

The need for Regional Climate Modelling for Brazil

¹Lincoln Alves, ²Kitty Attwood, ³Kate Halladay, ³Ron Kahana and ³Robin Chadwick

¹ National Institute for Space Research (INPE), Brazil (lincoln.alves@inpe.br)

² University of Oxford, UK, ³ Met Office Hadley Centre, UK

Introduction

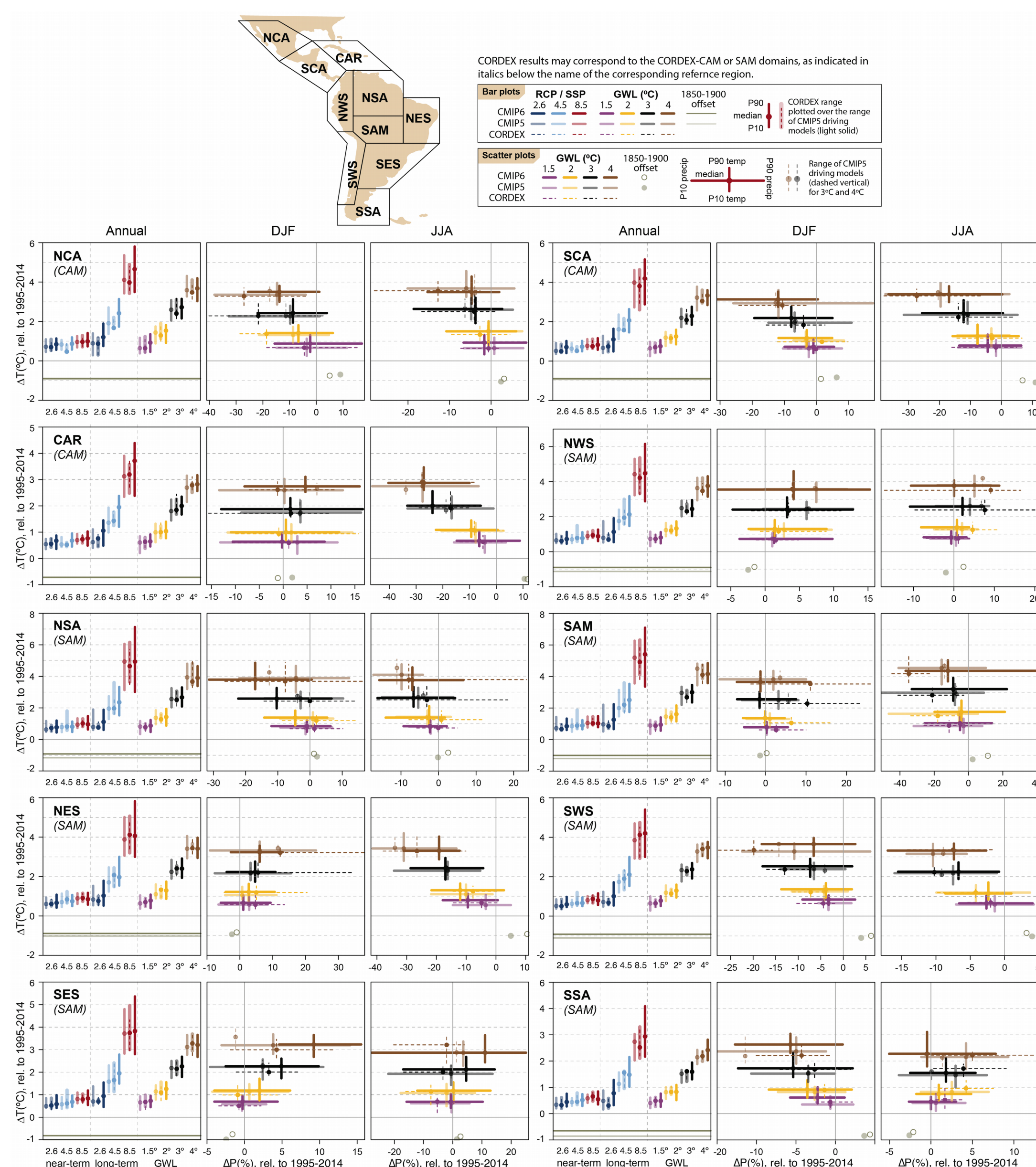
Simulations of the climate at convection-permitting resolution (at kilometer-scale) are emerging as a promising tool to produce a better-detailed representation of regional climate and its extremes.

New cutting-edge climate simulations have recently been completed over South America using a Met Office high-resolution convection-permitting climate model as part of the CSSP-Brazil project (<https://www.metoffice.gov.uk/research/approach/collaboration/newton/cssp-brazil/index>).

Here, we present a perspective on the potential need of the regional modelling frameworks for Brazil. The work begins with a general overview of the current state of knowledge on future projections that are available via the GCM and RCM models. The presentation also shows preliminary results on how the CPM performs in representing the main features of daily precipitation over Brazilian regions. These unique simulations are expected to provide Brazilian climate scientists with improved understanding of many.

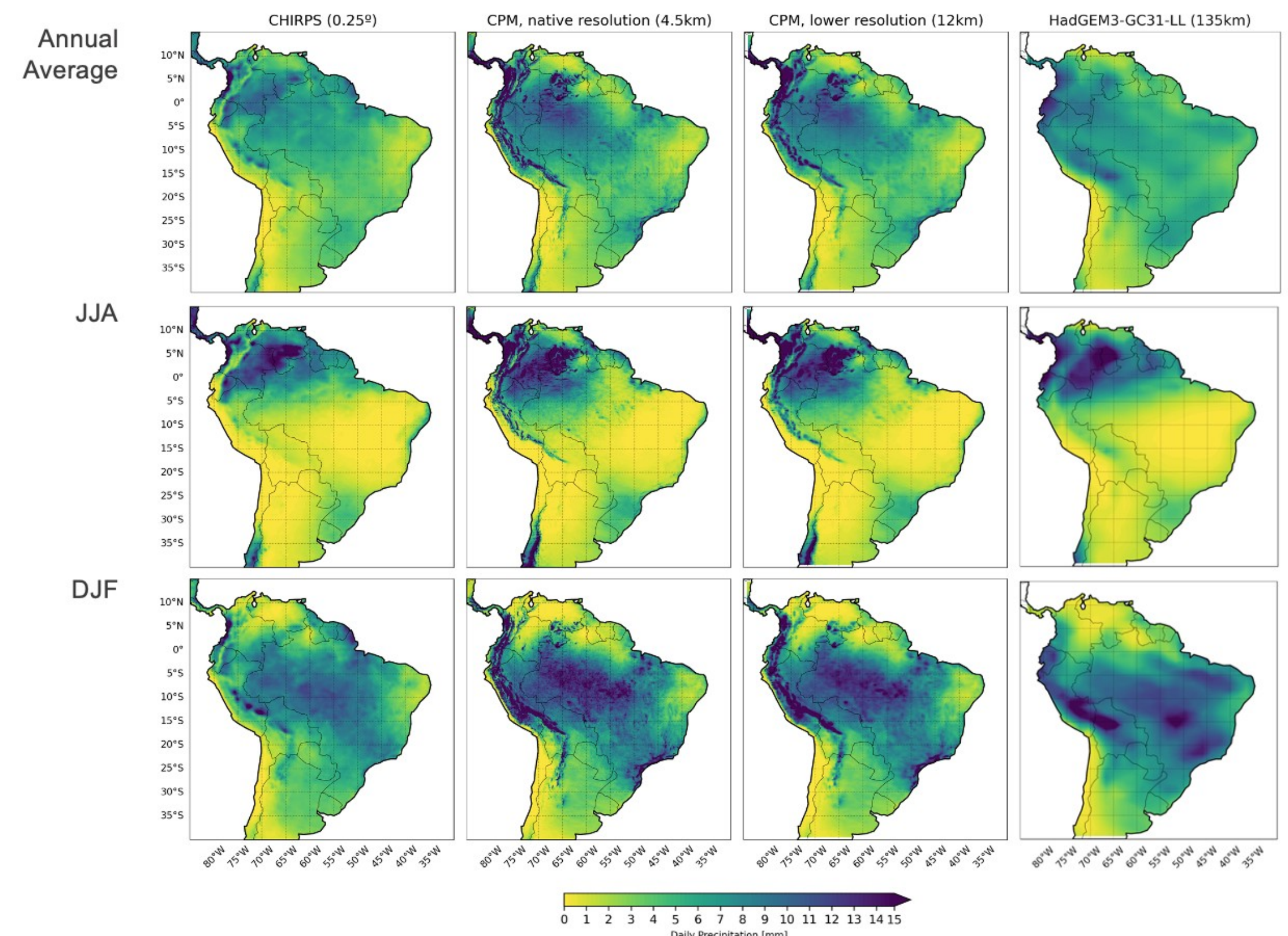
Key Features of the Regional Changes

Regional changes over land in annual mean surface air temperature and precipitation relative to the 1995–2014 baseline for the reference regions in Central America, the Caribbean and South America (IPCC AR6 WGI Figura Atlas 22)

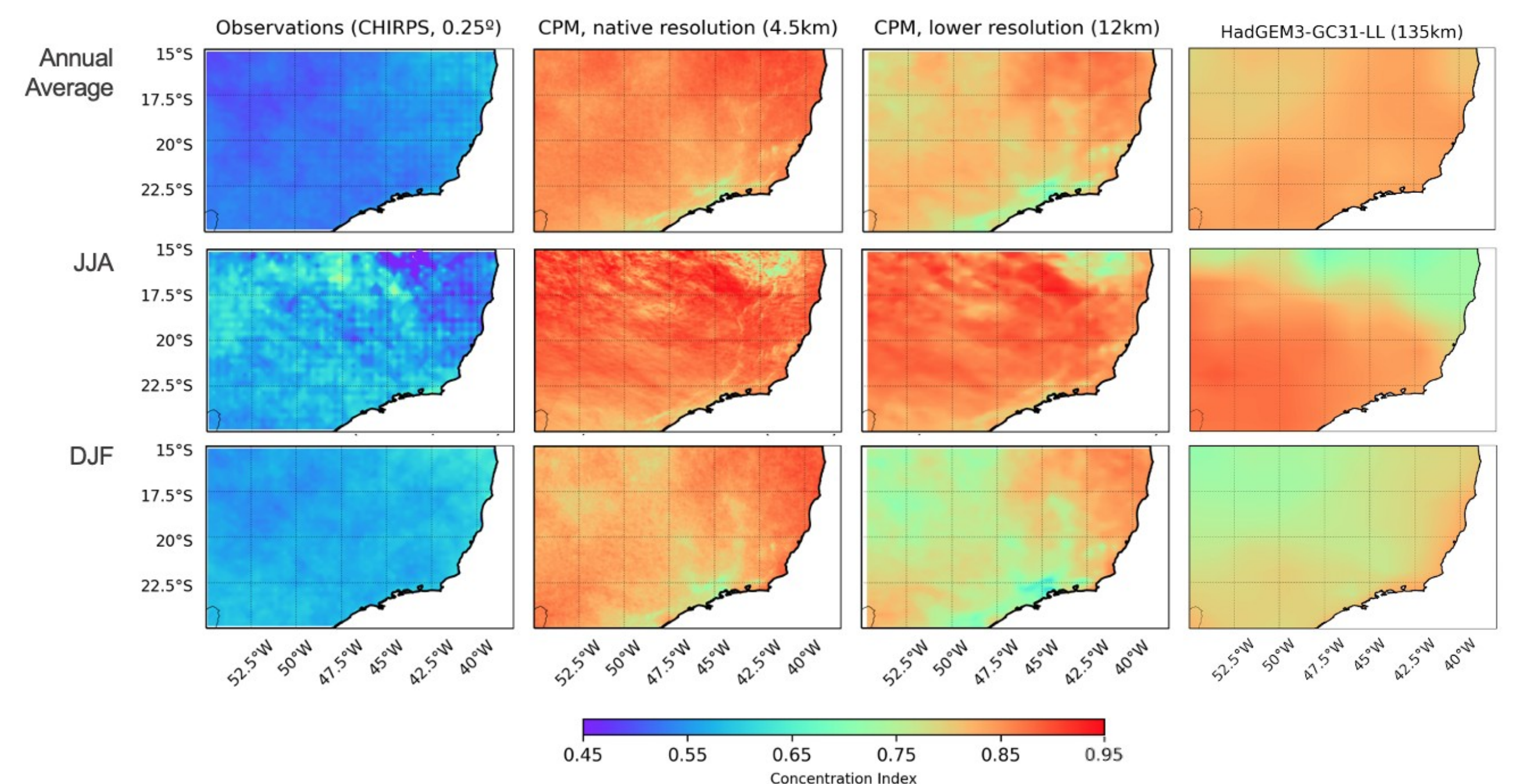


CPM First Results

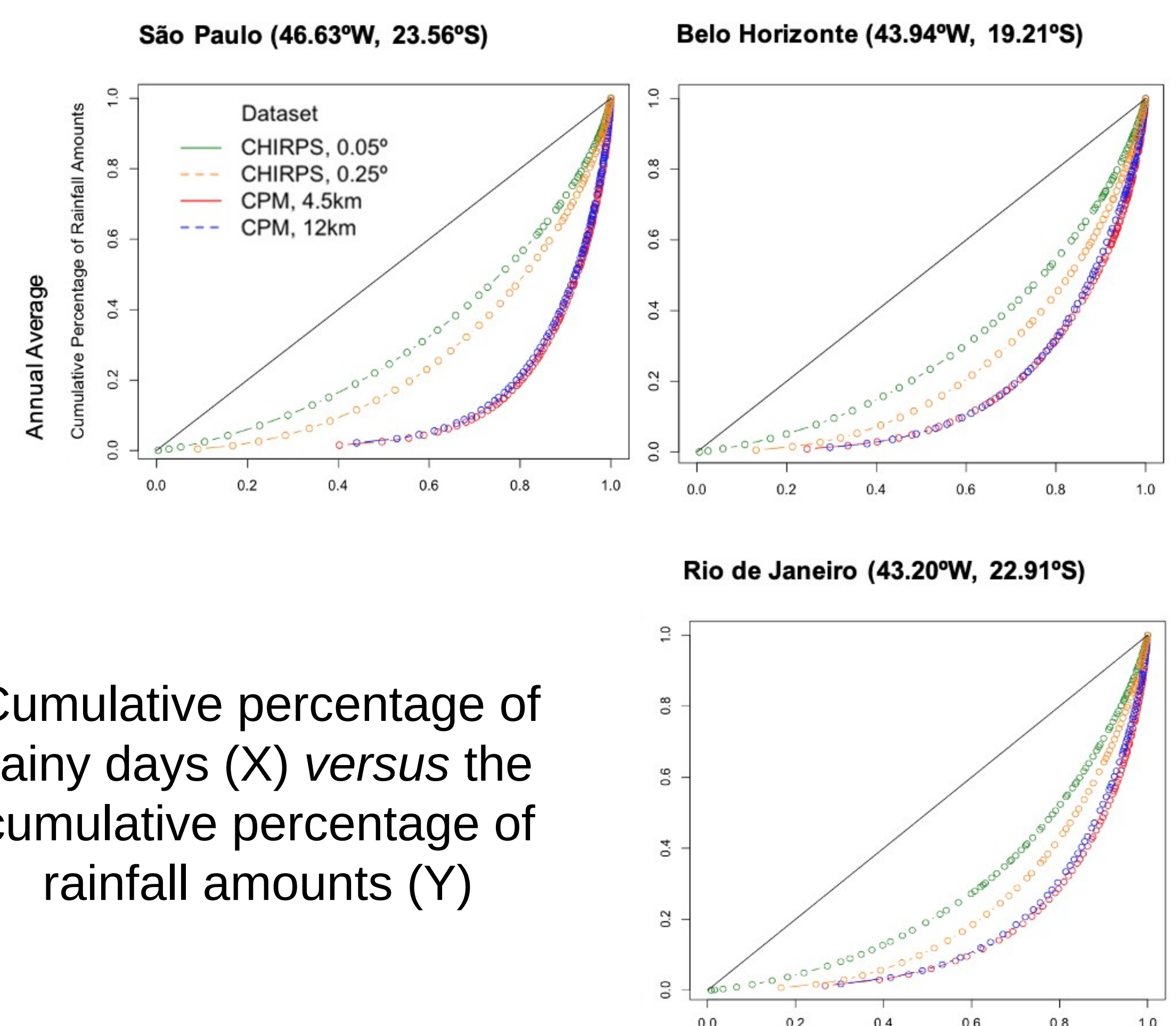
Evaluation of CPM Historical Precipitation Simulation (1998-2007)



Spatio-temporal variability of daily precipitation Concentration Index (CI) Martin-Vide (2004)



CI evaluates the contribution of the rainiest days to the total amount



Cumulative percentage of rainy days (X) versus the cumulative percentage of rainfall amounts (Y)

Comments and Final Remarks

The results show that CPM perform better for winter than summer precipitation, consistent with previous results in the literature

Overall CI values are too high in CPM

Daily precipitation intensity and frequency is overestimated in the CPM with too many wet days over high orography

Extend results to include other variables, process-based analysis of circulation as well as future scenarios

Challenges:

- Huge data outputs of CP models