changes

CMIP5



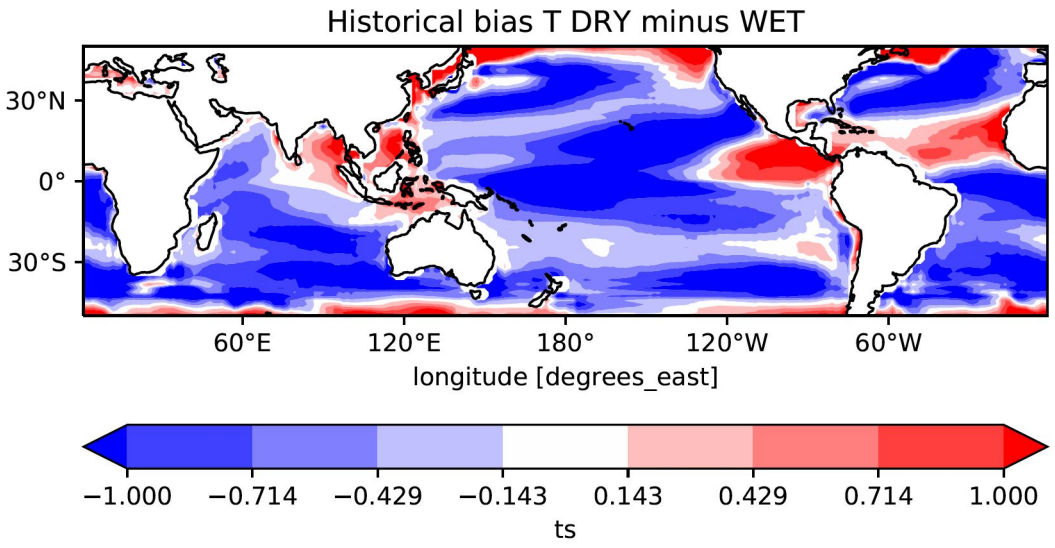
CMIP6



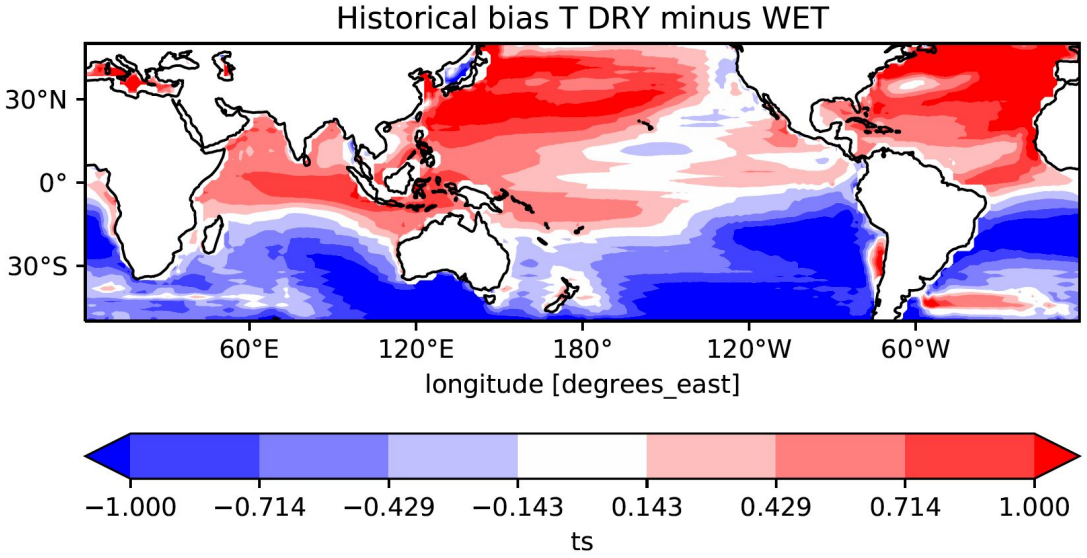
The difference in SST changes between the two groups is small.

SST biases

CMIP5



CMIP6



The difference in historical SST bias is striking! Interhemispheric gradient?

Conclusions

- Australian monsoon projections will likely remain uncertain
- Available CMIP6 models do not show the same relationship between Australian monsoon rainfall and biases, warming patterns seen in CMIP5
- With approximately 10 CMIP6 models available, it is too early to make any strong conclusions