Met Office
Hadley Centre

Large rainfall changes expected over tropical land in the coming century

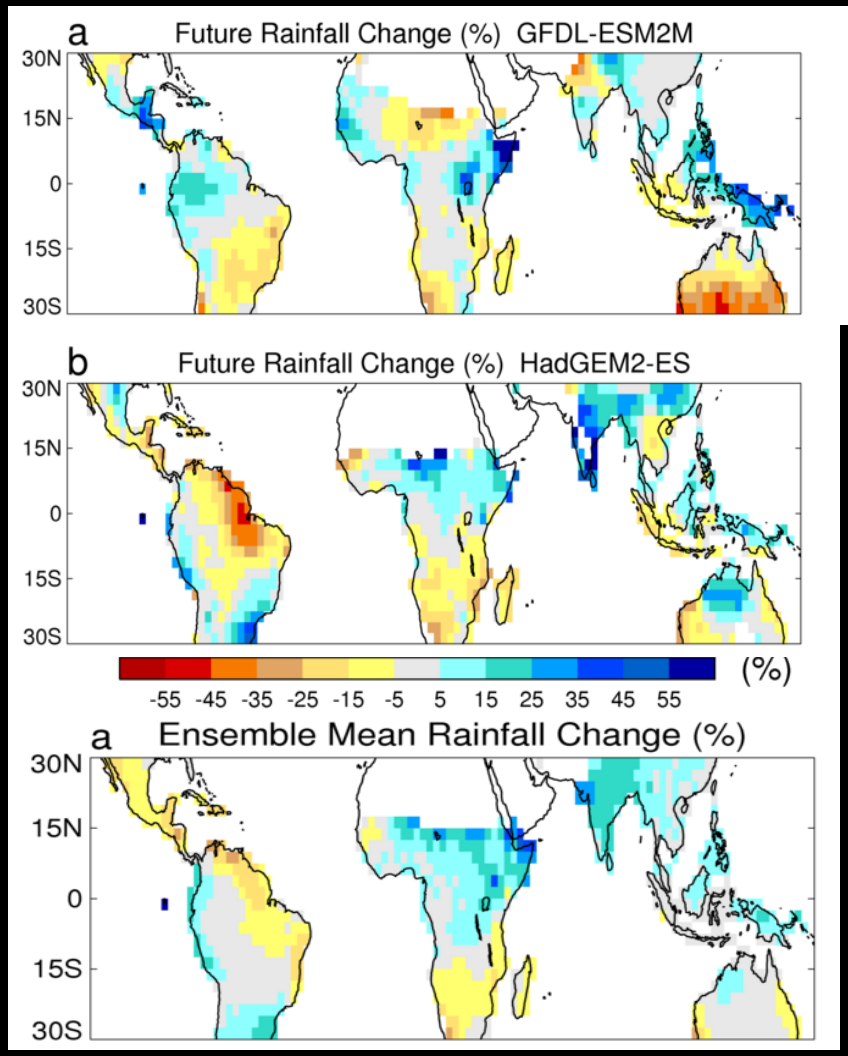
Rob Chadwick, Peter Good, Gill Martin, Dave Rowell

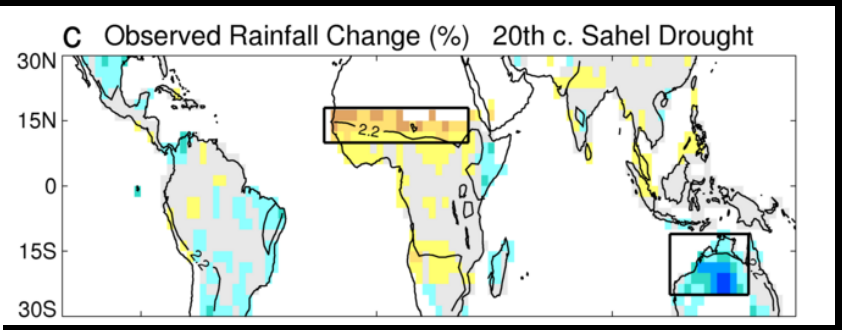
Uncertainty in current tropical rainfall projections

GFDL-ESM2M

HadGEM2-ES

CMIP5 ensemble mean

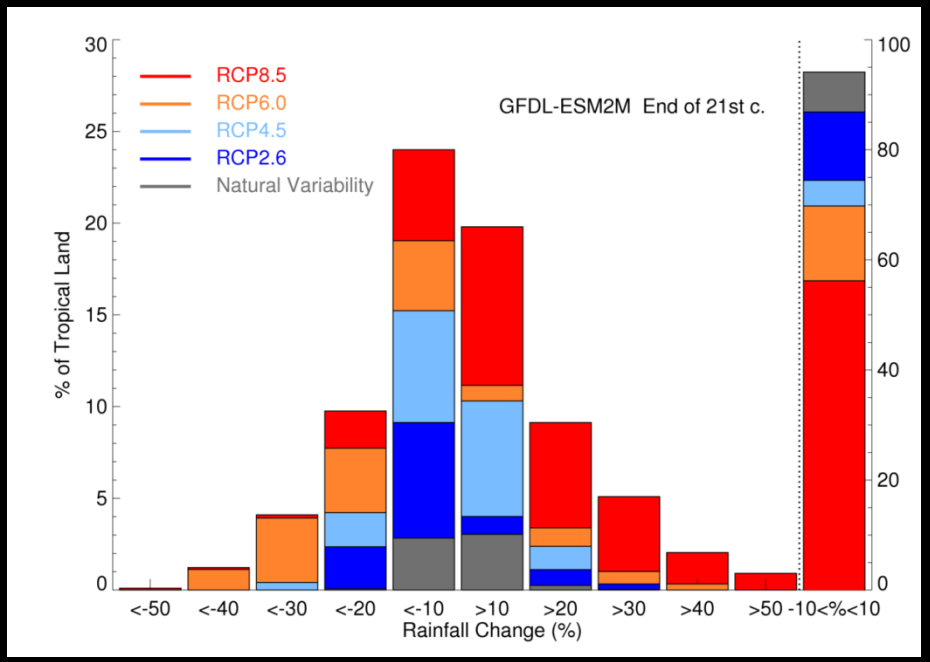




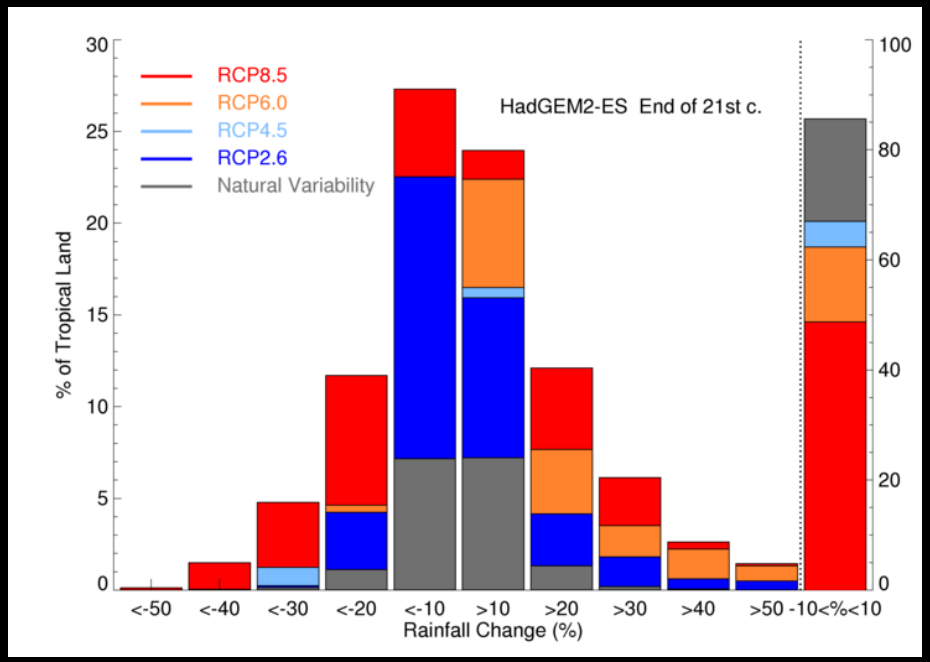
Observed Sahel drought

Histogram approach

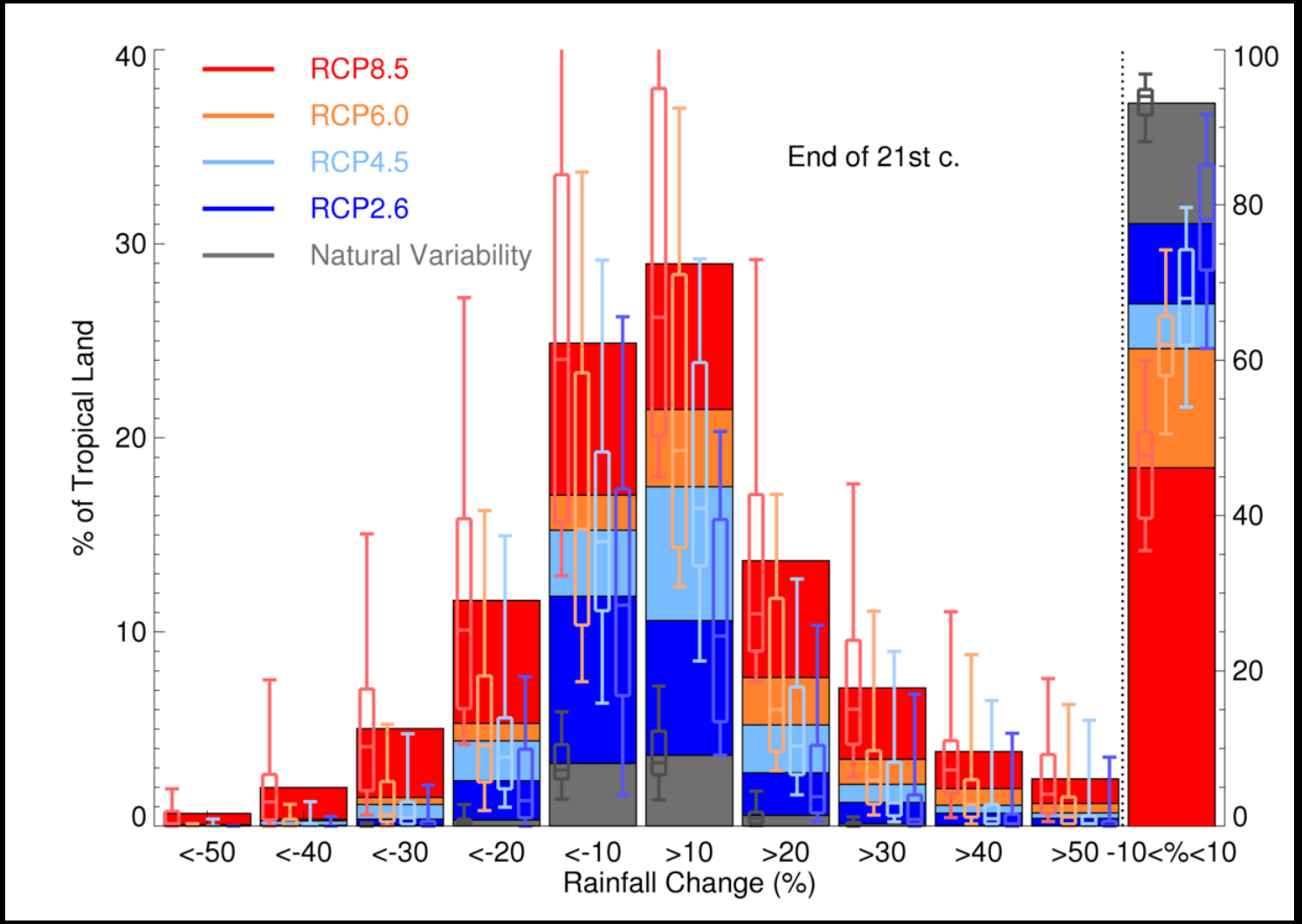
GFDL-ESM2M



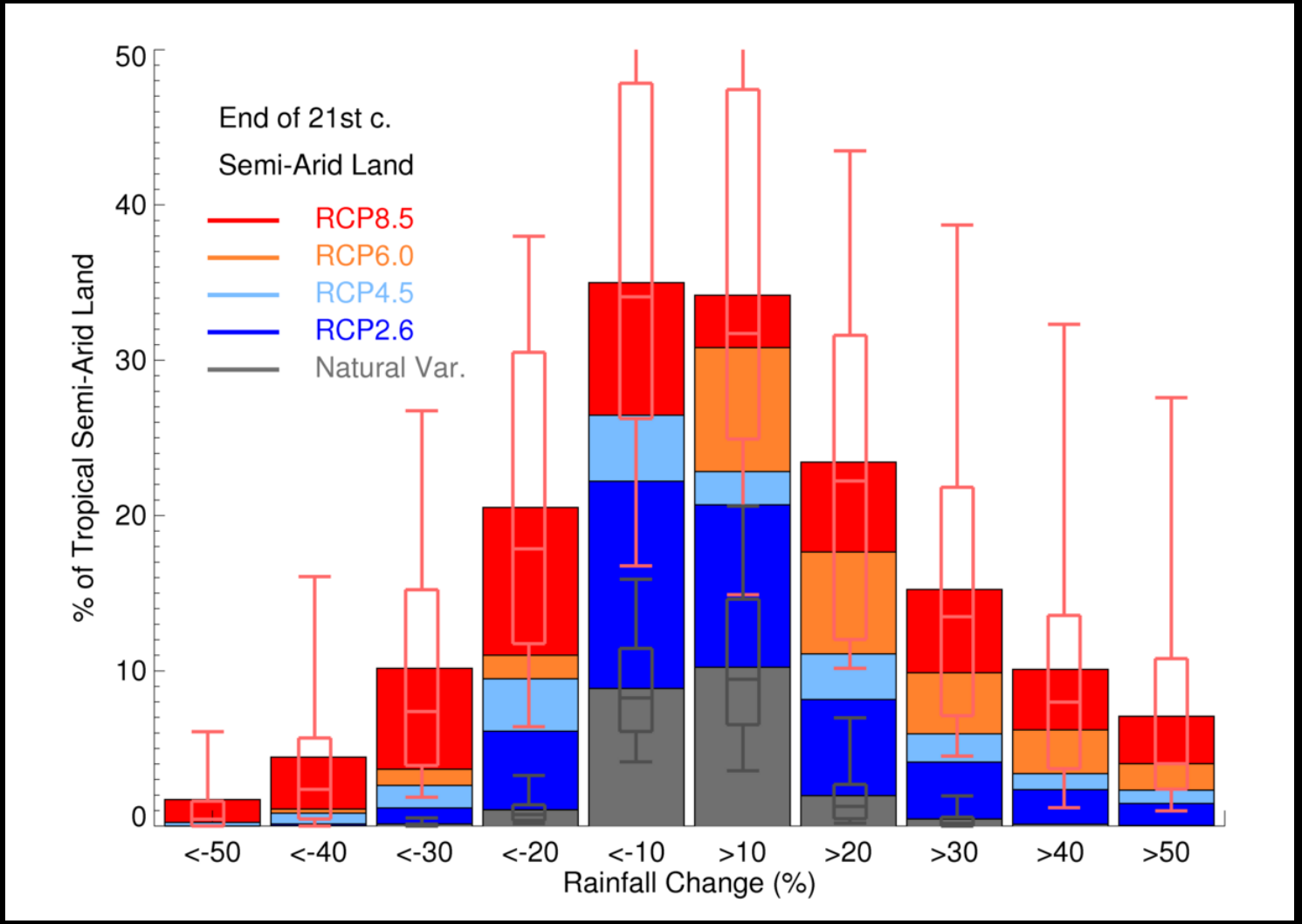
HadGEM2-ES



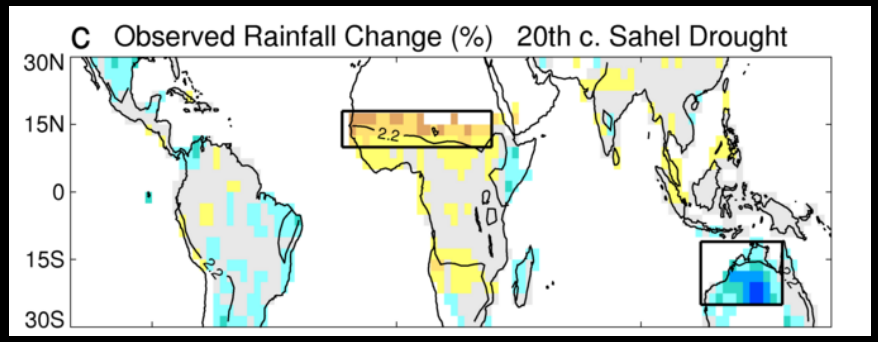
End-of-Century Projections

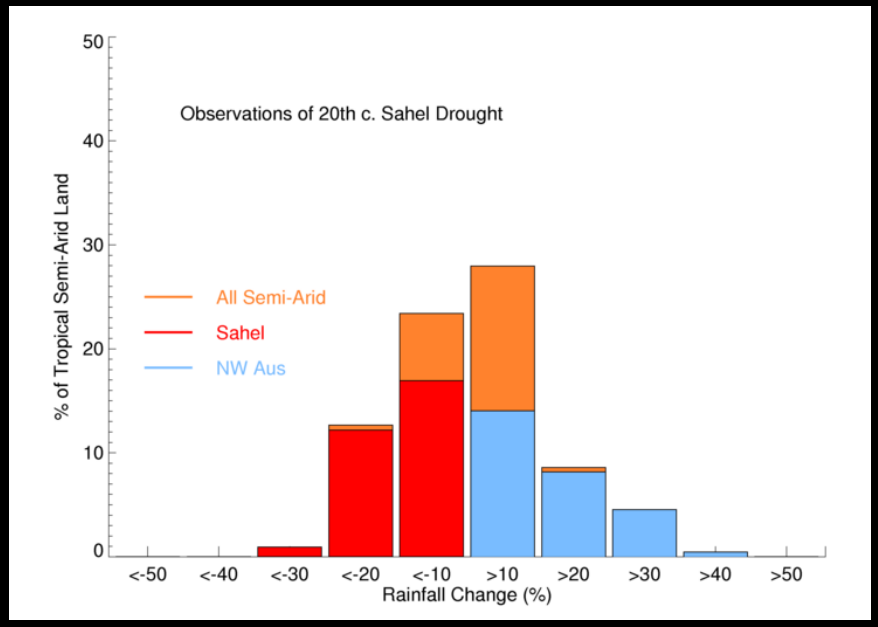


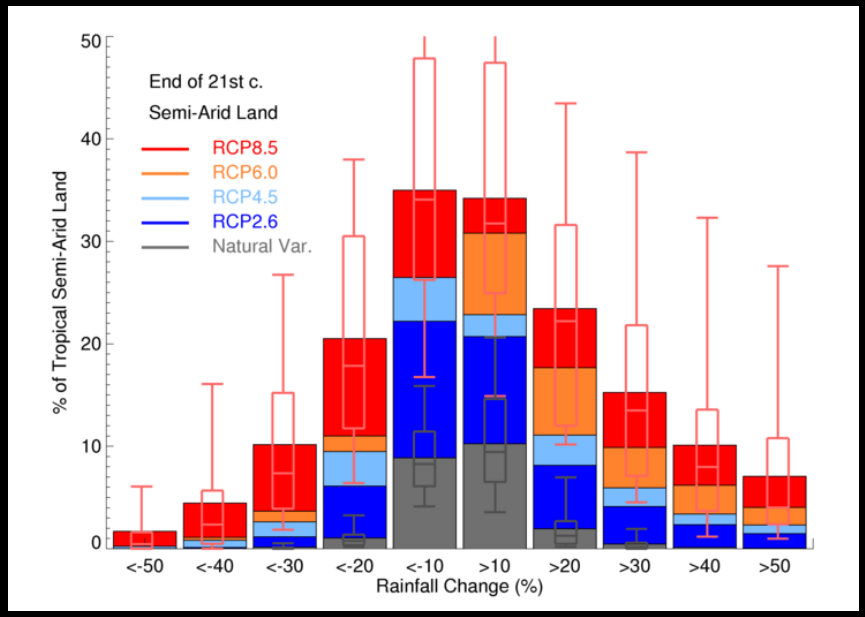
Semi-arid land



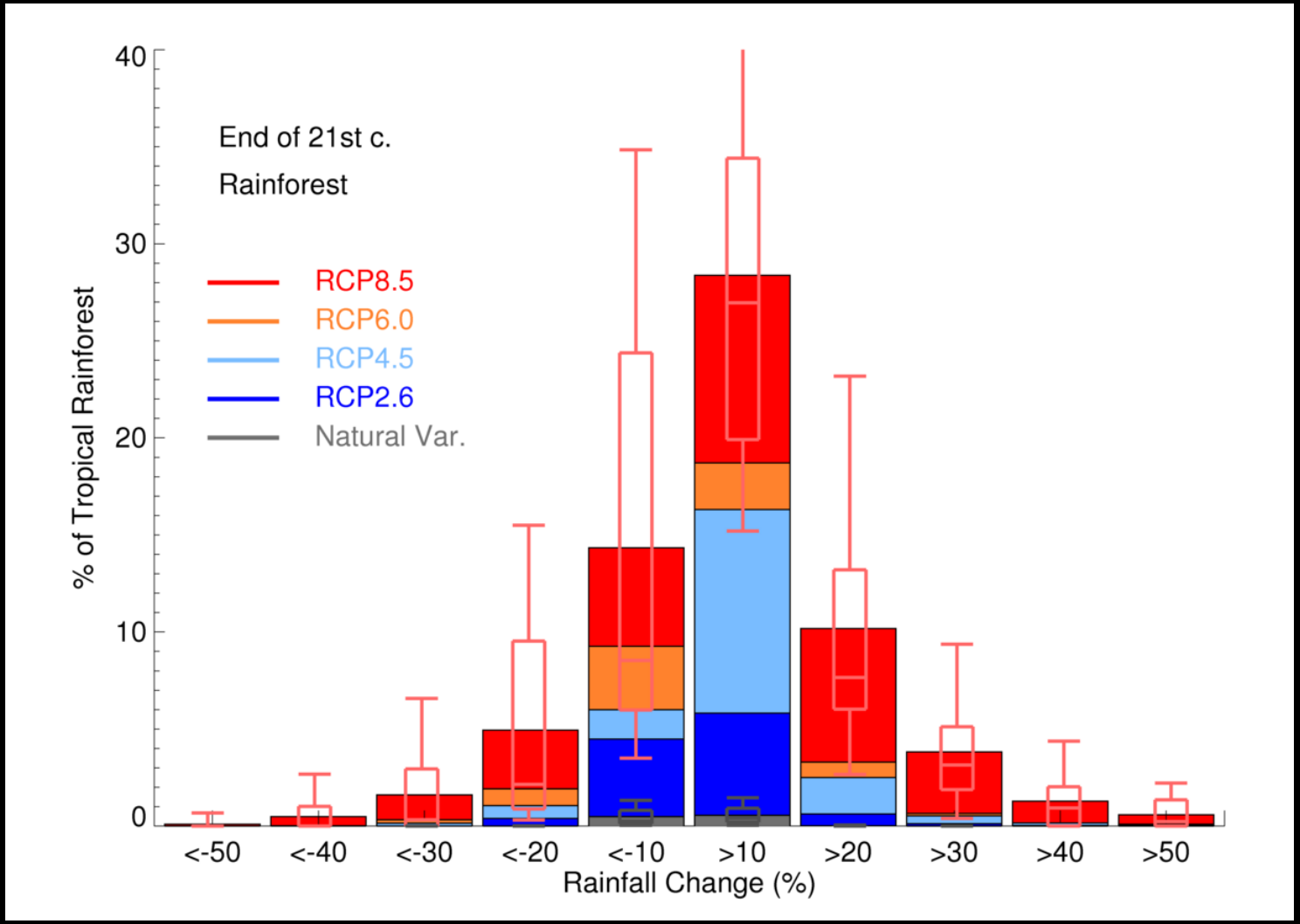
Sahel Drought



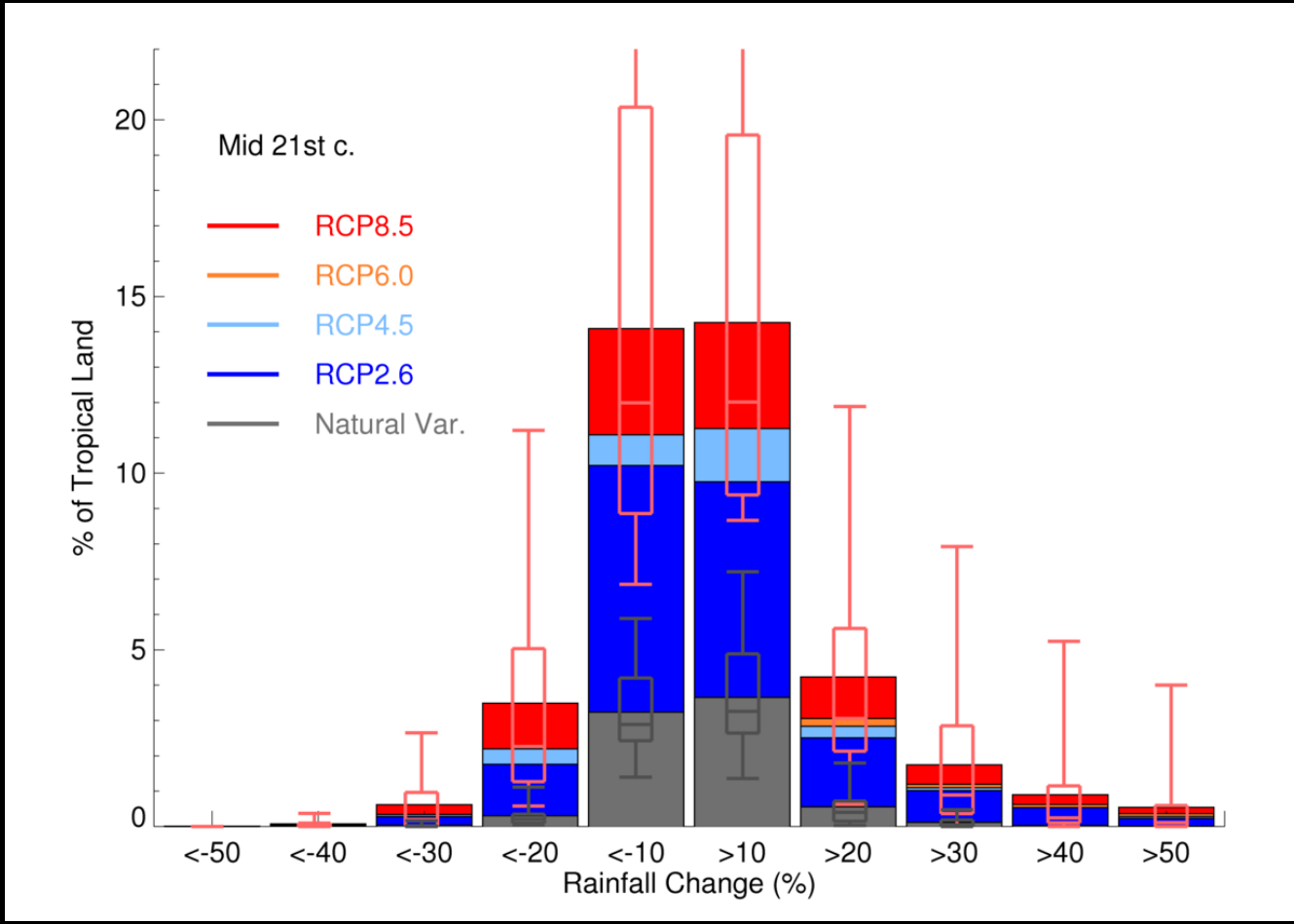




Rainforest



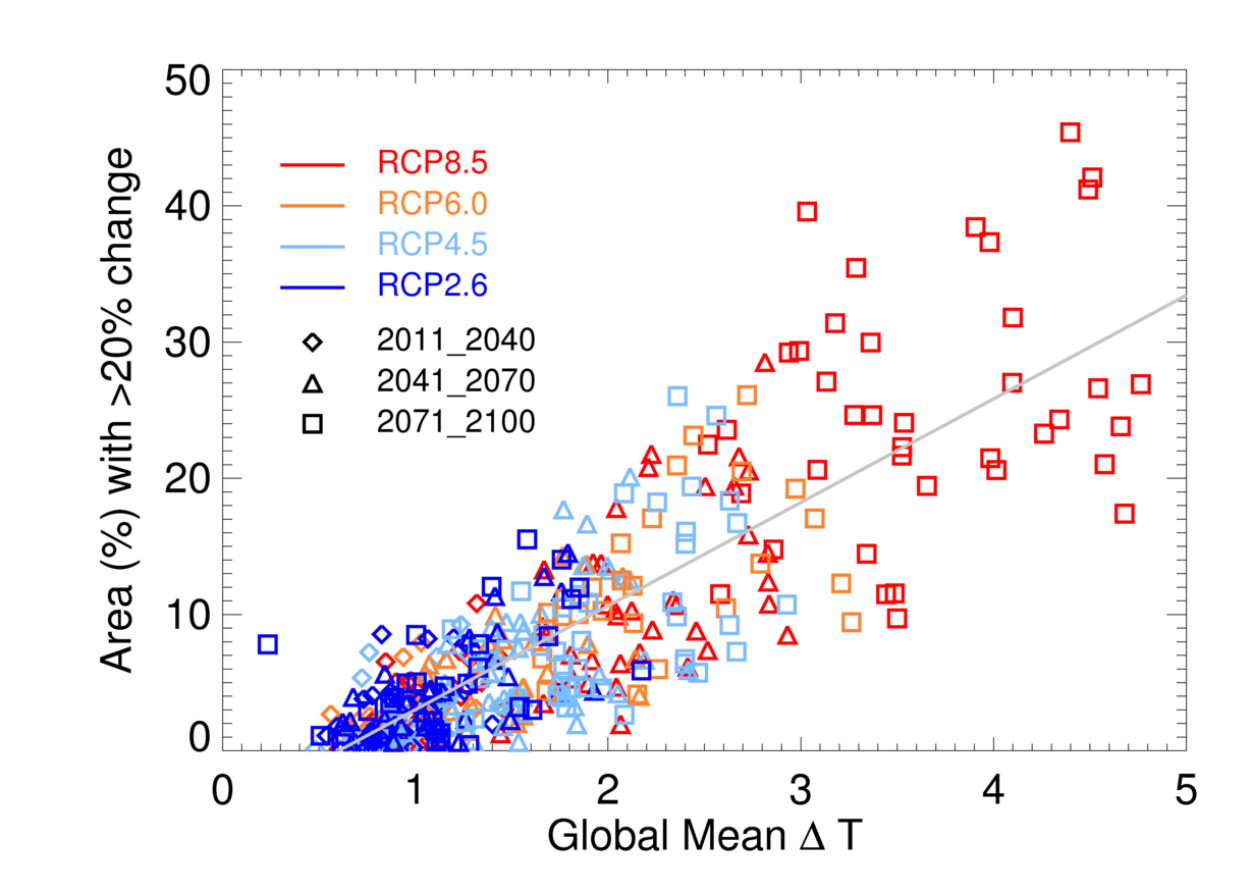
Mid-Century projections



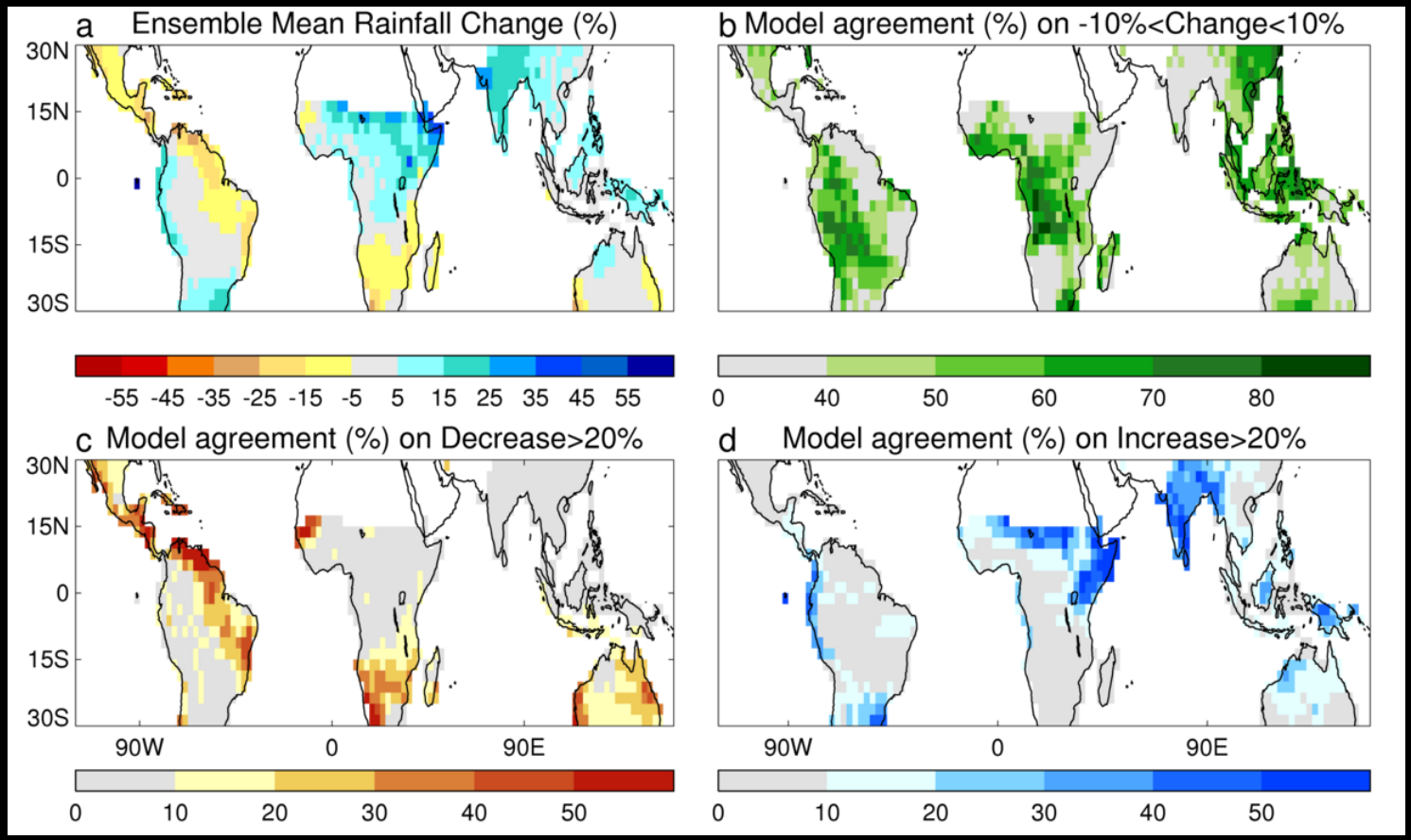
IPCC AR5

In the tropics, precipitation changes exhibit strong regional contrasts,[...]. However, decreases are not projected to be larger than natural 20-year variations anywhere until the end of this century under the RCP8.5 scenario.

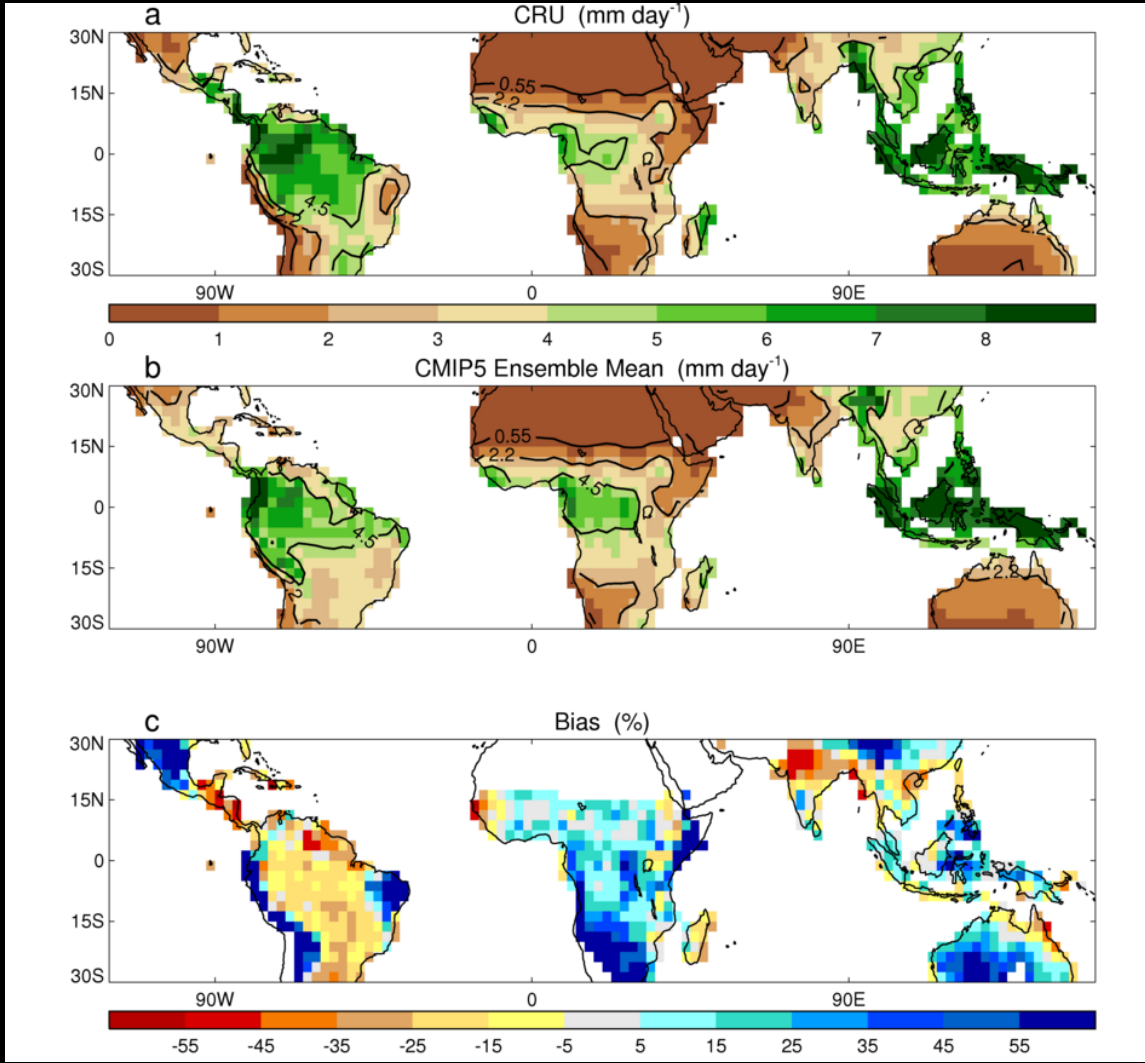
Connection with global mean temperature change



Regions at greatest risk of large changes



Credibility of projections?



Summary

- Despite uncertainty about the *location* of rainfall shifts, all CMIP5 models agree on the *occurrence* of large changes over a considerable proportion of tropical land.
- The area of semi-arid land affected by large changes under a high emissions scenario is likely to be greater than during the late 20th c. Sahel drought.
- Substantial changes are projected to emerge by mid-century – earlier than previously thought - and to intensify in line with global mean temperature rise.

Chadwick et al. 2015, Large rainfall changes expected over tropical land in the coming century, Submitted.