1st CORDEX-SEA Workshop

Revised climate change by dynamic downscaling over the Maritime Continents: Preliminary results

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Background

High and complex orography.

Prominent diurnal variations (Holland and Keenan 1980; Kikuchi & Wang 2008; Sato et al. 2009).

Convection interacts with monsoon, MJO, and ENSO (Williams and Houze 1987; Sui and Lau 1992; Chang et al. 2005; Ichikawa and Yasunari 2008; Qian et al. 2010)

Due to smoothing the complex topography over the SEA region, the local error in the coarse resolution model can lead to systematic global uncertainties in climate simulation (Neale & Slingo 2003; Qian 2008; Peatman et al. 2013).

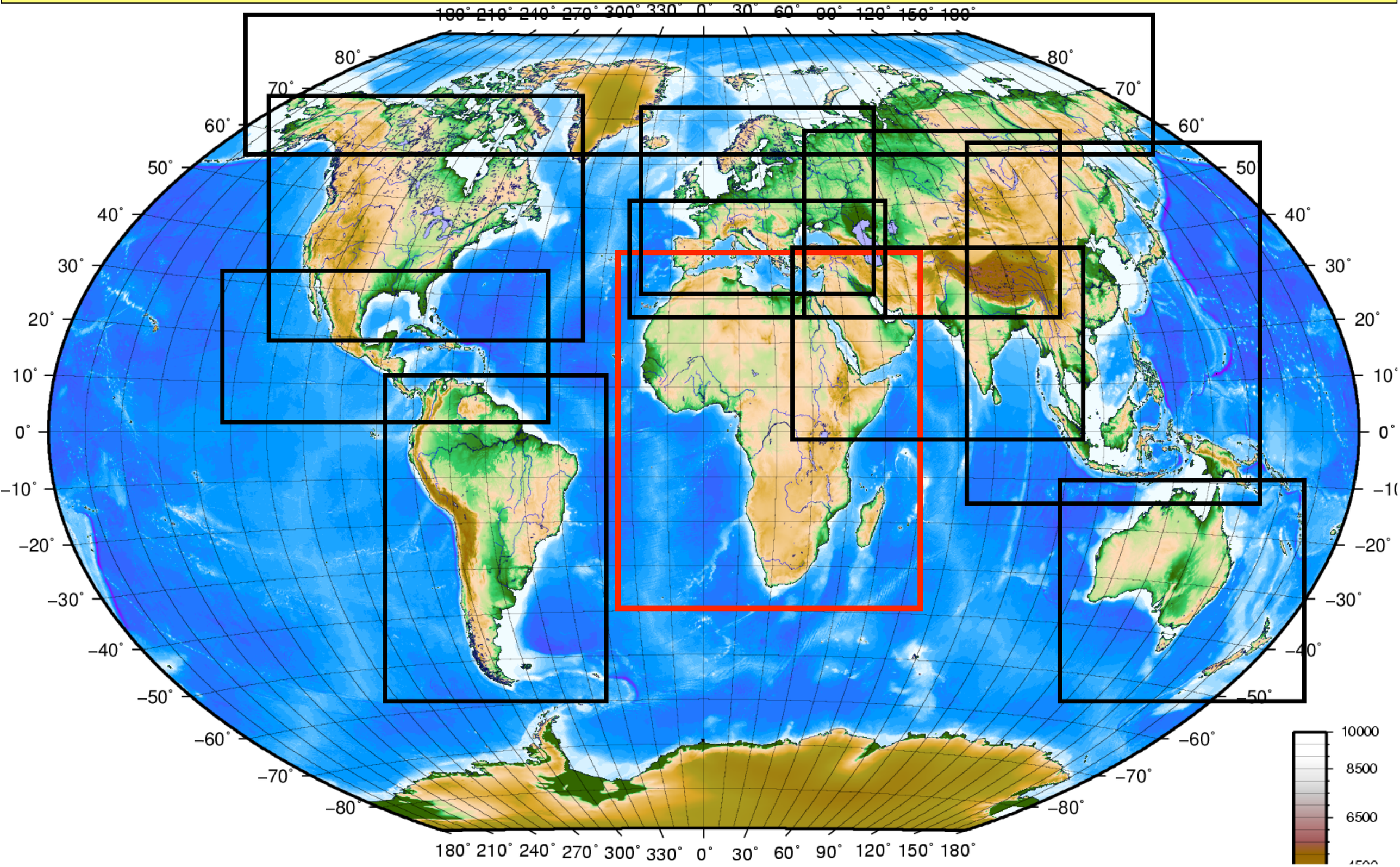
The high resolution model can detect the uplift condensation due to the topography (Qian and Zubair 2010), which improves the performance on amplitude of the diurnal cycle and mean rainfall (Wu and Hsu 2009; Love et al 2011).

The fine grid experiments projected consistent sign of climate change (Smith et al. 2013).

Thus, the high-resolution regional climate downscaling (RCD) of climate change projection is essential to analyze the potential climatic impacts and adaptation measurements.

Therefore, a framework called the COordinated Regional climate Downscaling EXperiment (CORDEX) was established and aimed at improving coordination of international efforts in RCD research.

CORDEX domains



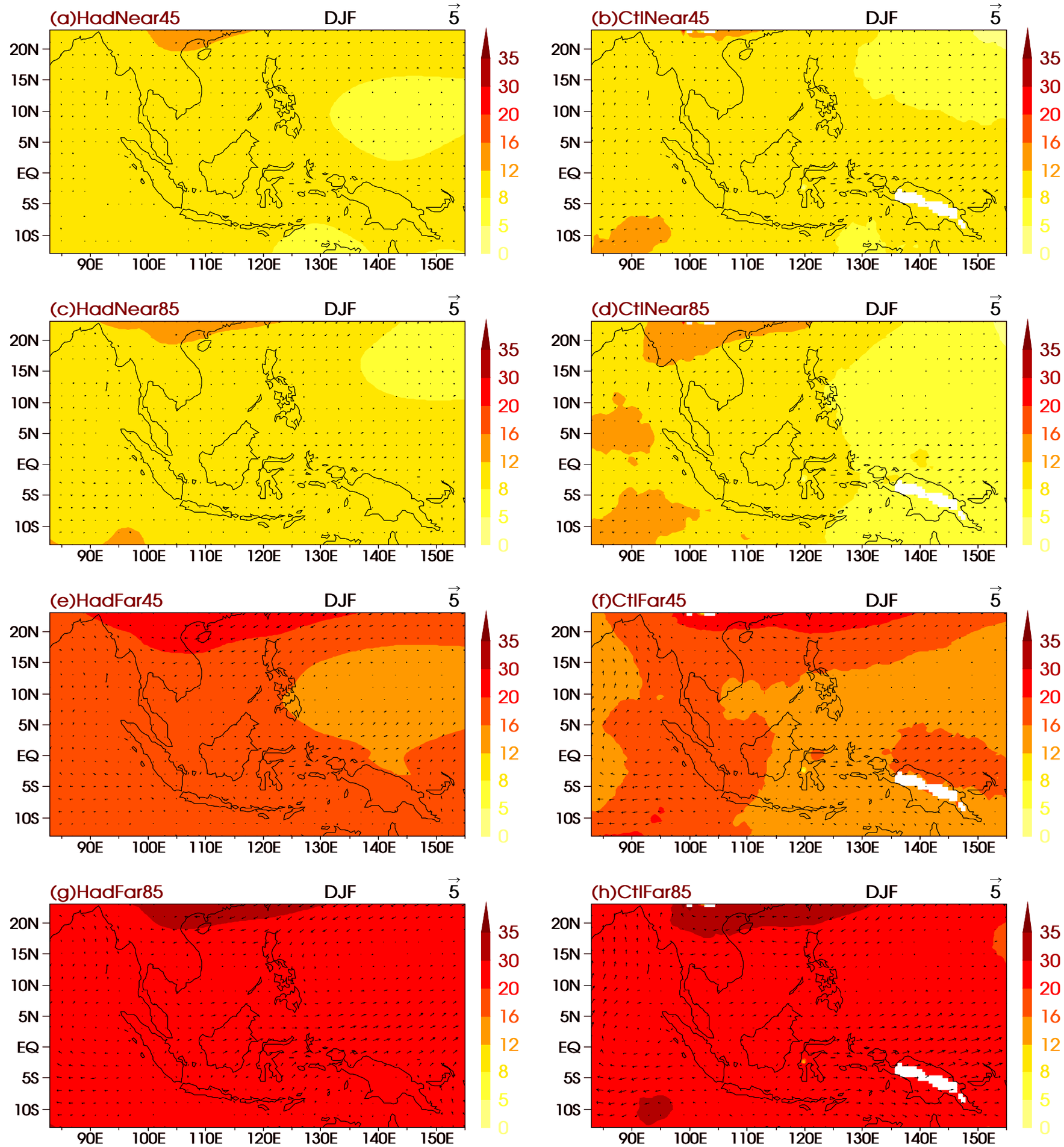
However, the RCD activity in the SEA region is minimal and uncoordinated.

Thus, the CORDEX Southeast Asia (CORDEX-SEA) project is establishing.

Two new CORDEX domains are being proposed

ARAB Domain

South East Asia Domain



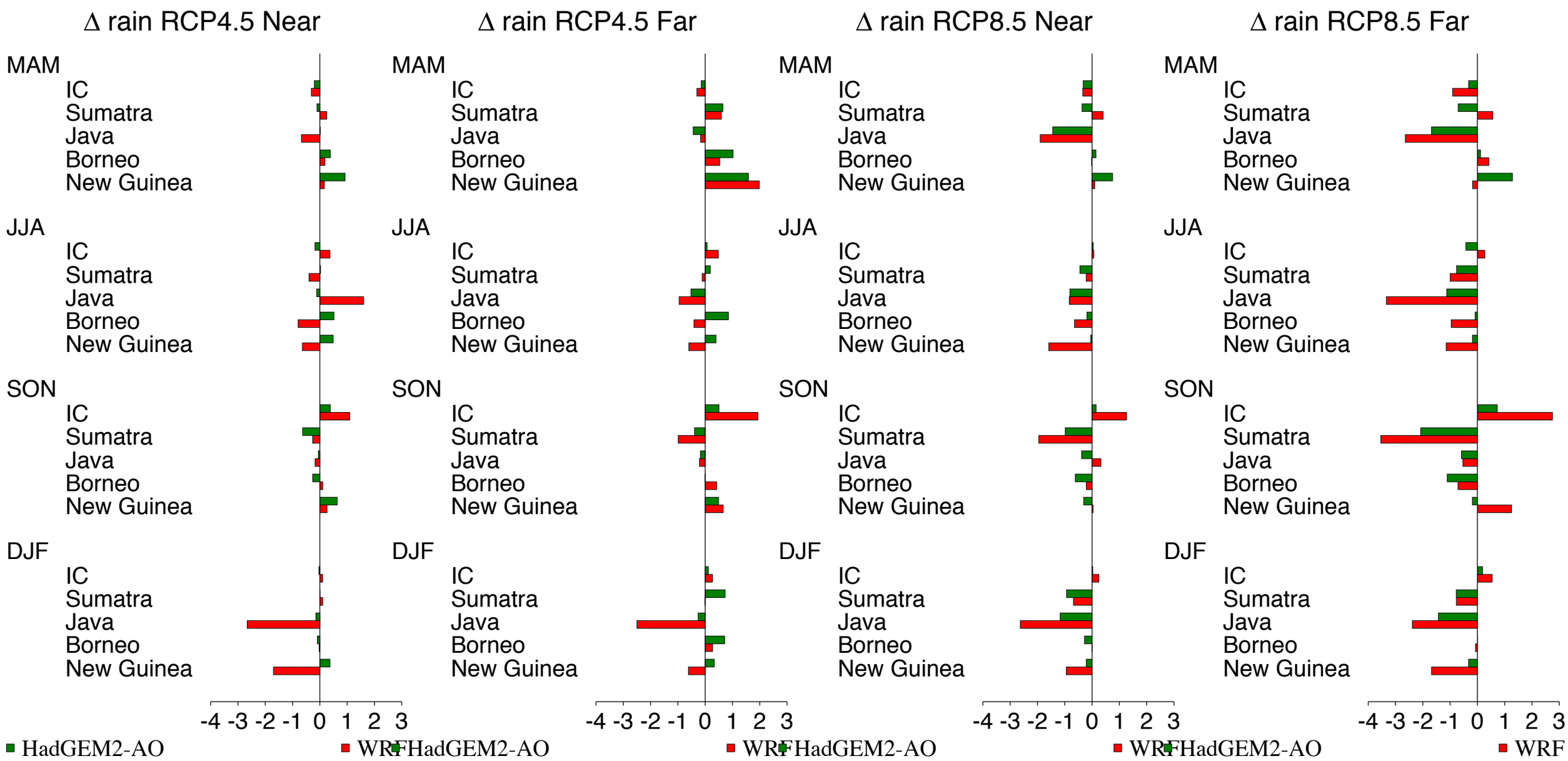
DJF

Far > Near

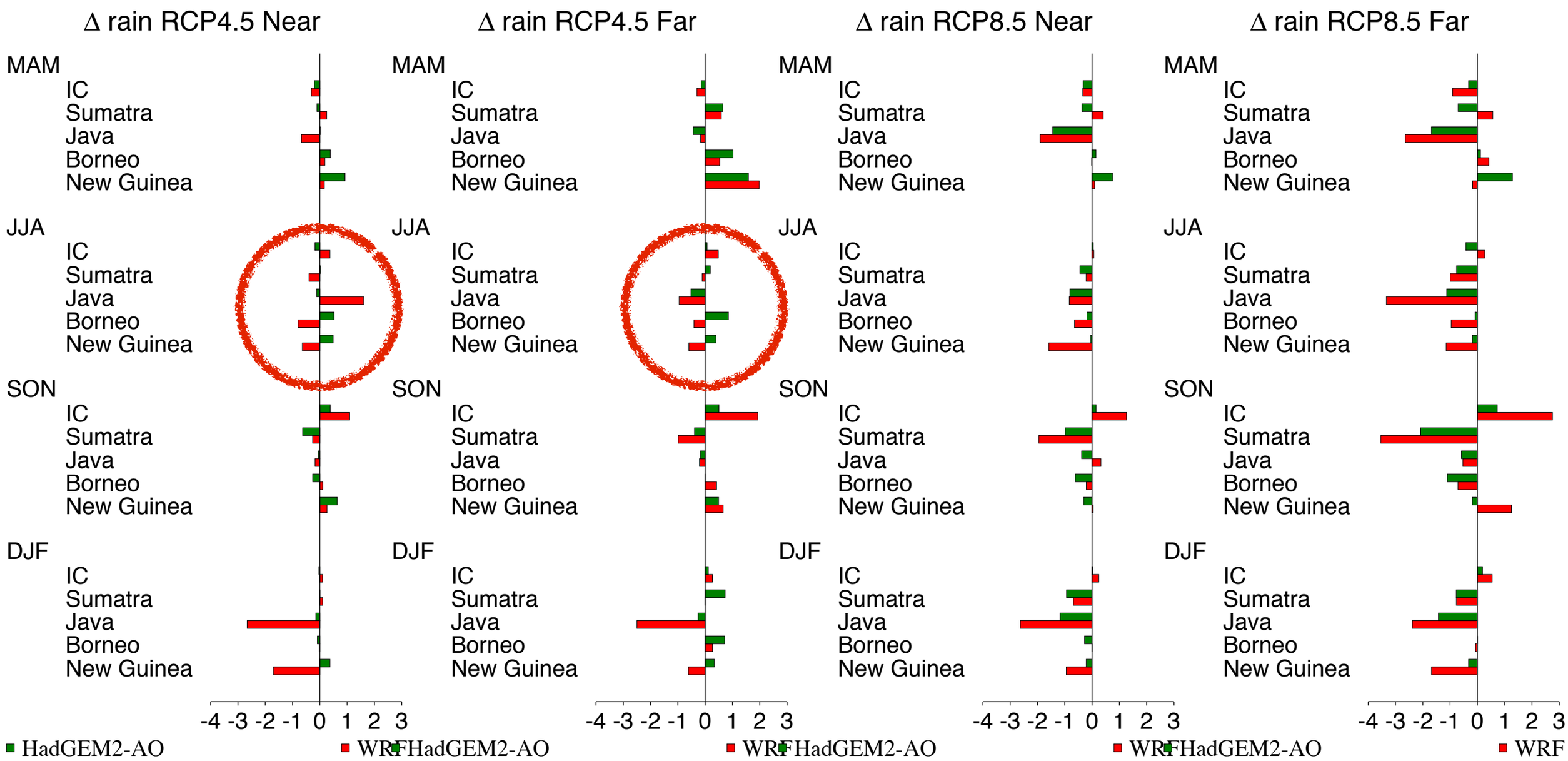
RCP8.5 > RCP4.5

WRF <> HadGEM

Rcp4.5

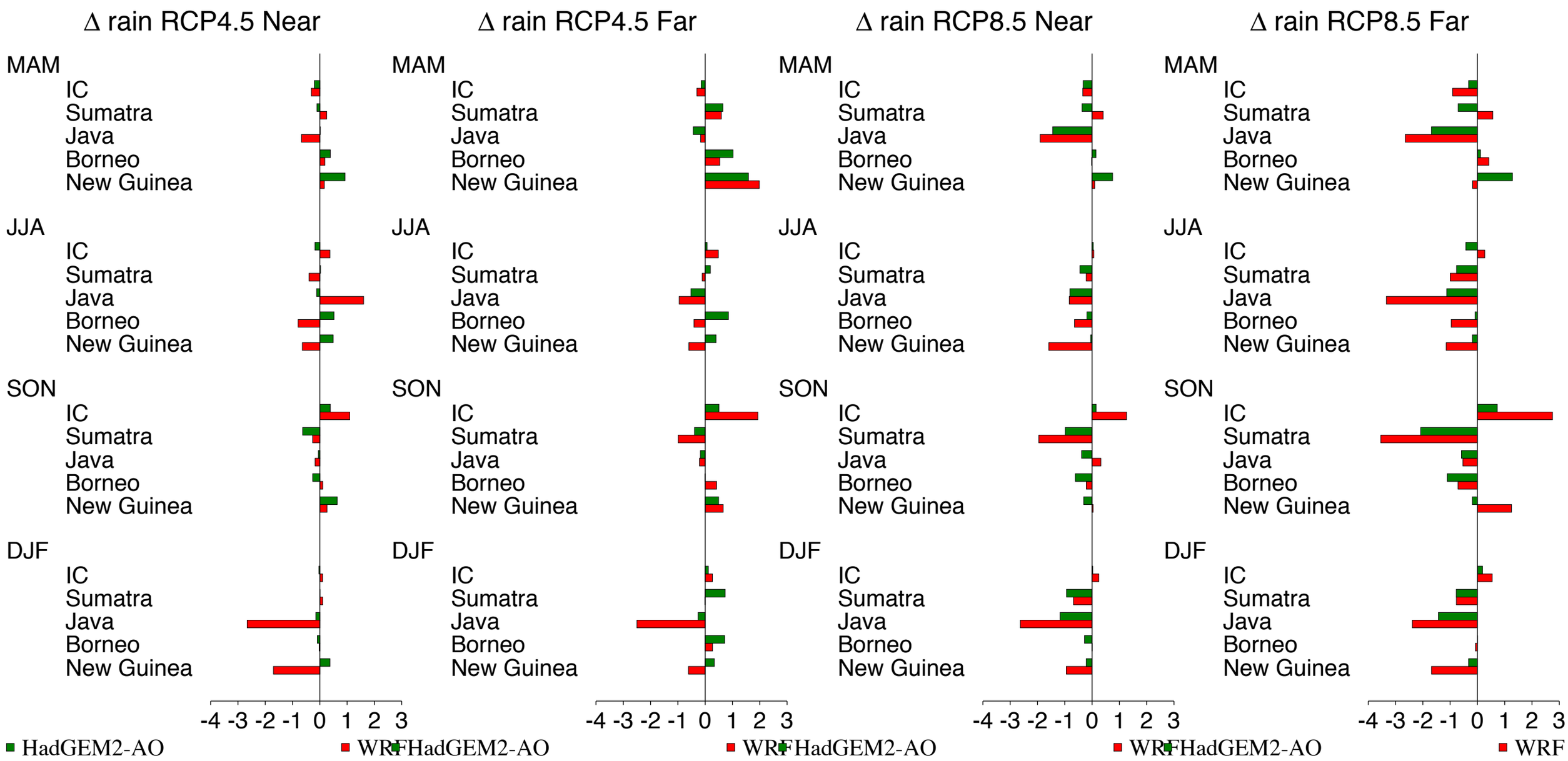


Seasonal dependent Uncentain

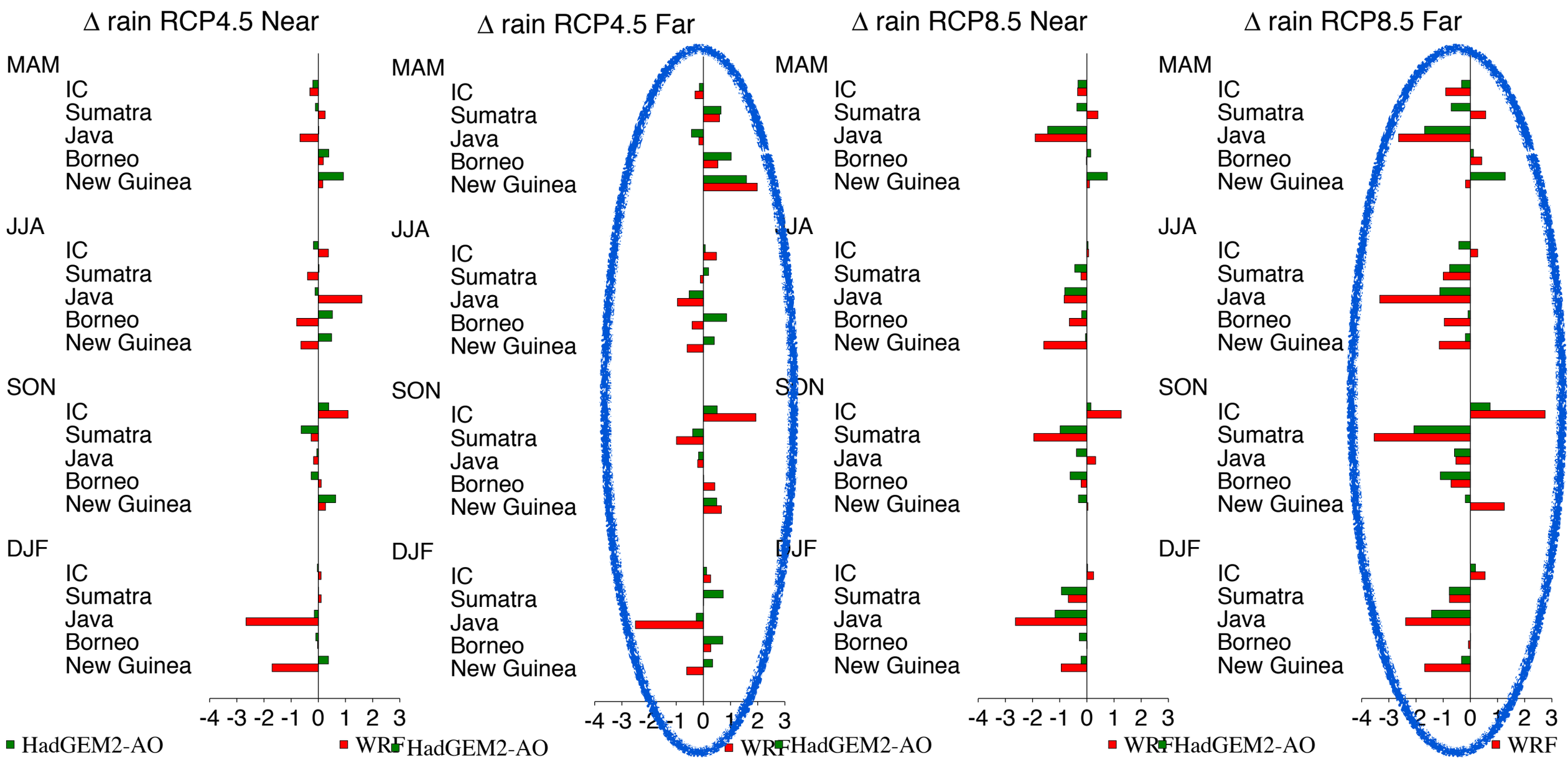


large uncentainty

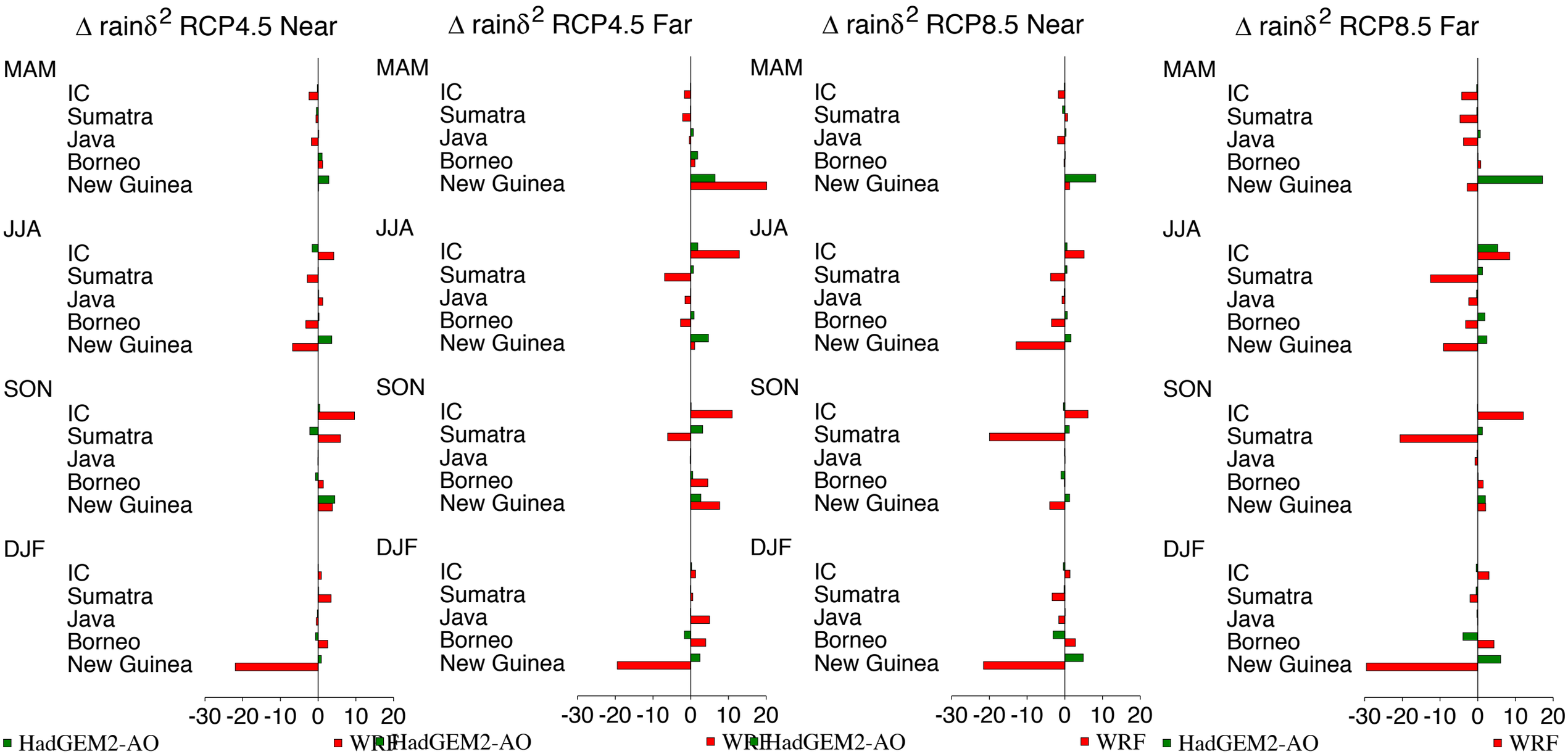
Rcp8.5



Become dry

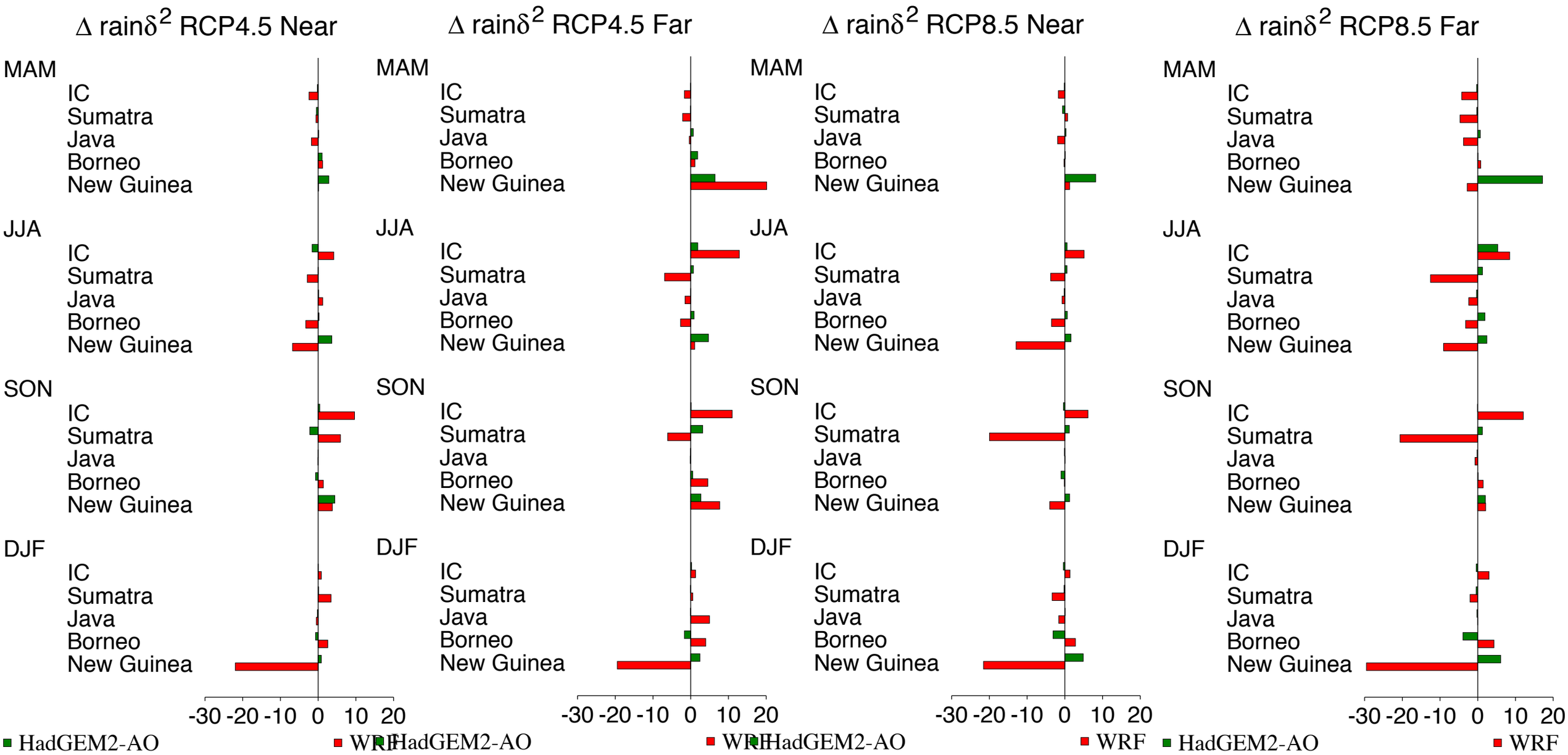


WRF largely enhanced the change



Uncertainty in variability > Uncertainty in mean

scale=30 scale=3



GCM variability change < WRF variability change

(1) The uncertainty in projection rcp4.5 in JJA was the largest one among all the cases (largest discrepancy).

(2) The change in HadGEM2-AO was more likely enhanced by the WRF in the far future than the near future.

(3) The uncertainty in variability was large than that in mean precipitation.

Conclusion:

The added values of dynamic downscaling over the land are more than those over the ocean is due to the subtle described underlying surface in regional model

The added value increase due to neglect the small islands means that the worse performance of the WRF model over the small islands degrade its skill.

The WRF model has added values over the big lands in hindcast and historical experiments.

In circulation in historical exp., WRF enlarge the bias of HadGEM2.

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The change in HadGEM2-AO was more likely enhanced by the WRF in the far future than the near future.

The uncertainty in variability was large than that in mean precipitation.

Thanks !