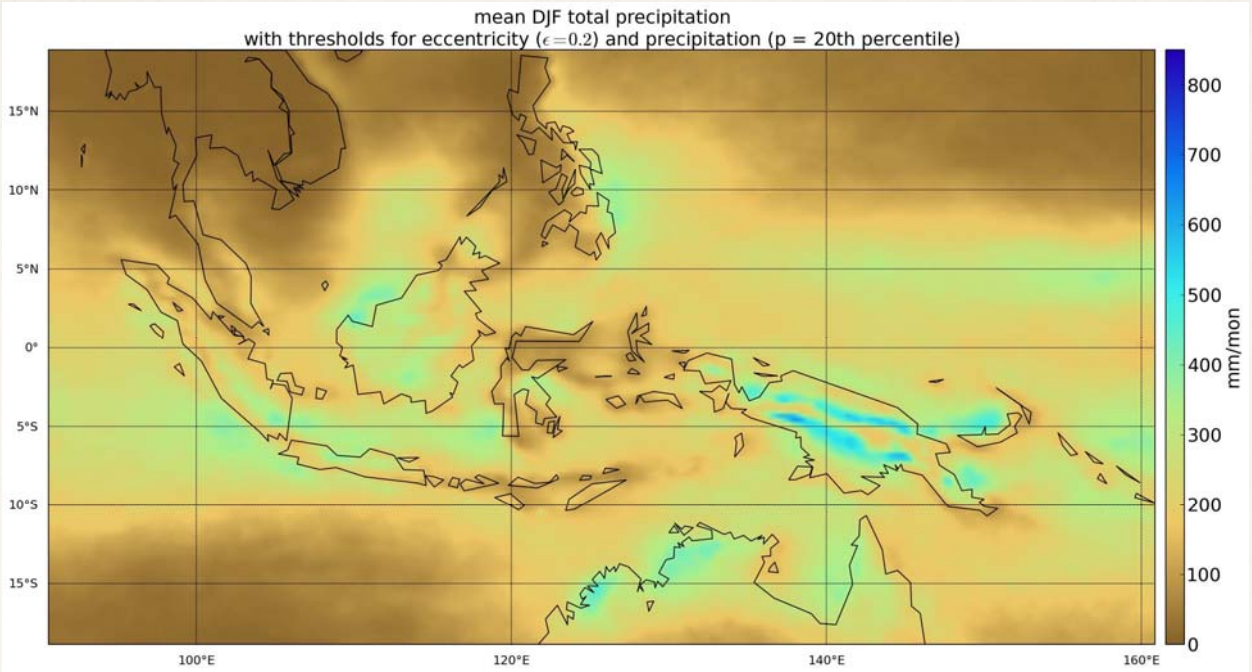


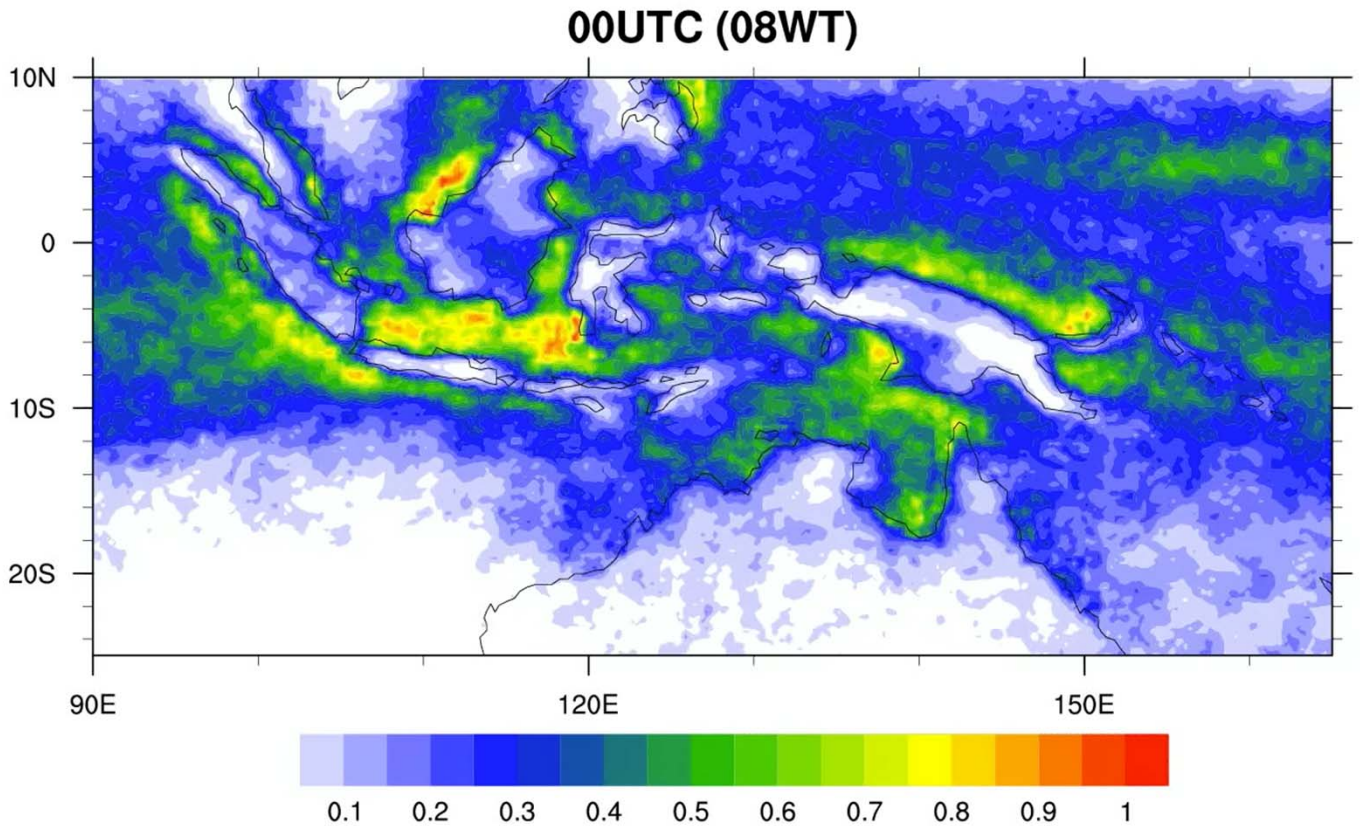
YMC modelling efforts – Why bother?

Christian Jakob, ARC Centre of Excellence for Climate System Science, Monash University, Melbourne, Australia

Based on the work of G Berry, M Bergemann, Juliane Schwendicke, Duncan Ackerley, Suaydhi Suaydhi

The MC provides a fascinating set of convective features

Mean diurnal cycle – December – TRMM

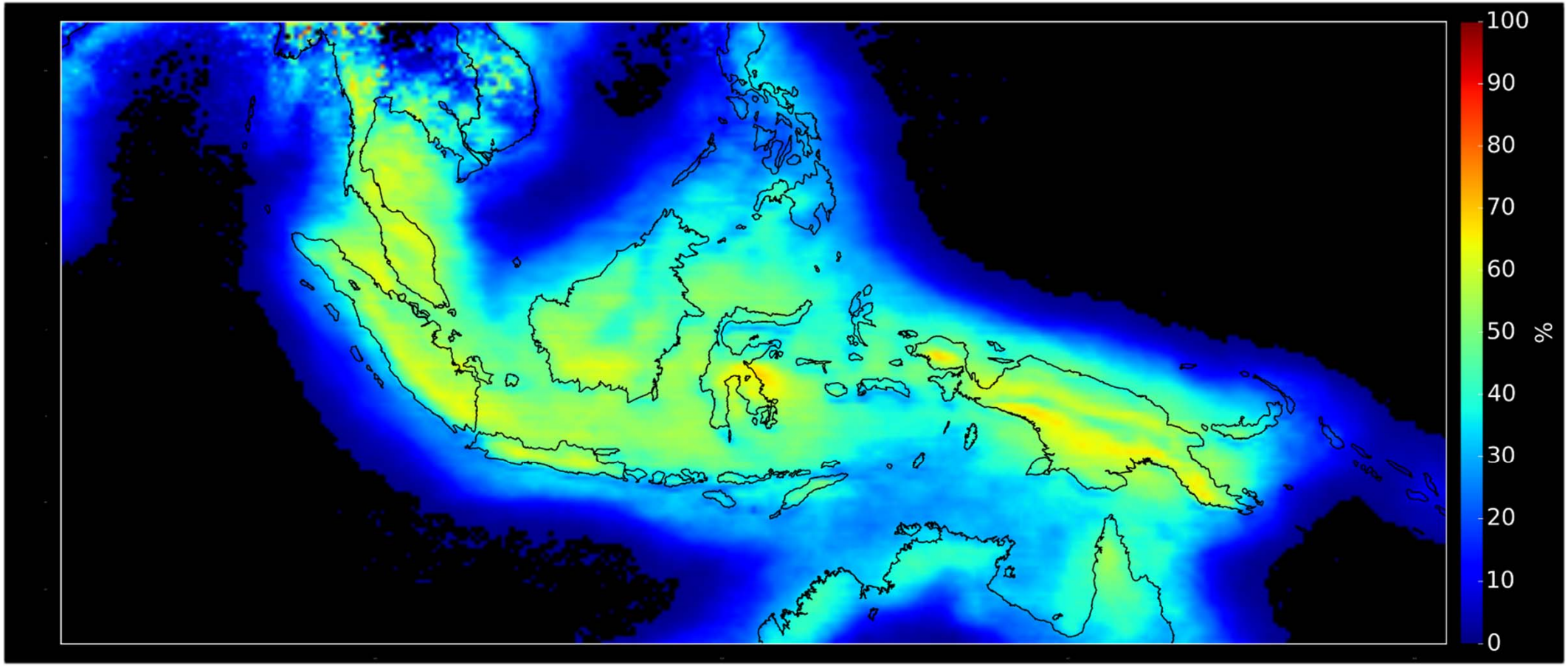


Thanks to G. Berry

ARC CENTRE OF EXCELLENCE FOR CLIMATE SYSTEM SCIENCE

MONASH University Science

A large fraction of the rainfall is associated with coastal features:

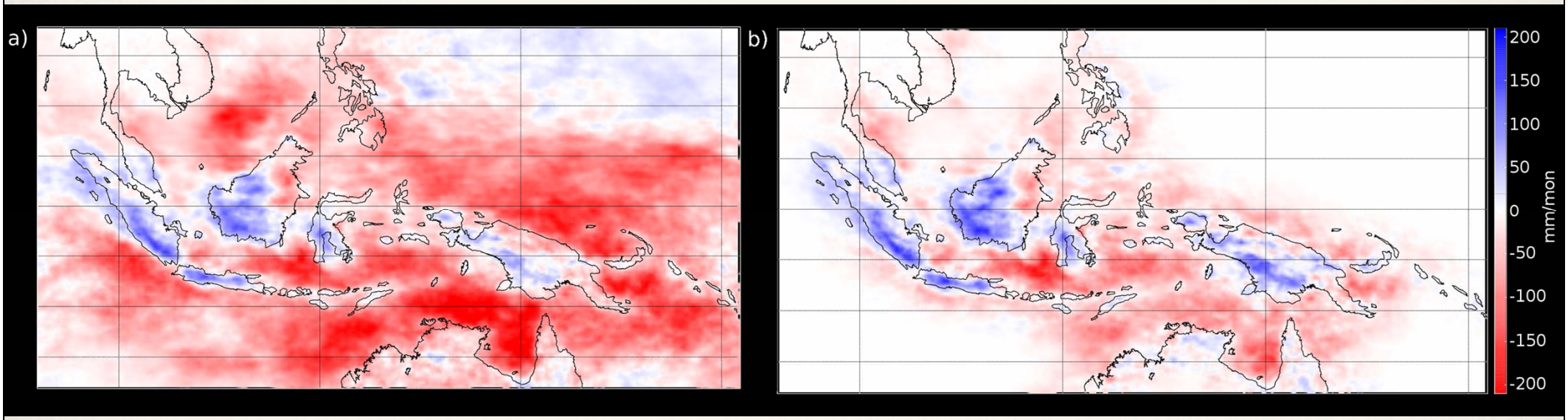


Annual percentage of rainfall from coastal features

Thanks to Martin Bergemann

The Maritime Continent does interesting things to the MJO (and other waves)

Rainfall difference – Suppressed – Active MJO Phase

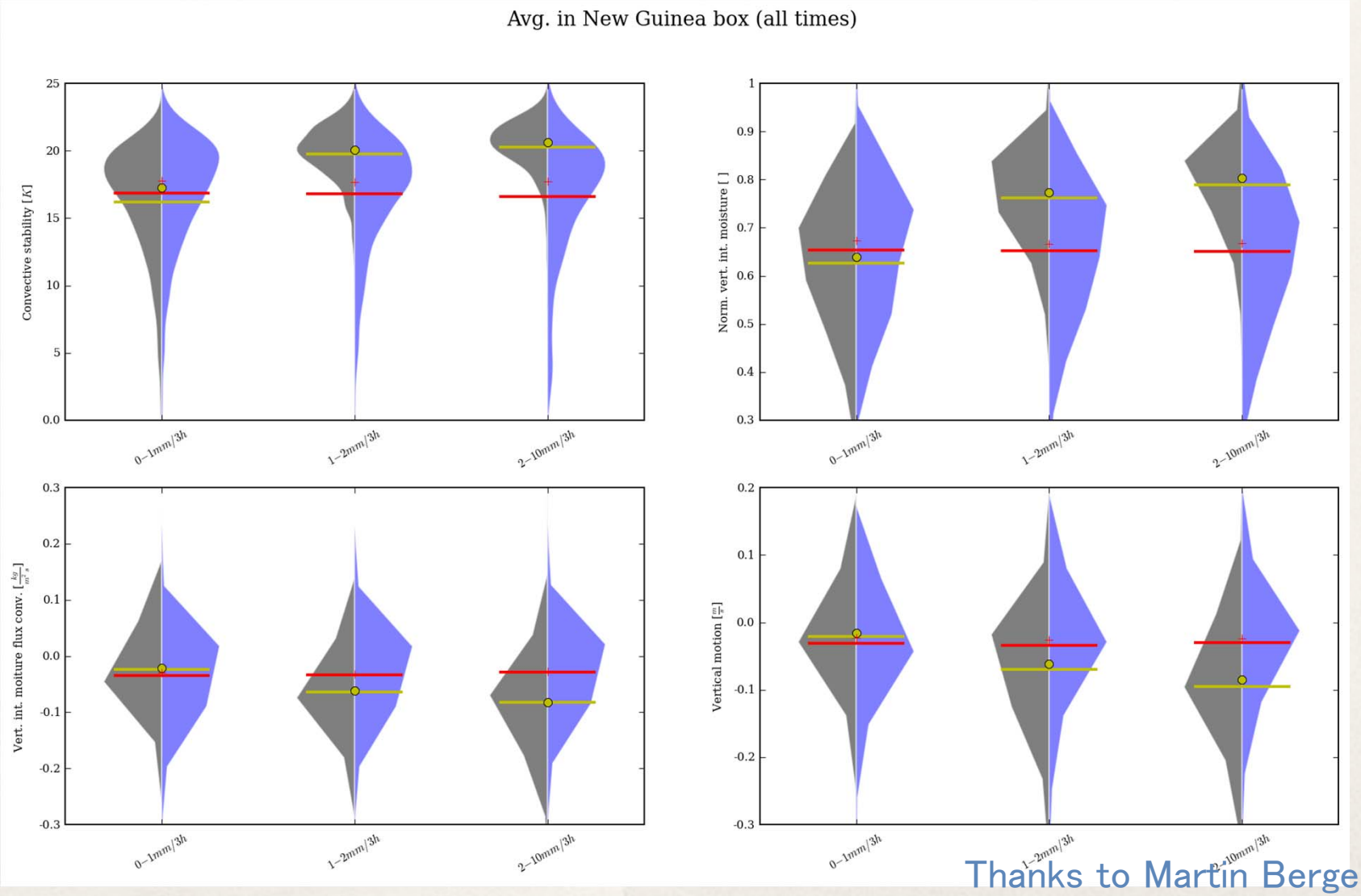


All rain

Coastal rain

Thanks to Martin Bergemann

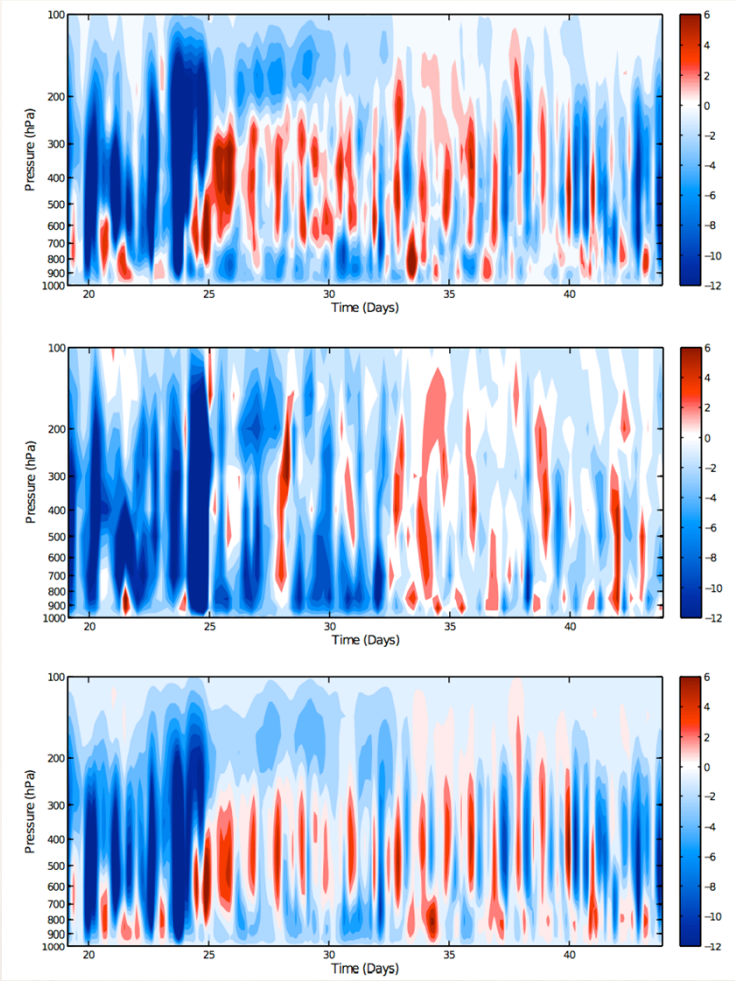
Rainfall over land occurs at distinctly different large-scale conditions



Thanks to Martin Bergemann

Consequently we must know the large-scale state well

TWP-ICE $\omega(p)$



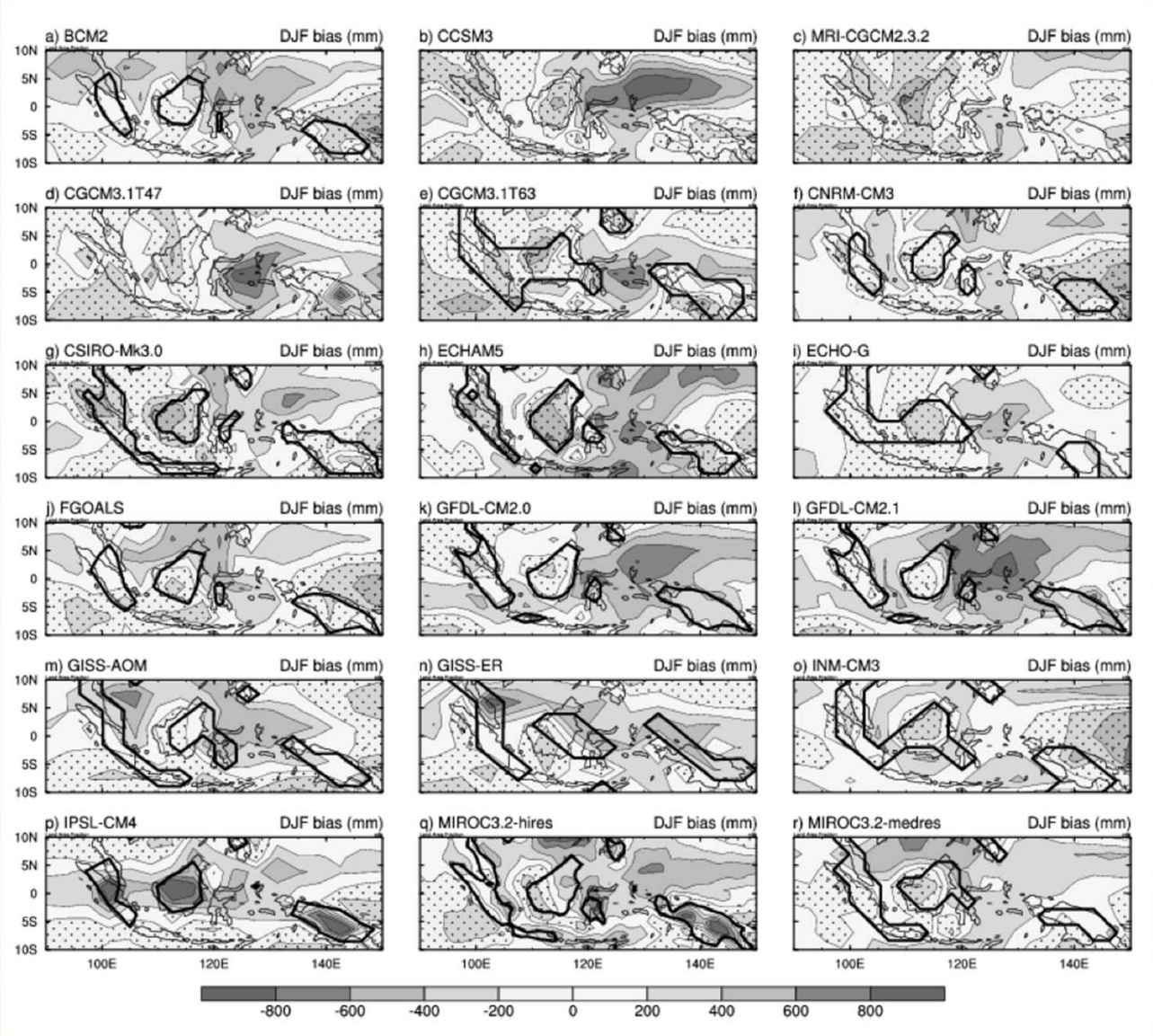
Analysis Obs

Analysis ECMWF

Analysis Hybrid

Large Scales

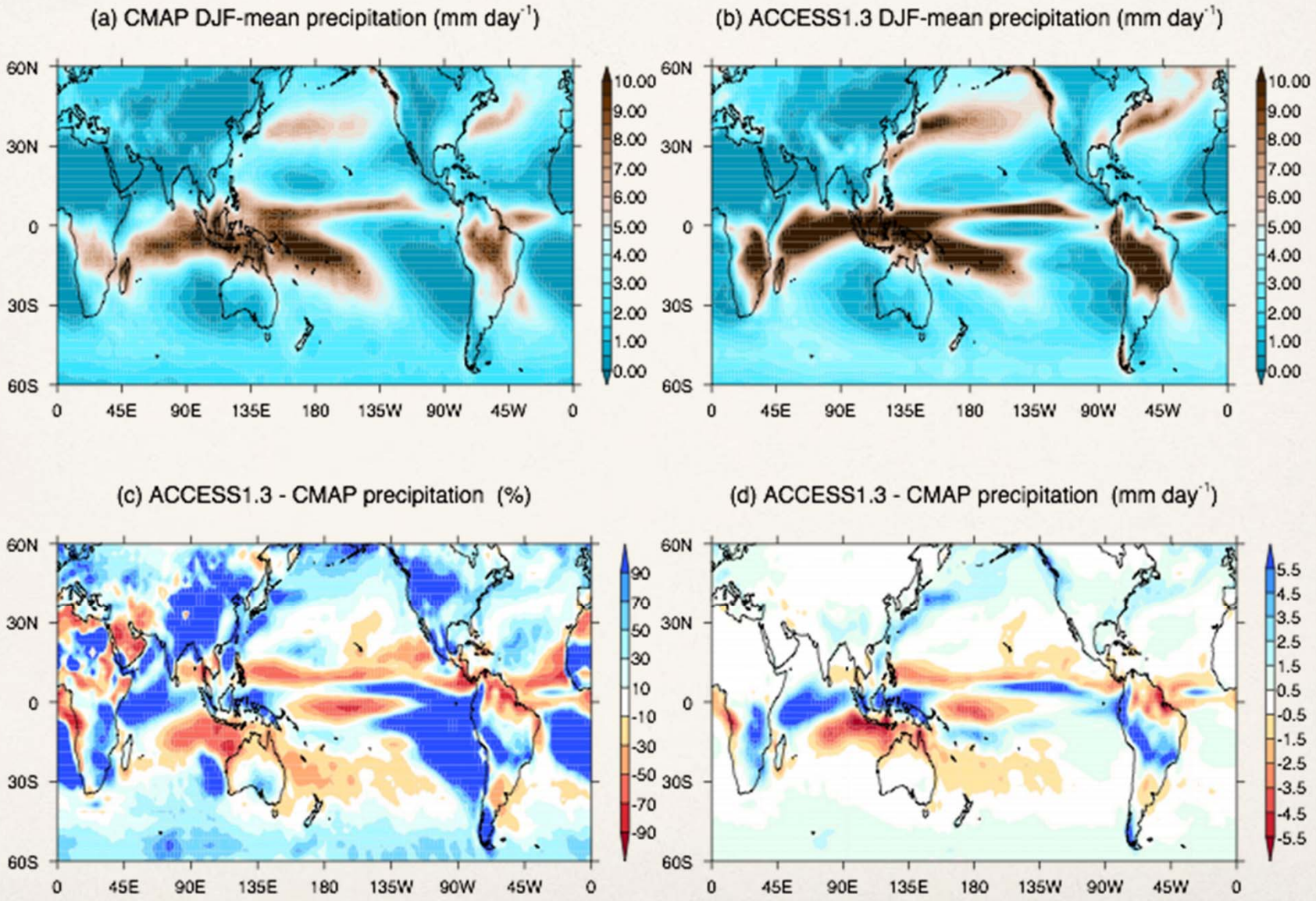
Models have all sorts of trouble around the Maritime Continent



DJF Rainfall biases – CMIP3 models

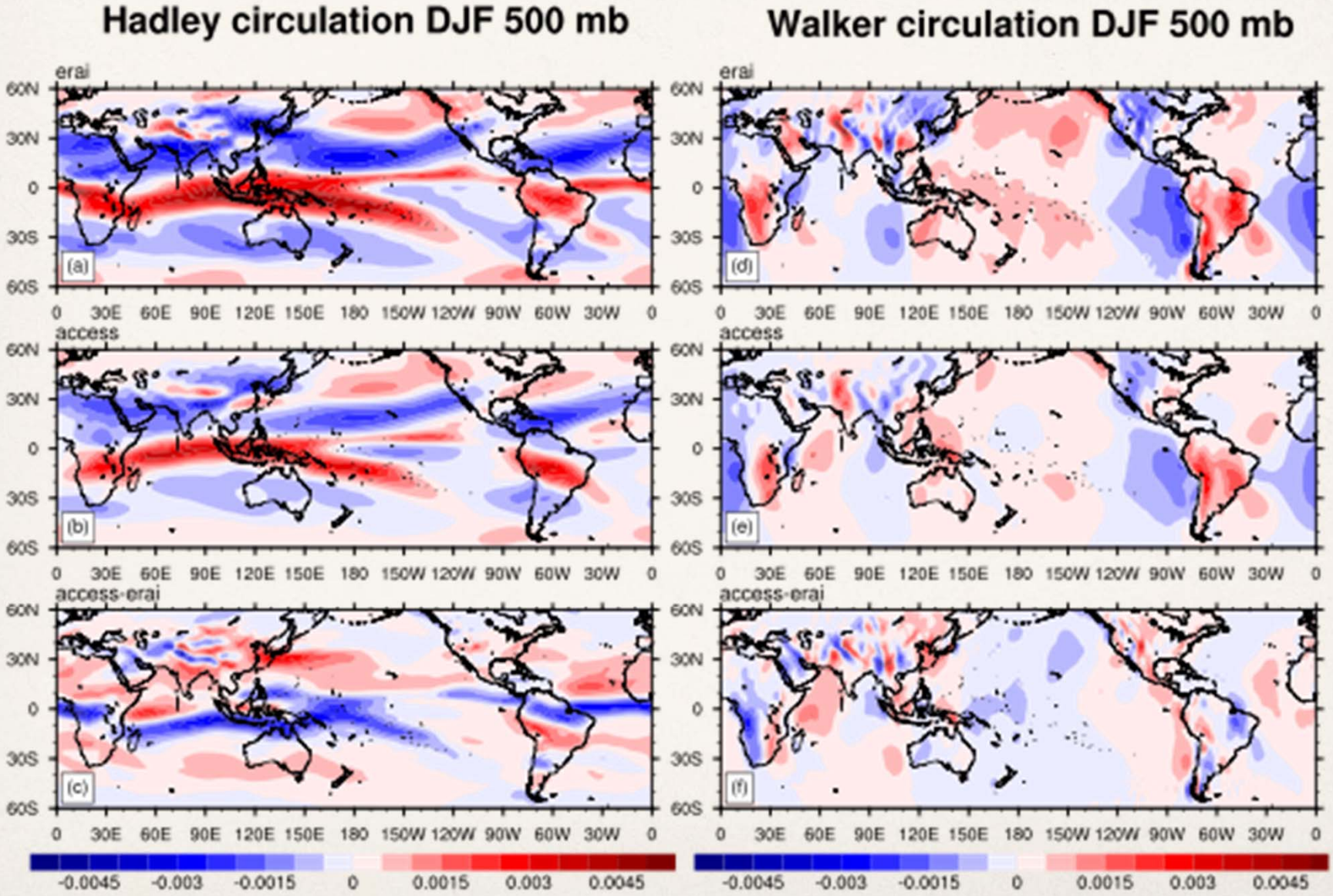
Thanks to Suaydhi

ACCESS has large rainfall biases around the Maritime Continent



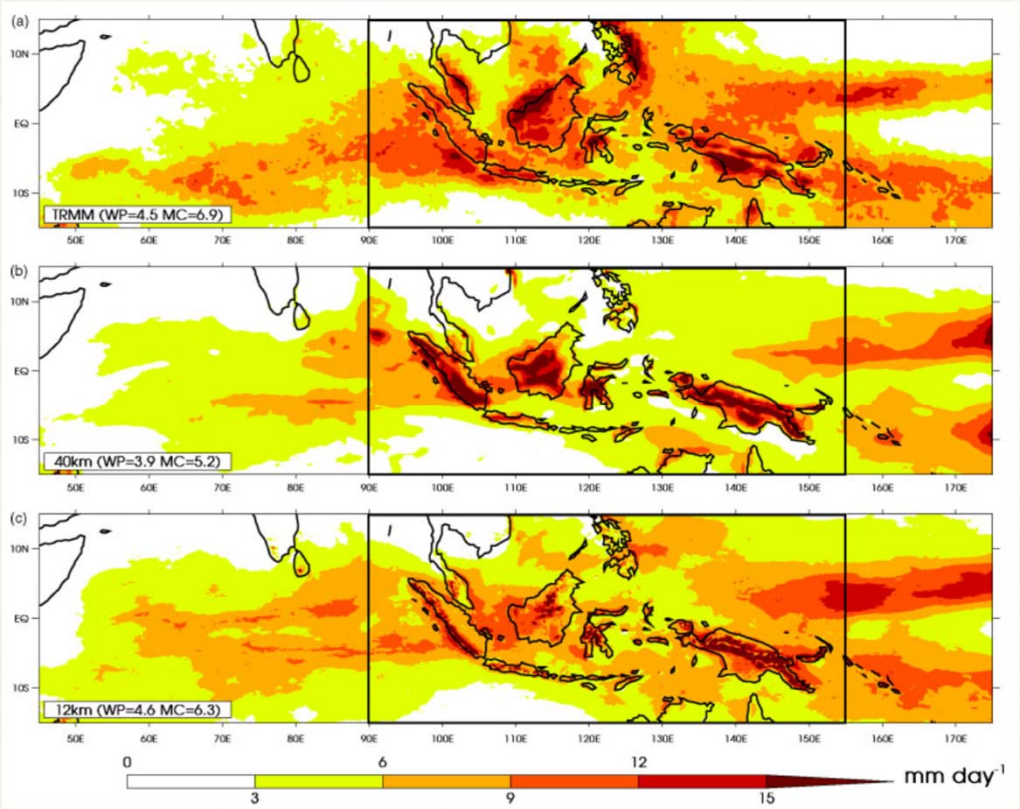
Thanks to Duncan Ackerley

There is a dynamical link between the biases over the MC and other regions

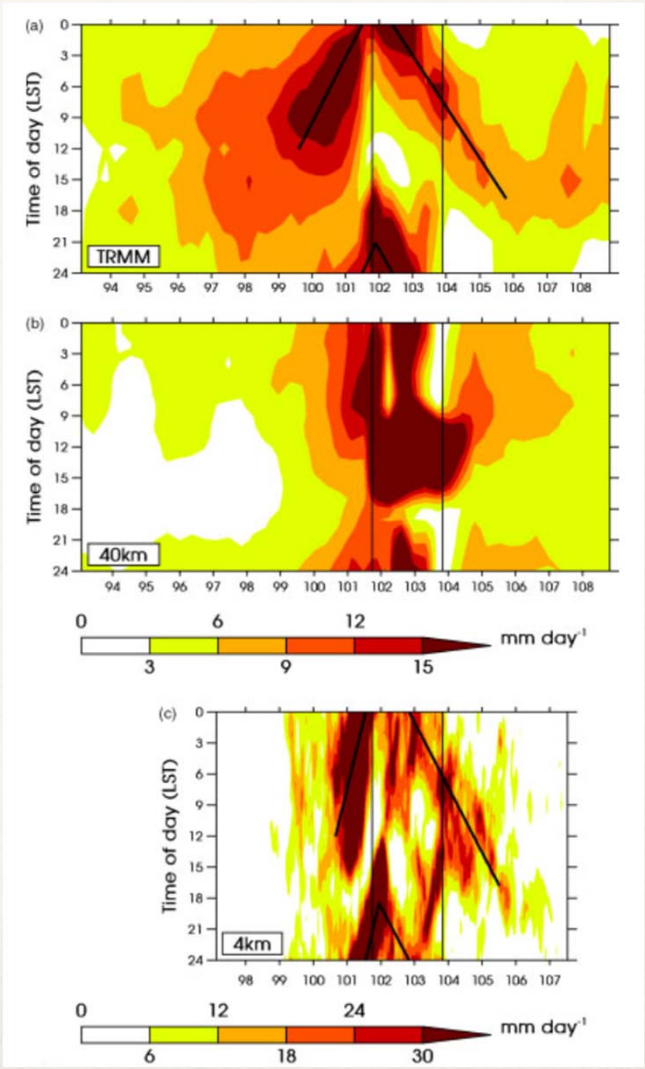


Thanks to Juliane Schwendike

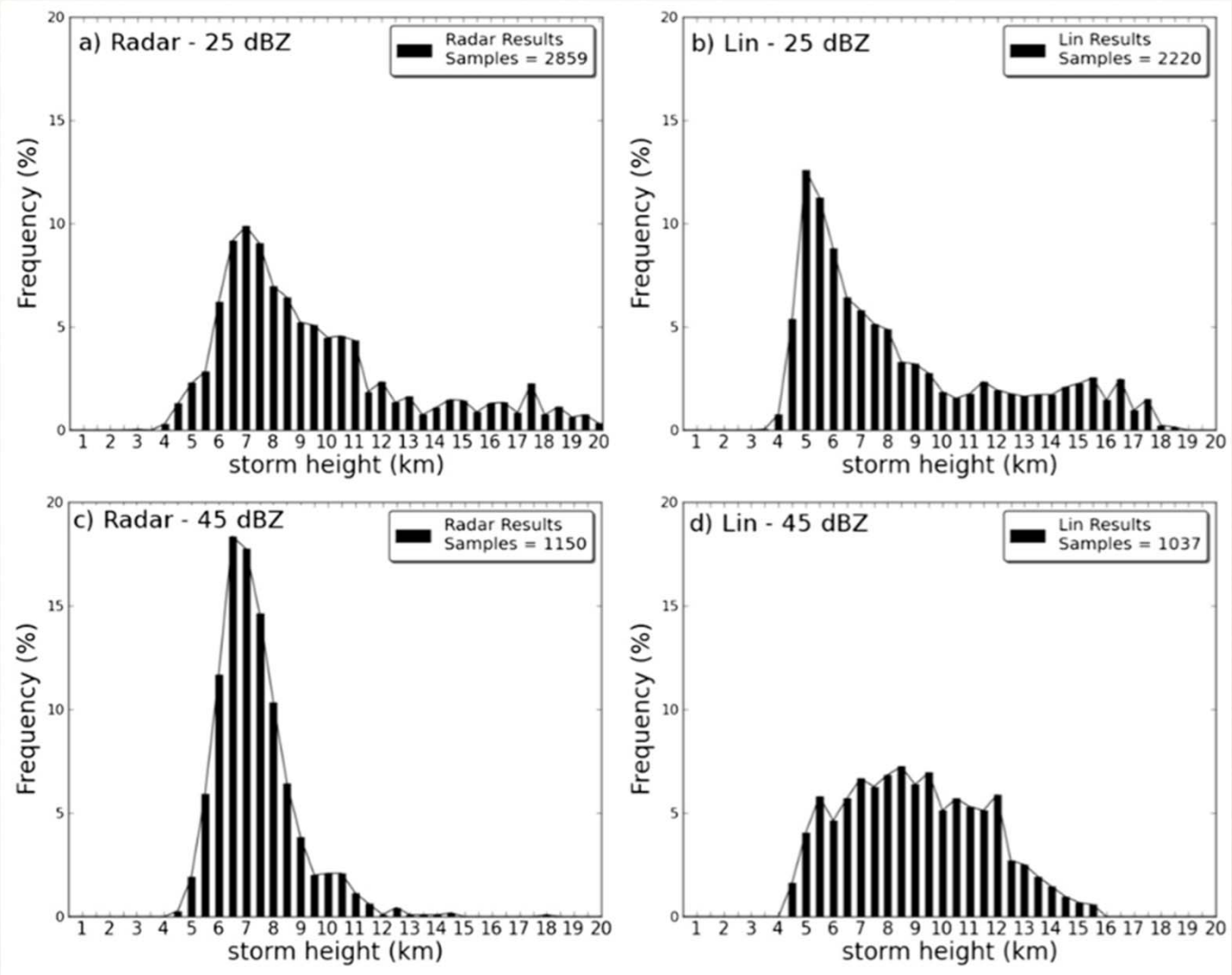
High-resolution models capture some of the rainfall behaviour



Love et al, 2011, QJ

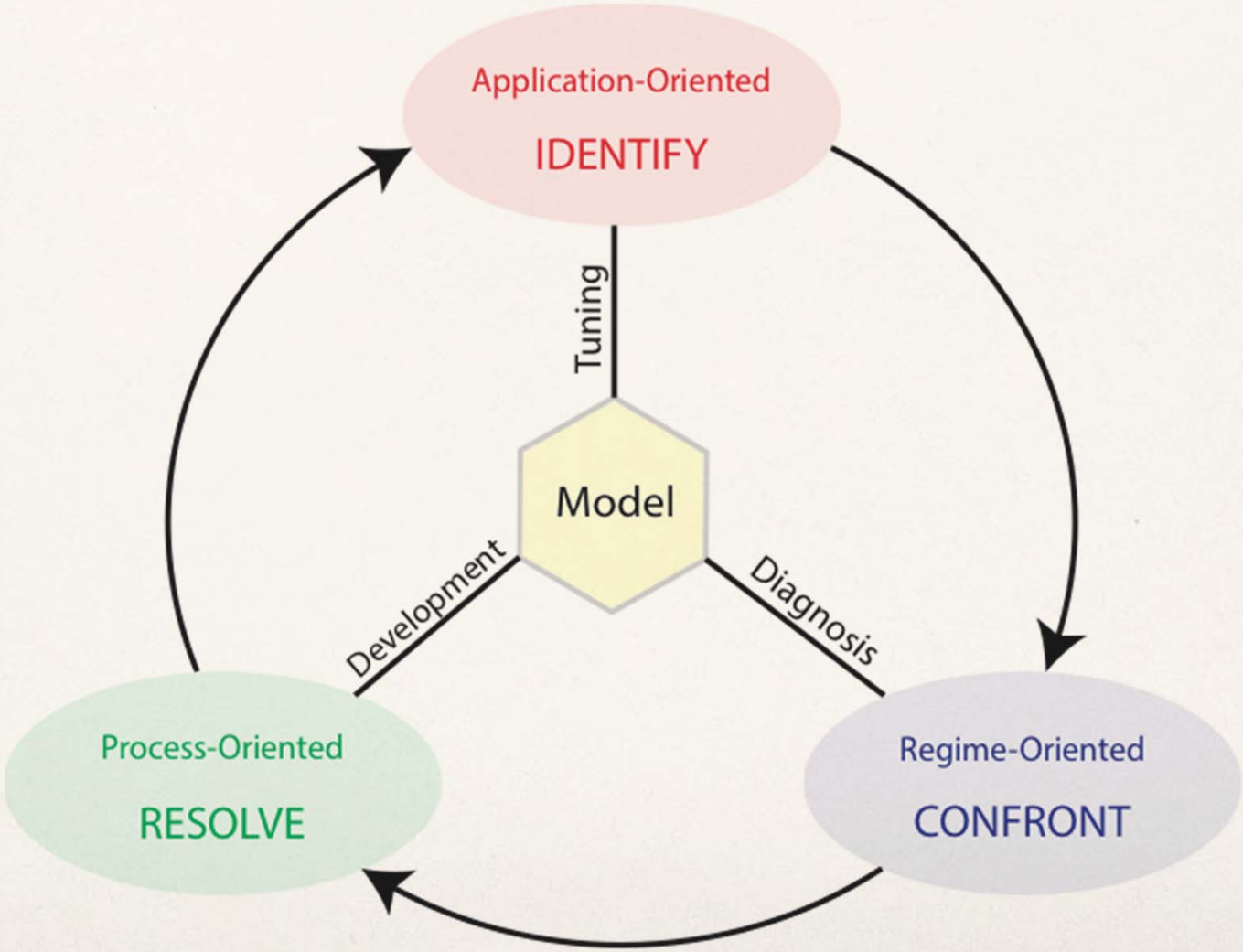


But more in-depth evaluation reveals interesting problems:



Caine et al., 2013

How are models really improved?



Goals for YMC modelling activities

- Process understanding at all scales – Hi-res models, NWP-style experiments and GCM sensitivity experiments
- Model evaluation against observations, both large-scale and YMC
- Inform model development
- Study grey-zone issues for deep convection

Potential activities

- CMIP5/CORDEX evaluation studies
- Comprehensive model study under GASS (AMIP, T-AMIP, LAM, CRM)
- Grey-zone community experiment including comprehensive CRM evaluation
- Real-time model predictions

And finally …

- It is better understanding that will support modelling, e.g., what makes convection possible under conditions that do not allow it to occur over the open ocean?
  - Larger clouds = less entrainment?
  - Same entrainment but modified environment due to focussing by sea-breeze?
  - Something completely different?
- Questions like this will be what will move us forward