8th Workshop on the theory and use of Regional Climate Models
ICTP, Trieste 23-03 May 2016

A Process-based study of a regional climate model added value over West Africa: application to the projected changes

Presented by:
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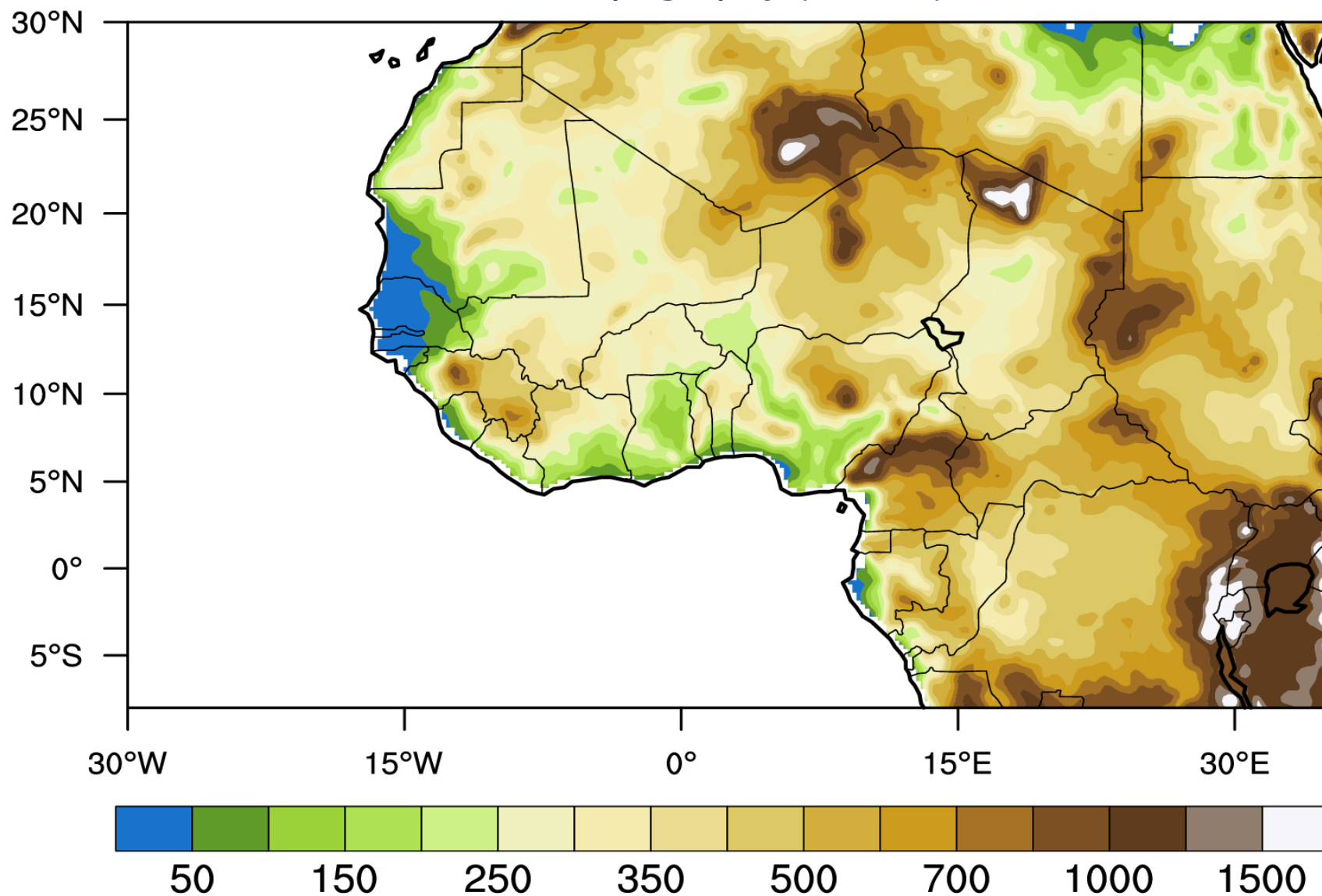**Contributors: Ibourahima Kebe, Michel Nikiema, Jerome Omotosho, Filippo Giorgi**
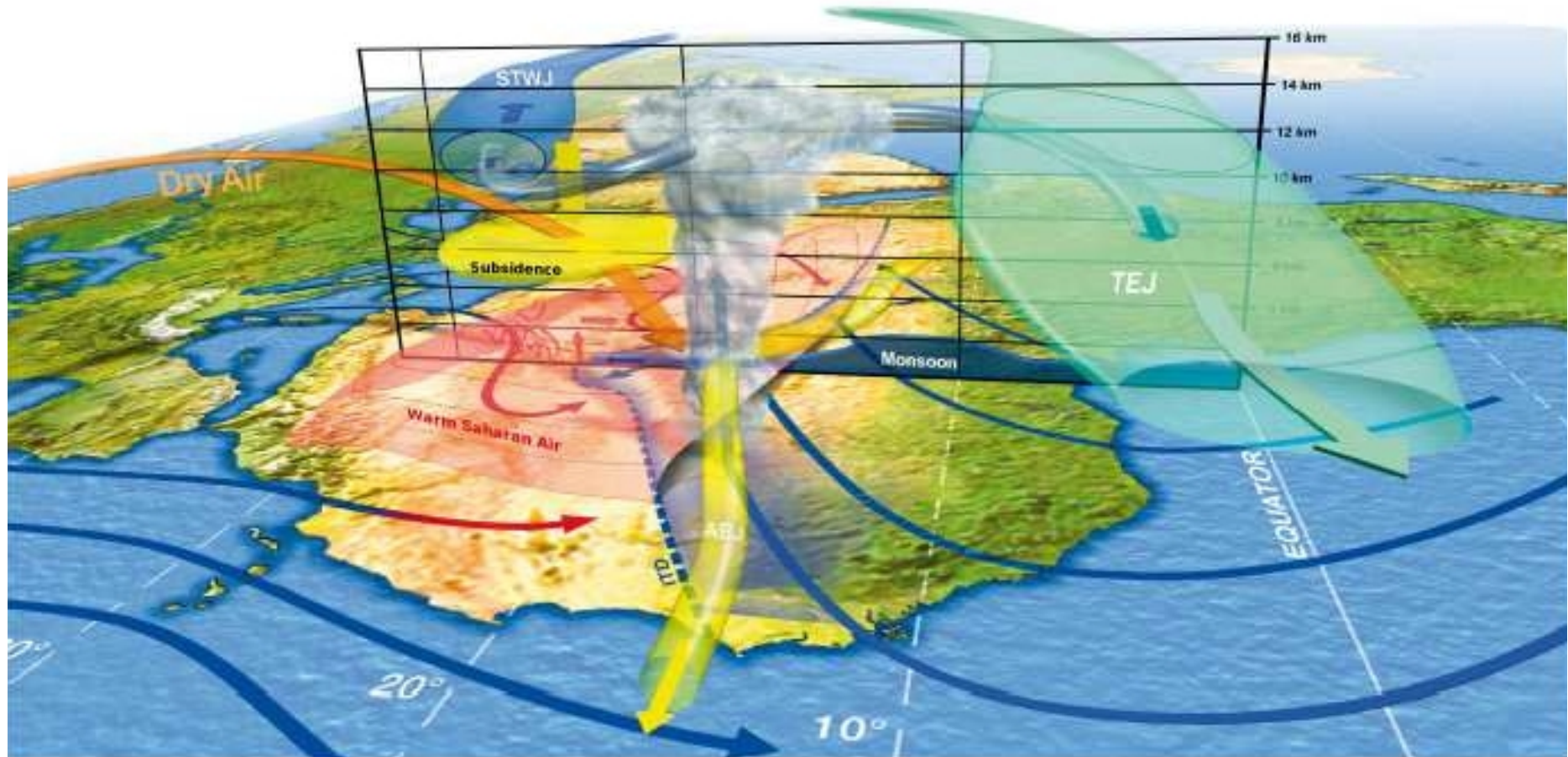
I/ Background and Motivation

Simulation Domain and Topography (meters)
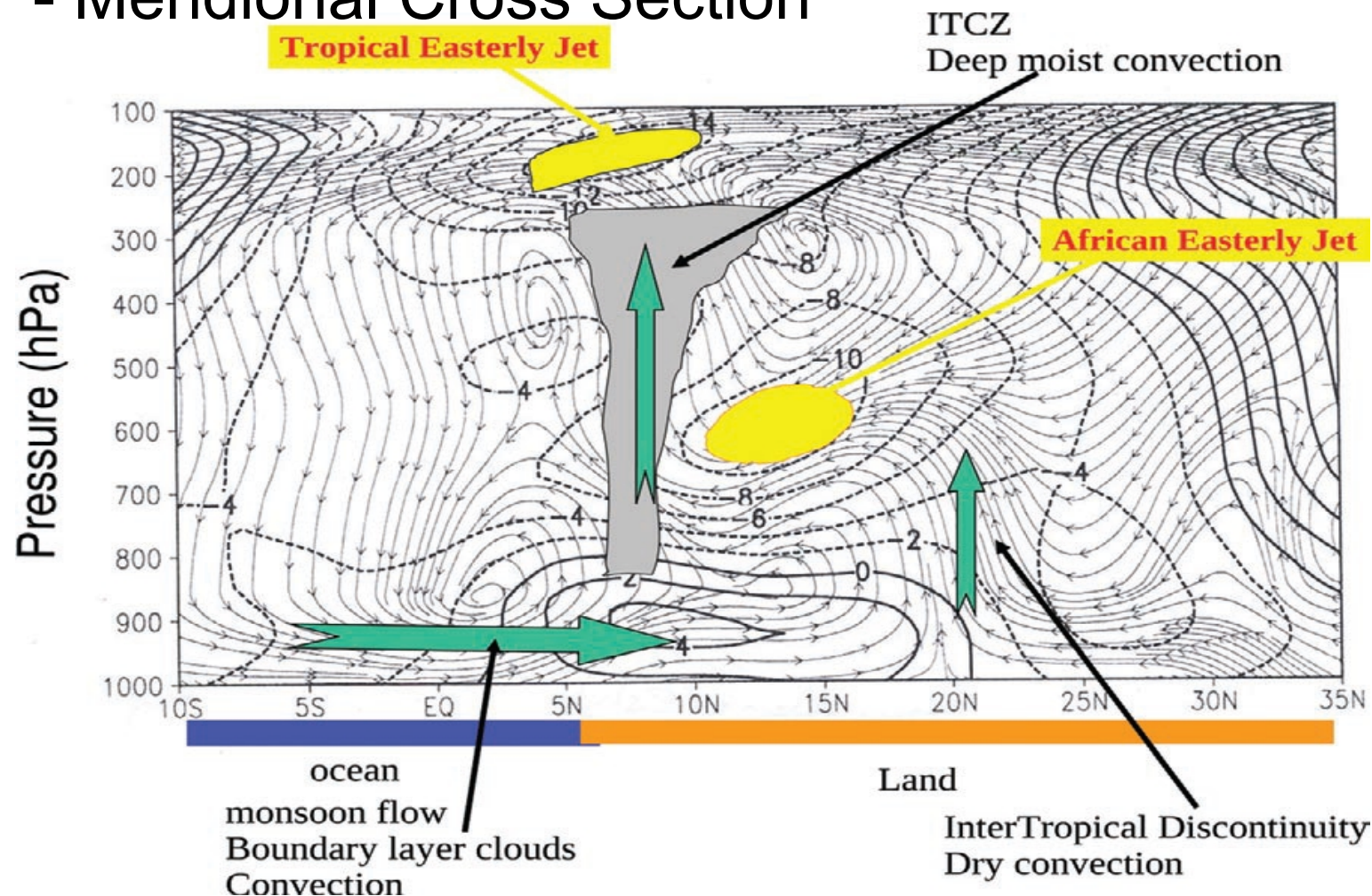
I/ Background and Motivation

- West African Monsoon System

(Meteo France)

I/ Background and Motivation …
- Meridional Cross Section

(Hourdin et al. 2010)

- How to select GCMs to downscale?
- How to assess added value

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II/ Model Setup

❑ **ICTP/RegCM4:**

➡ **Historical, RCP4.5 and RCP8.5**

➡ **25 km**

➡ **West Africa**

➡ **CLM3.5**

➡ **Emanuel, SUBEX, Zeng …**

➡**MPI-ESM, HadGEM2-ES and GFDL-ESM2M**
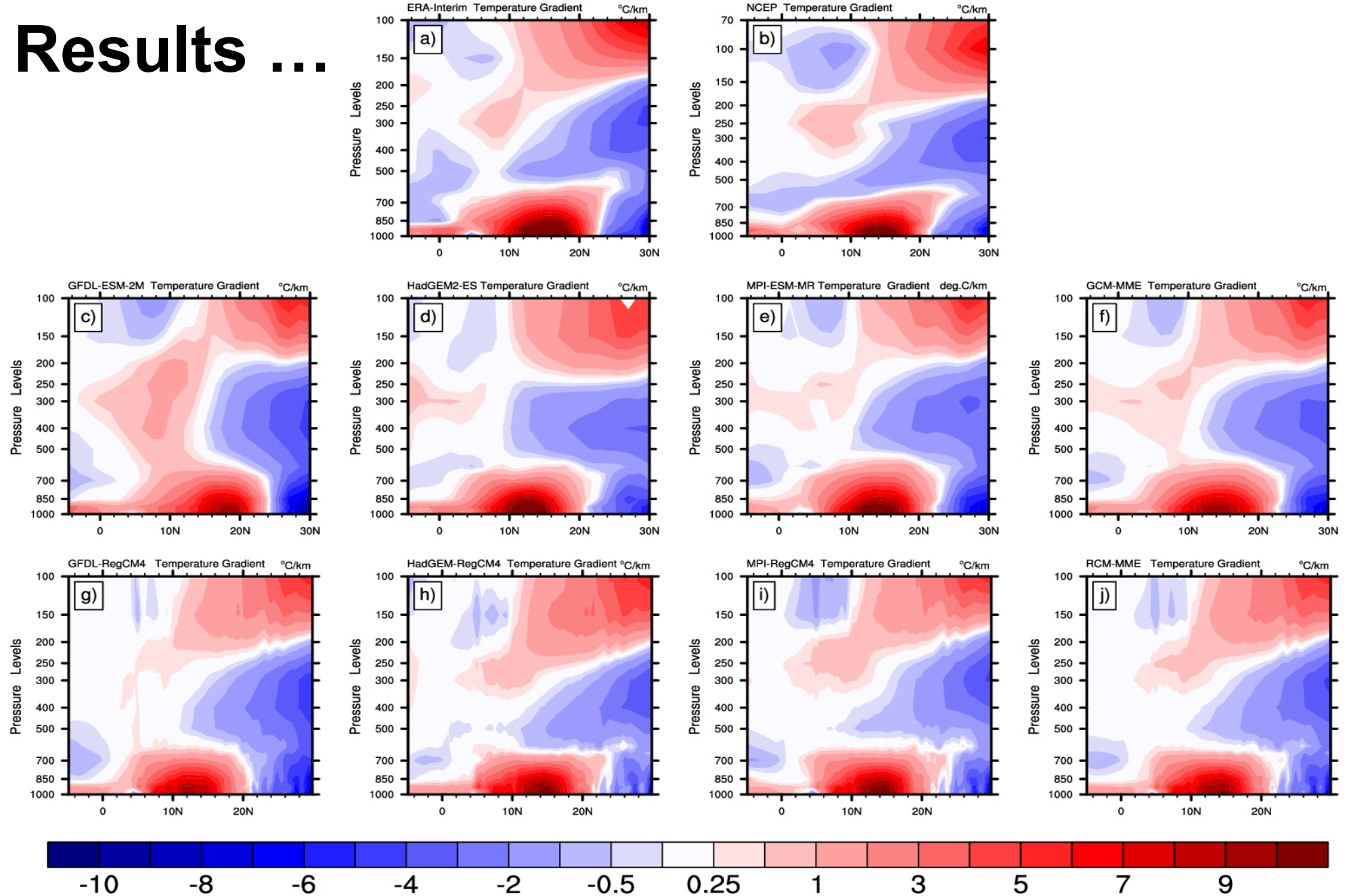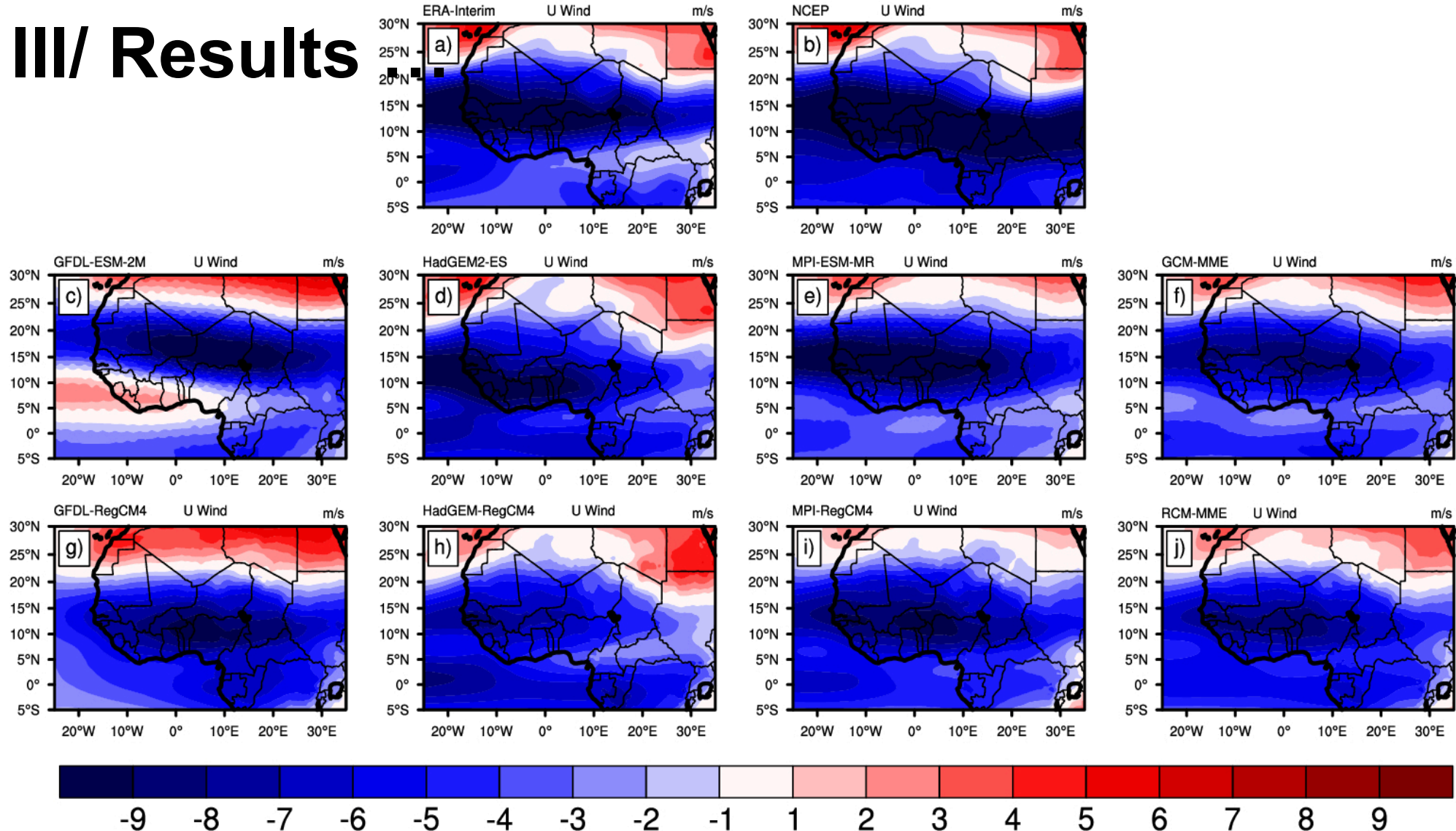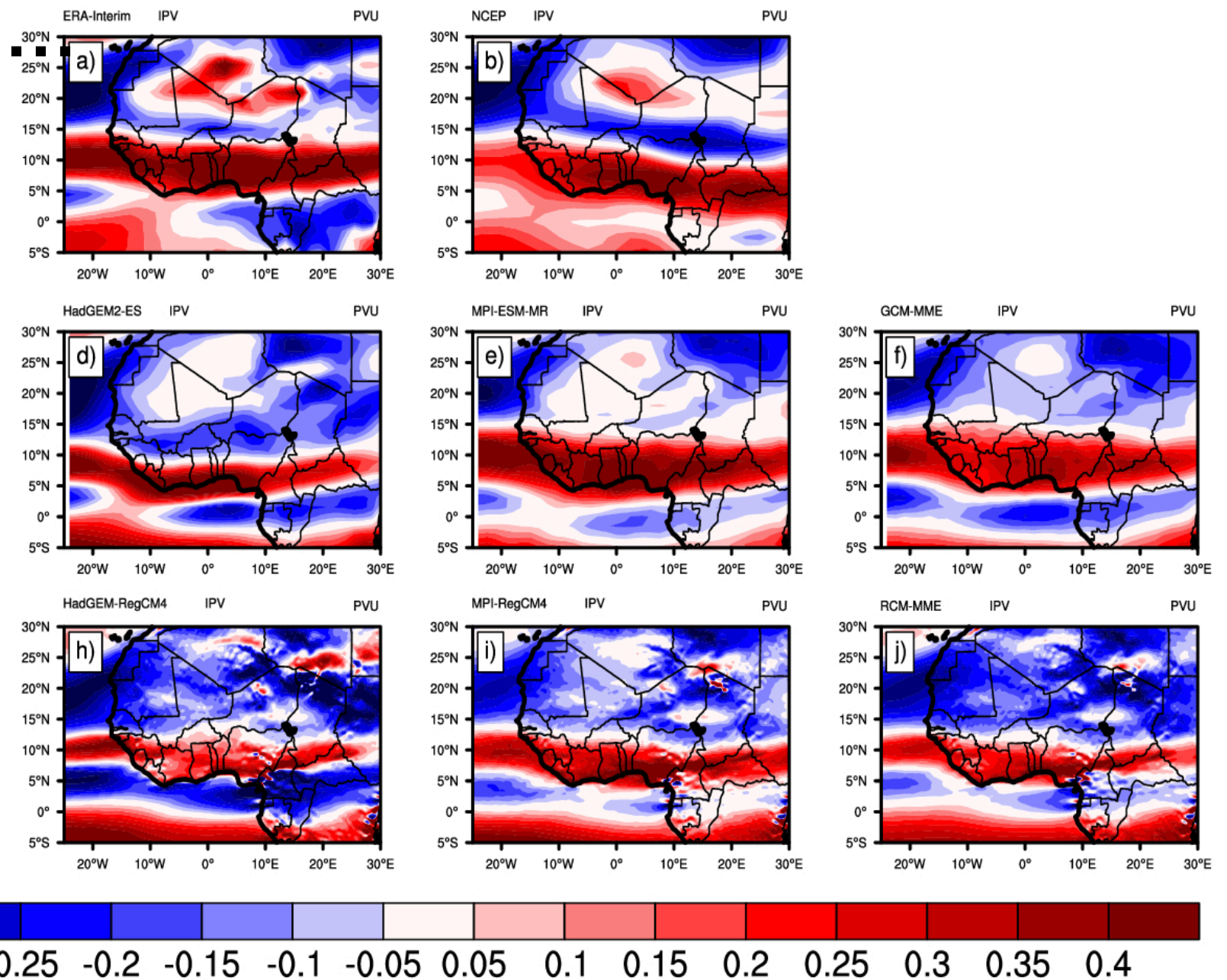
III/ Results
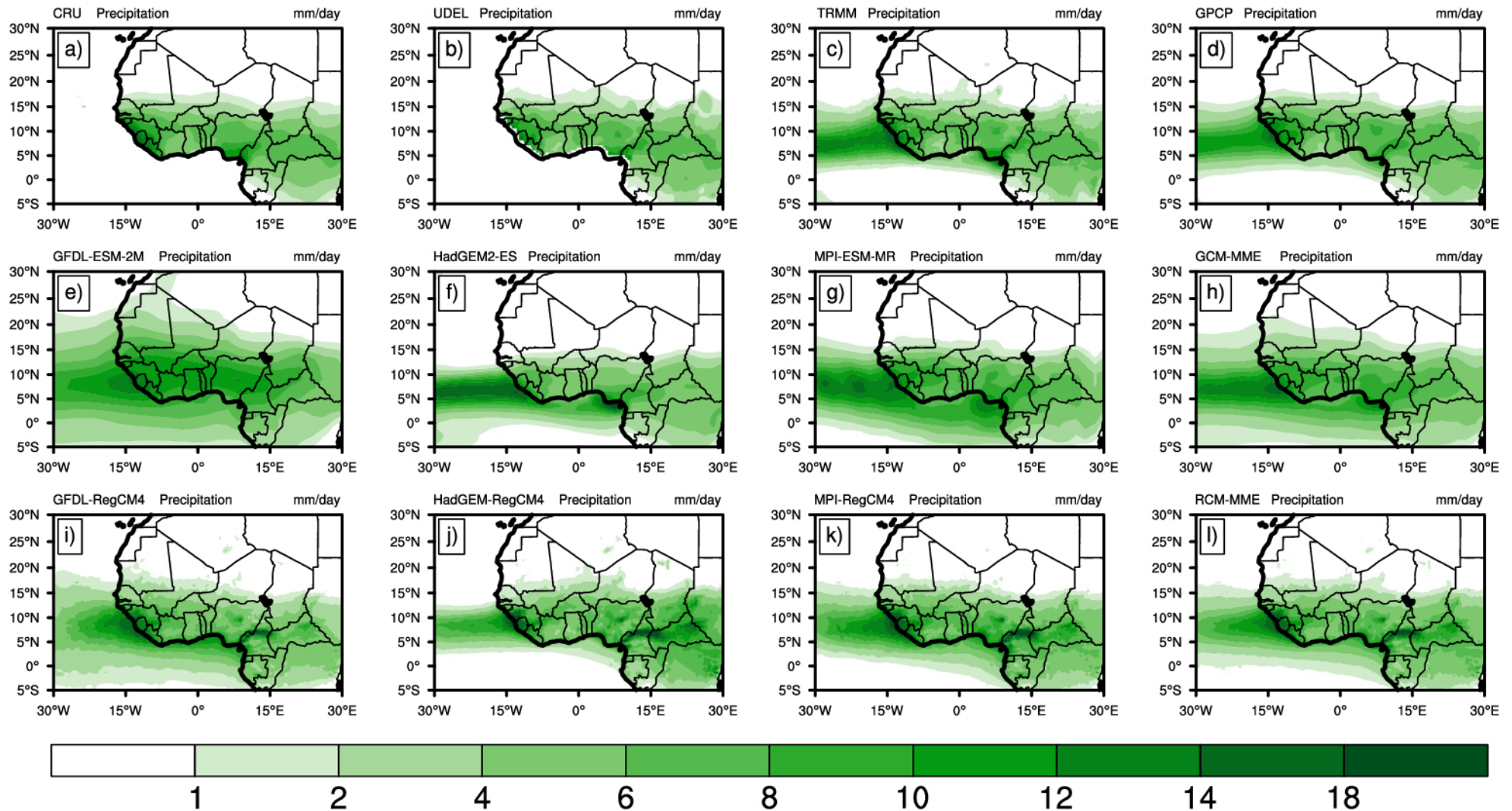
III/ Results …
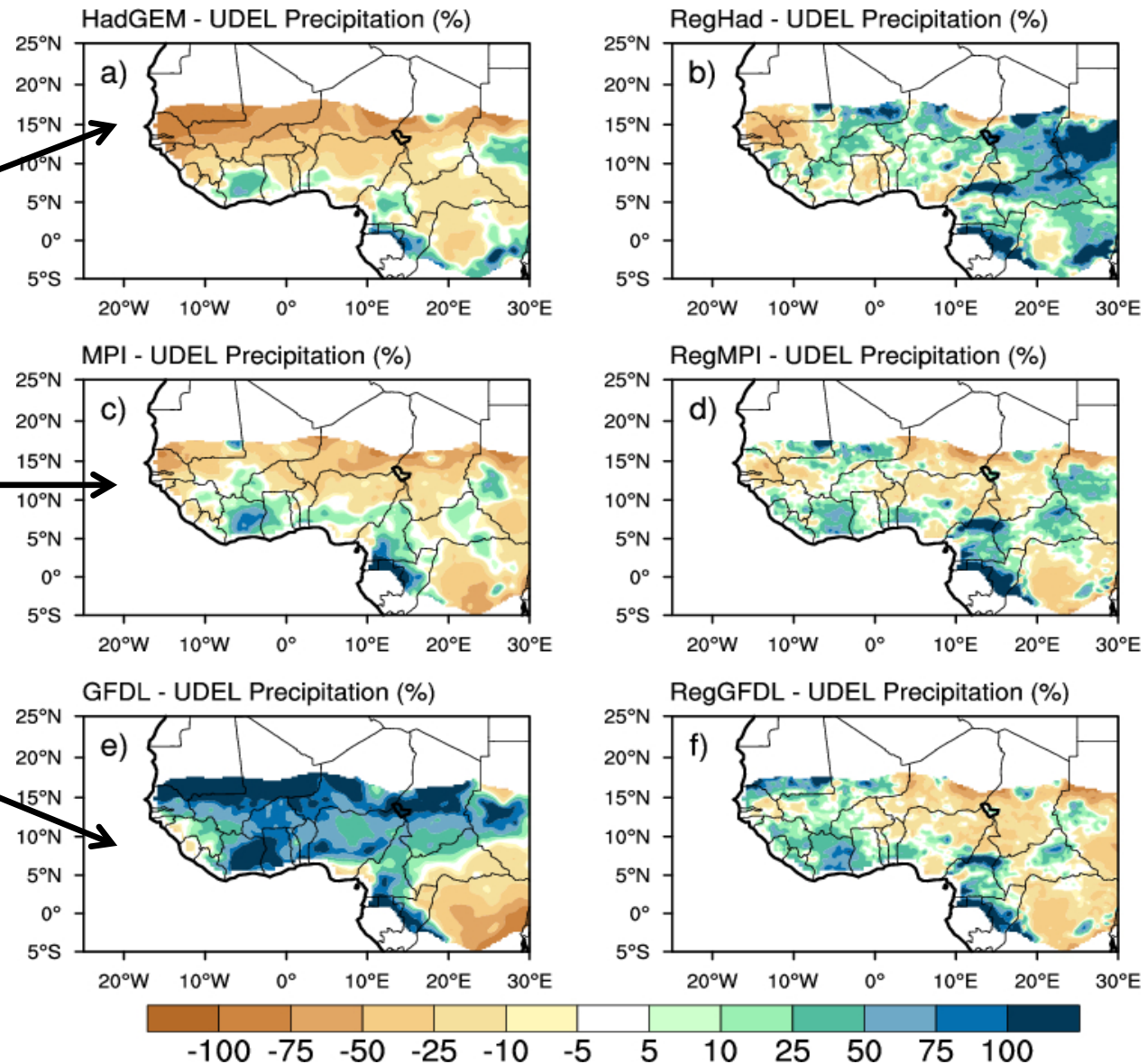
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III/ Results …

III/ Results ...

- Consistent to the temperature gradient distribution
- Consistent to the precipitation distribution

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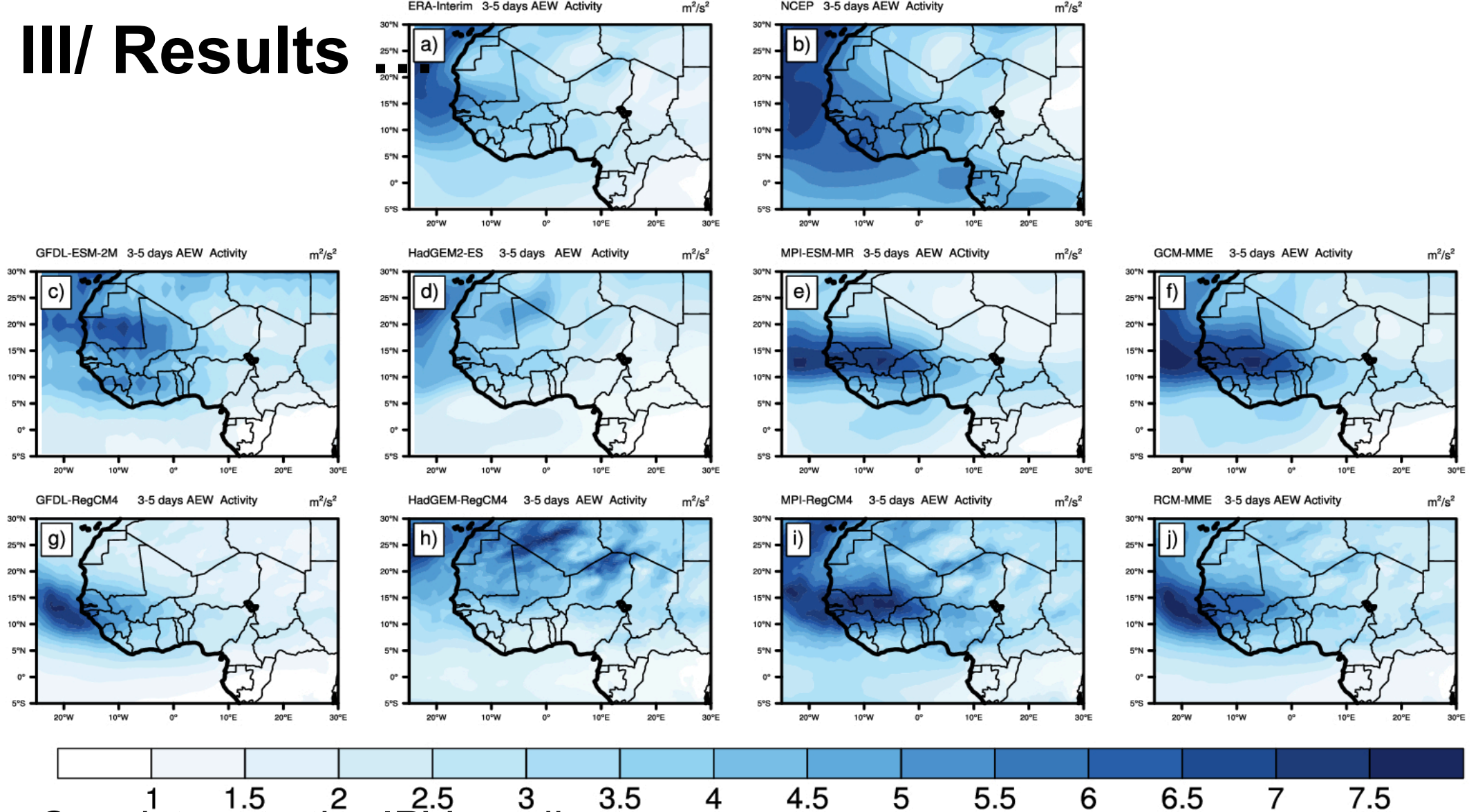Climate Change and Adapted Land Use

III/ Results ...

III/ Results ...

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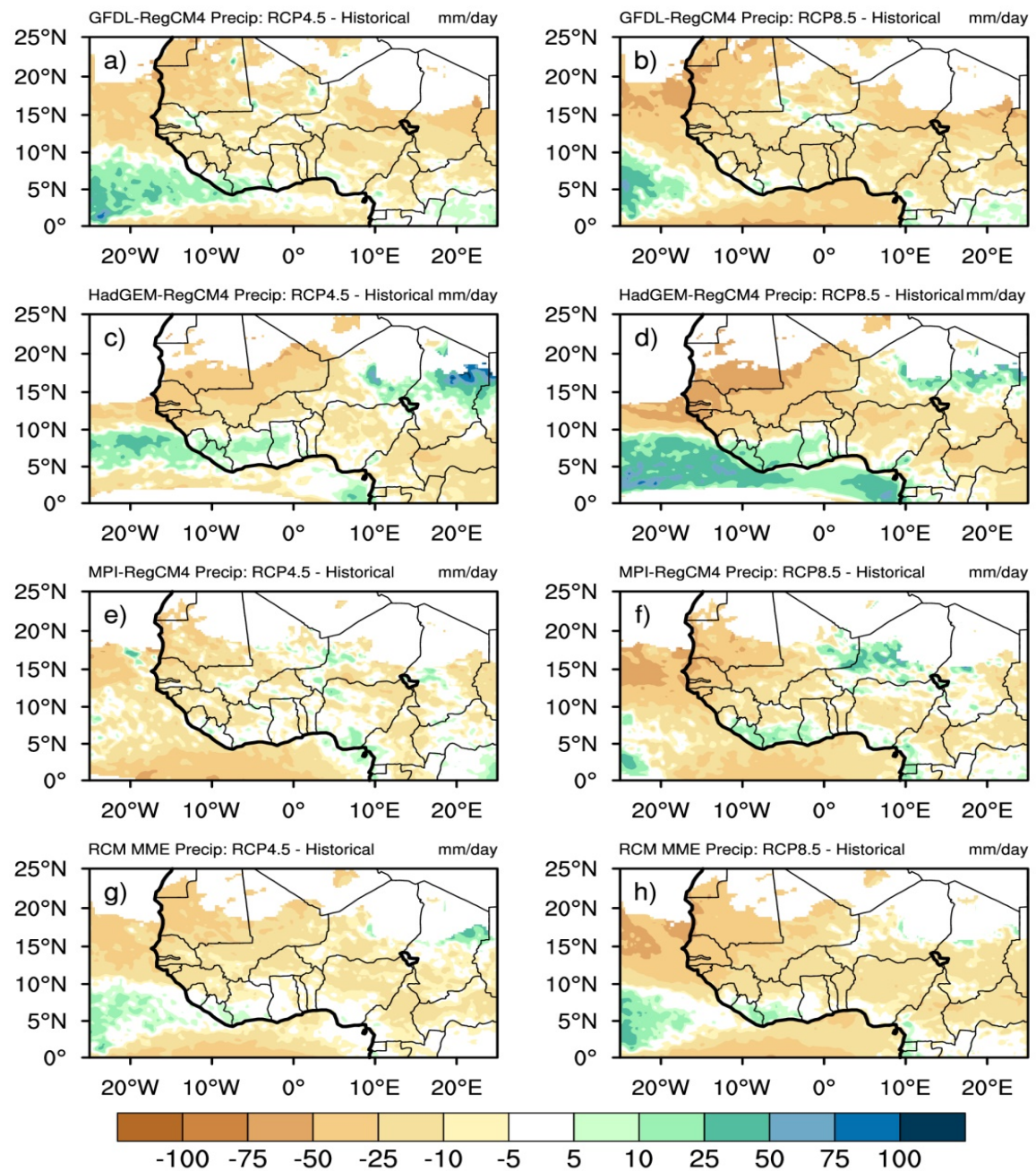
III/ Results ...

- Consistent to the IPV gradient
- Consistent to the precipitation distribution
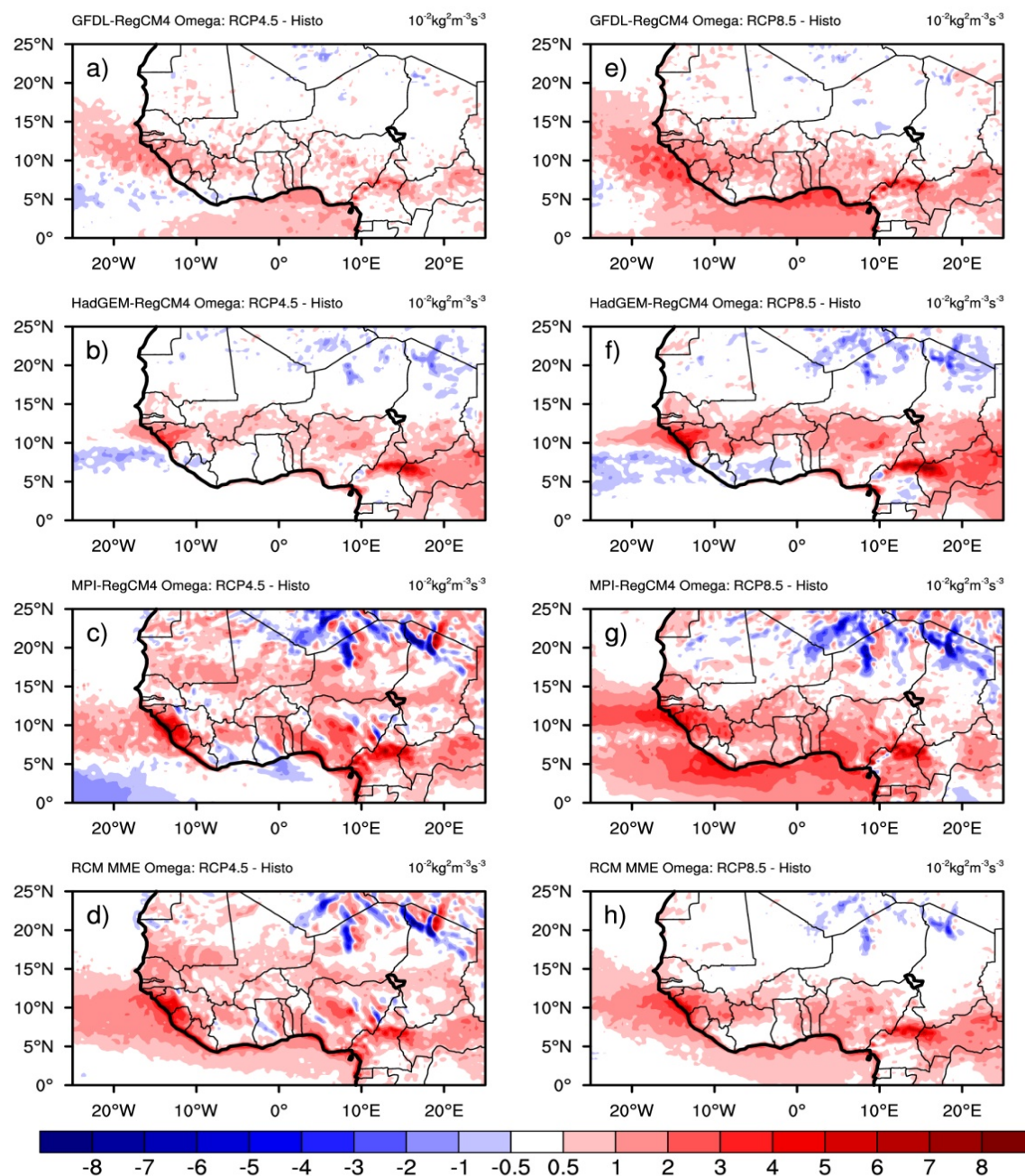
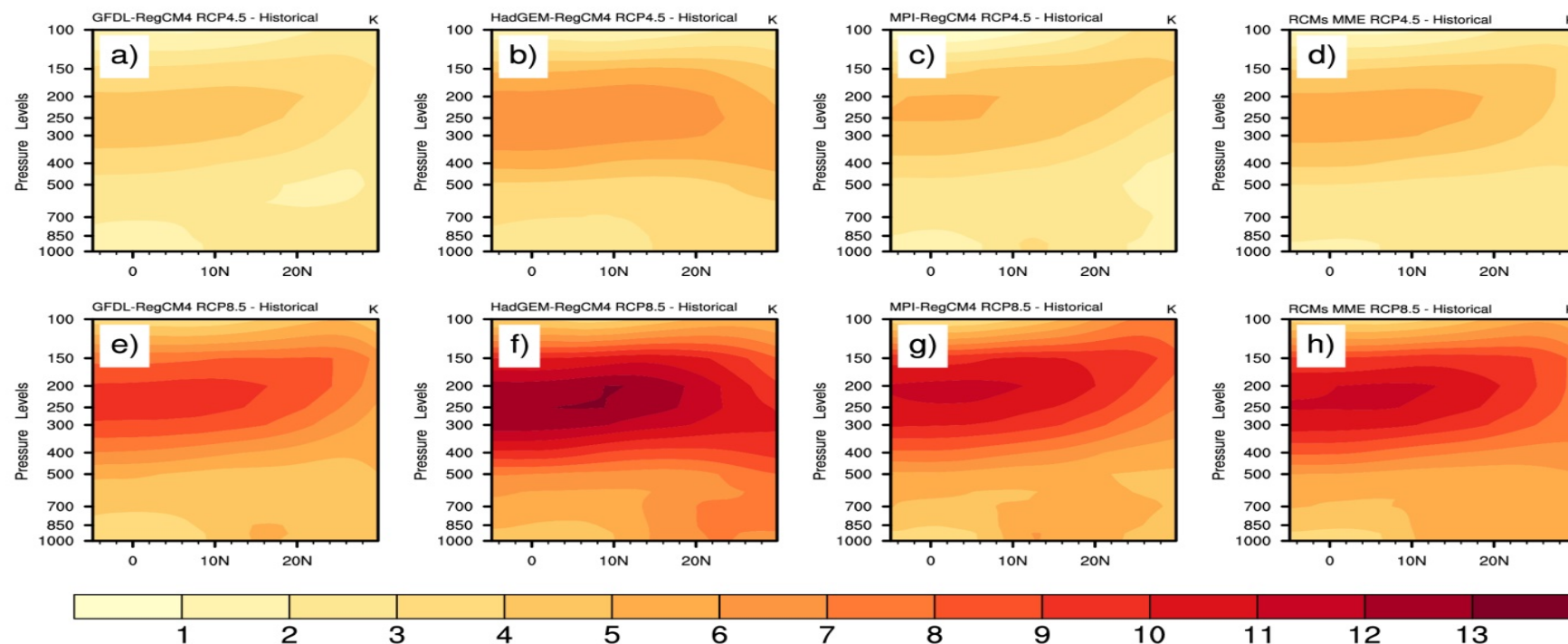# III/ Results …

❑ Projected changes

 - Decreased precipitation

III/ Results …

- Decreased vertical motion

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III/ Results …

- Positive changes in potential temperature in the upper layers

Block the ascent and induce subsidence

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III/ Results …
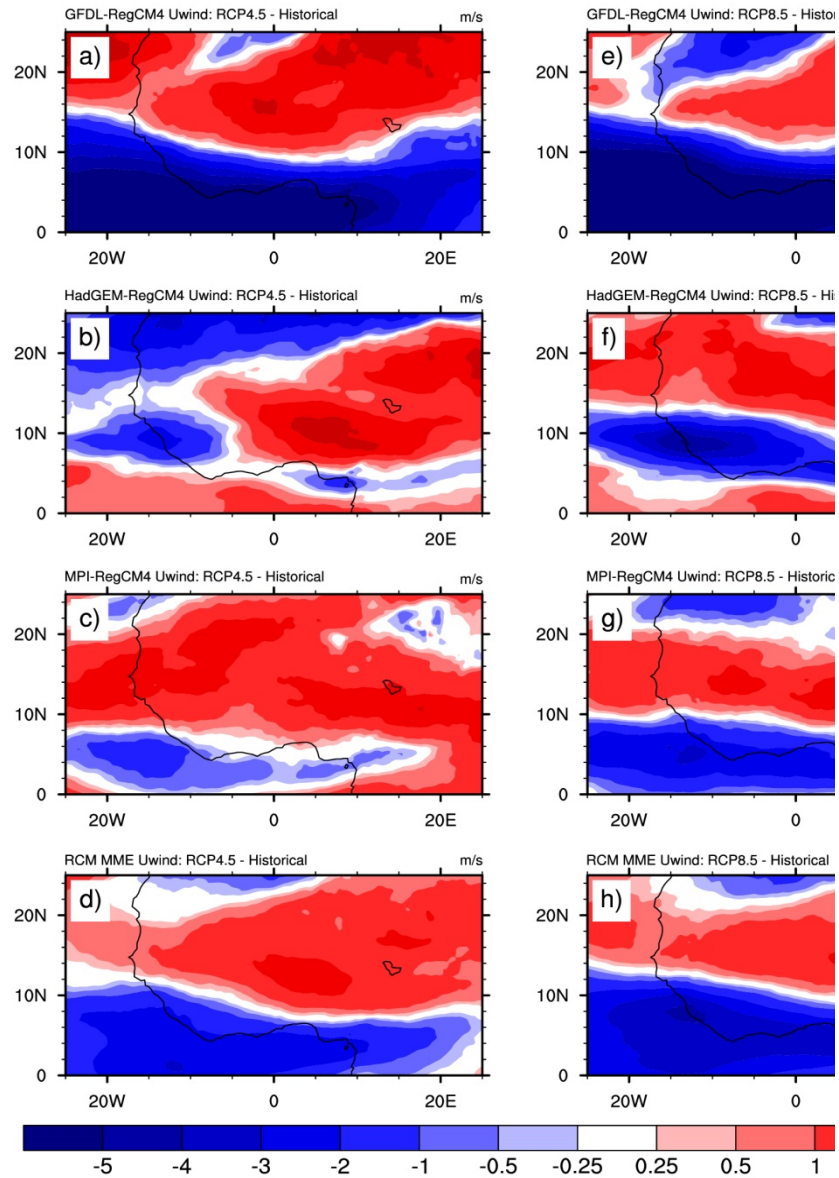
2-10 days AEW Activity
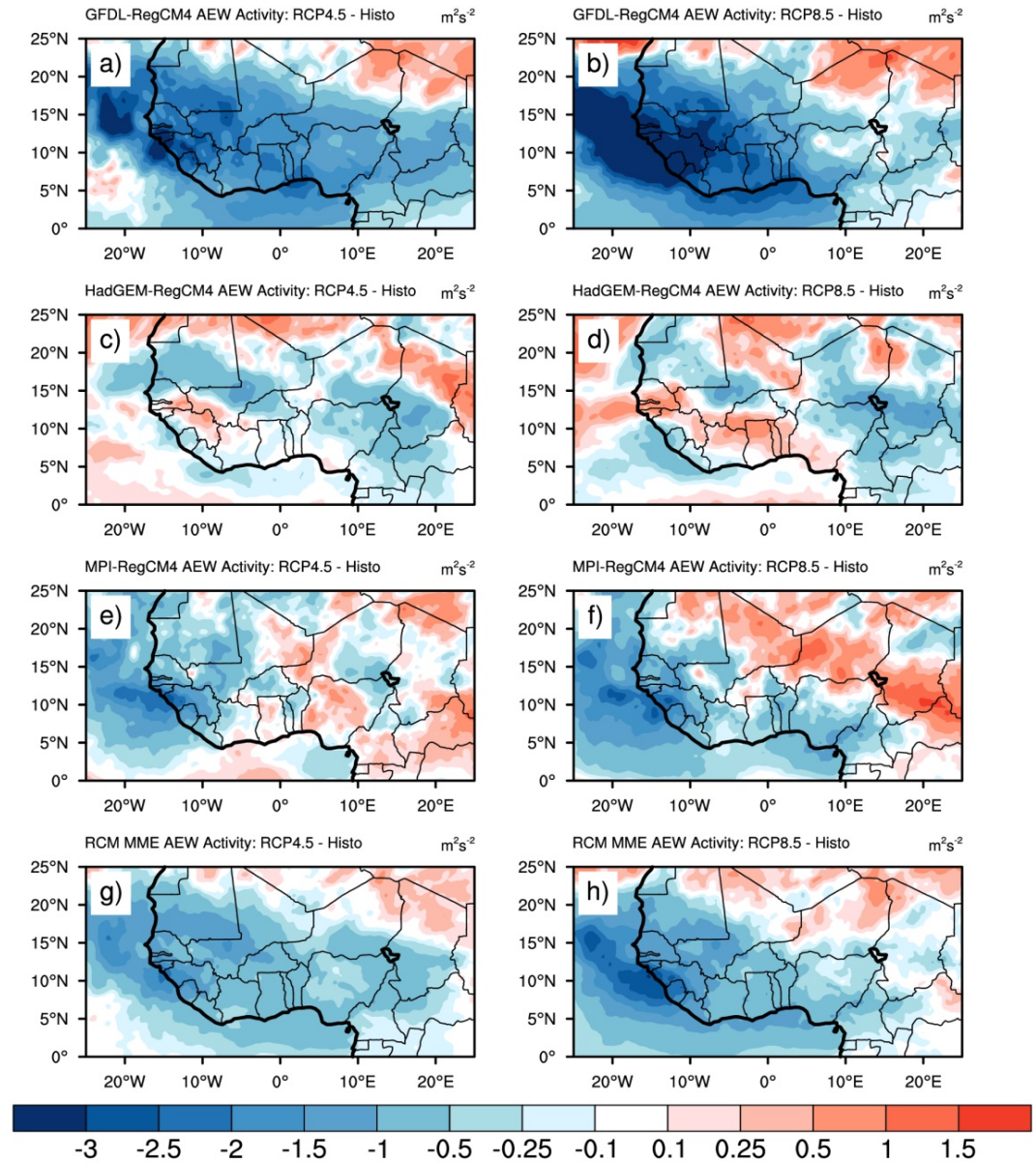
IV/ Conclusion …

- Different performances of the driving GCMs

- RegCM4 improves all of them

- MPI-ESM and MPI-ESM/RegCM4: best simulations

- Better simulations of the interactions between the different monsoon features

- Each experiments is internally consistent

- How to select a set of GCM to downscale?

- A set of GCMs that capture the monsoon dynamics?

- A set of GCMs with different bias (wet, average and dry?)

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Thank you for your attention

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