RegCM4-CLM COUPLING: Sensitivity to Grell and Tiedtke Convection Scheme over African CORDEX Domain

RegCM4 GROUP 15 :

David Adukpo, Guiling Wang, Babatunde Abiodun, Bedassa Cheneka, Jean Bell, Nsadisa Faka

TUTOR: GULILAT T Diro

OUTLINE

- Objective
- Sensitivity Grell Convection Scheme
- Sensitivity Tiedtke Convection Scheme
- Comparison of Grell and Tiedke Scheme
- Conclusion
- Outlook

OBJECTIVES

- To validate RegCM-CLM over African CORDEX domain
- Test the sensitivity of Grell and Tiedike convection schemes over the domain

EXPERIMENTAL DESIGN

- **DOMAIN: (CORDEX – Africa)**

LON: -45 : 70
LAT: -44 : 44

RESOLUTION: 50km

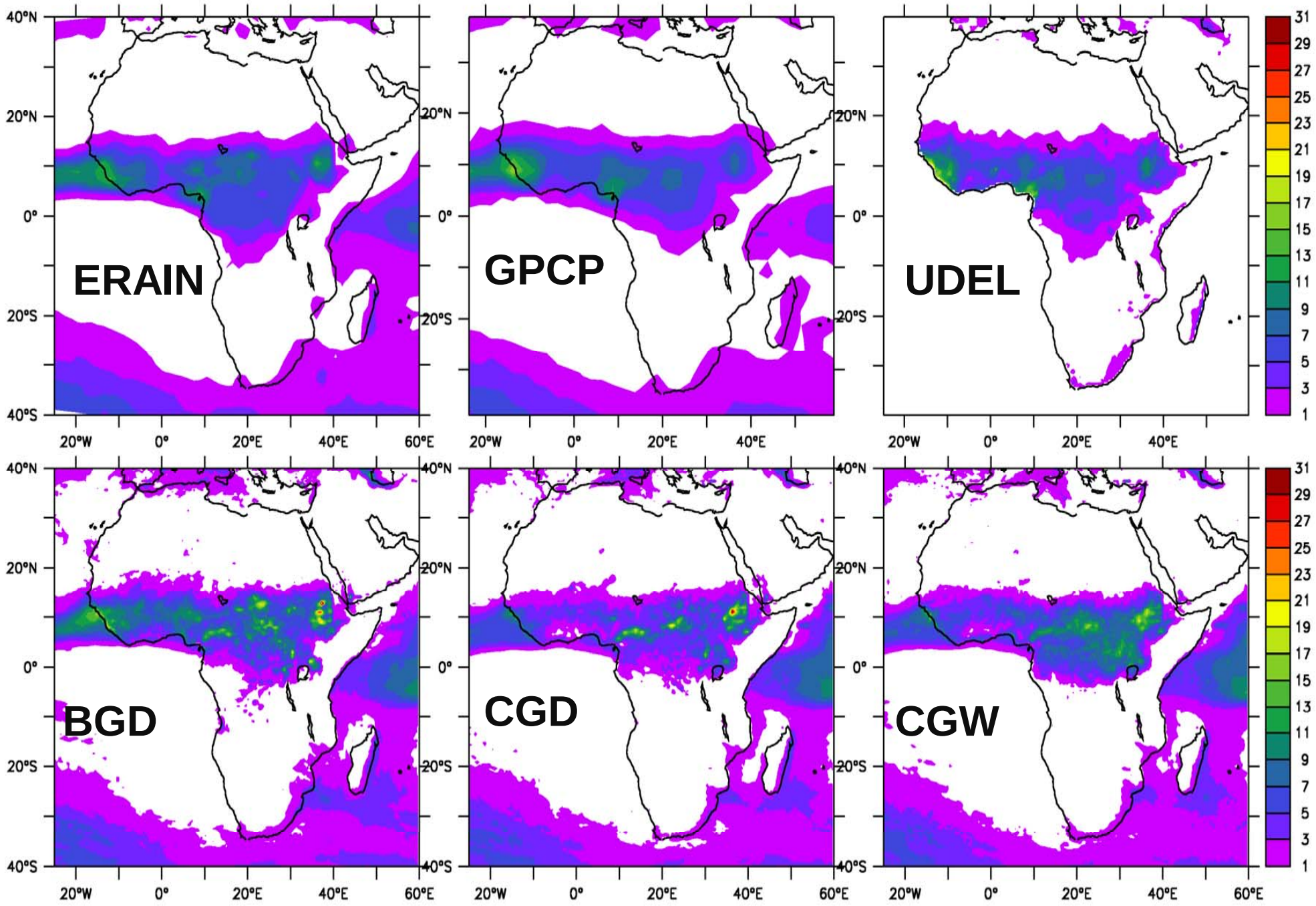
Sensitivity of RegCM-CLM to GRELL convection Scheme

BGD = BATS with Grell Scheme using Default (dry) setting (edtmax = 1) –> Control run

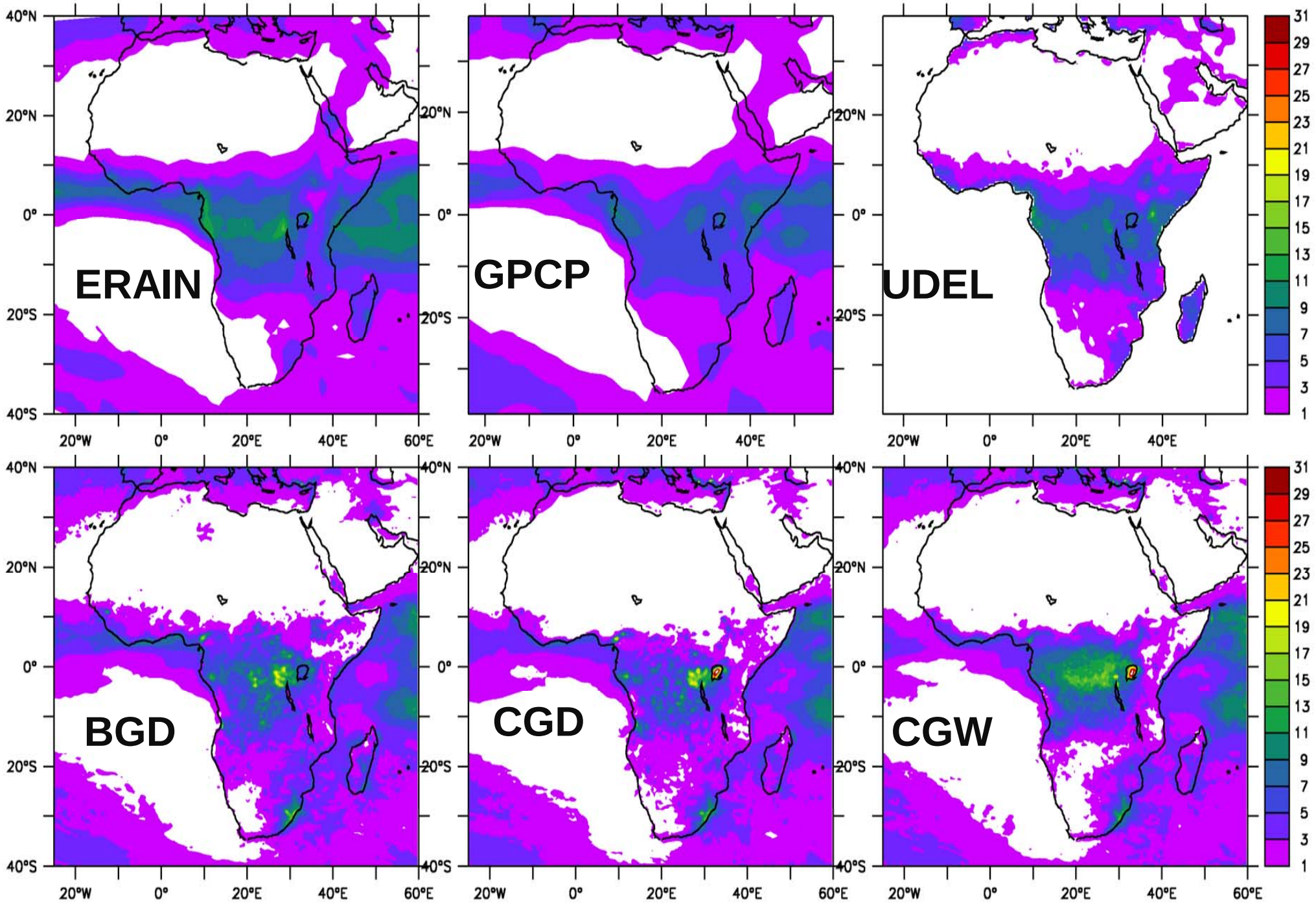
CGD = CLM with Grell Scheme using Default (dry) setting (edtmax =1)

CGW = CLM with Grell Scheme using Wet setting (edtmax = 0.5)

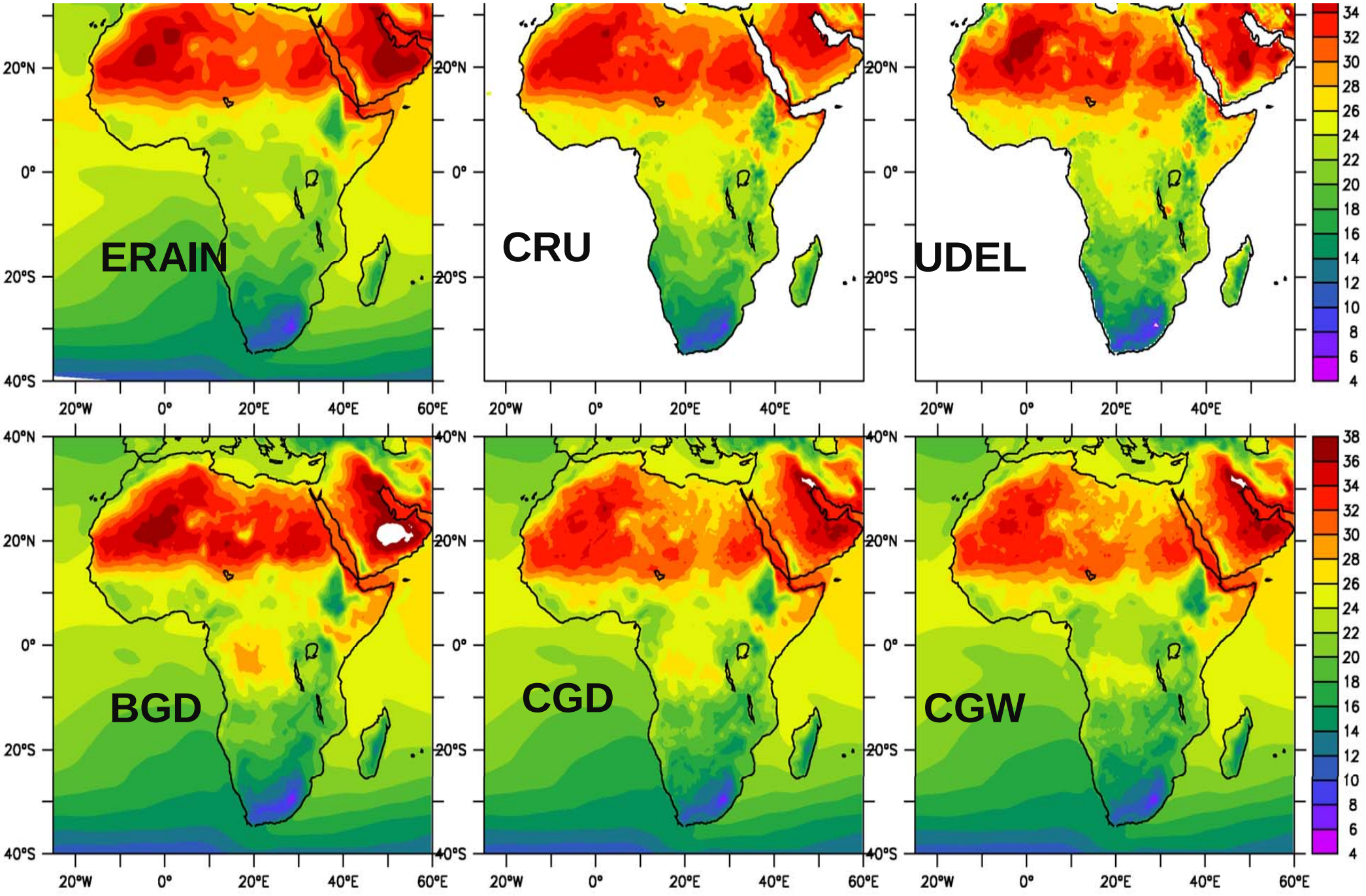
RAINFALL JJAS



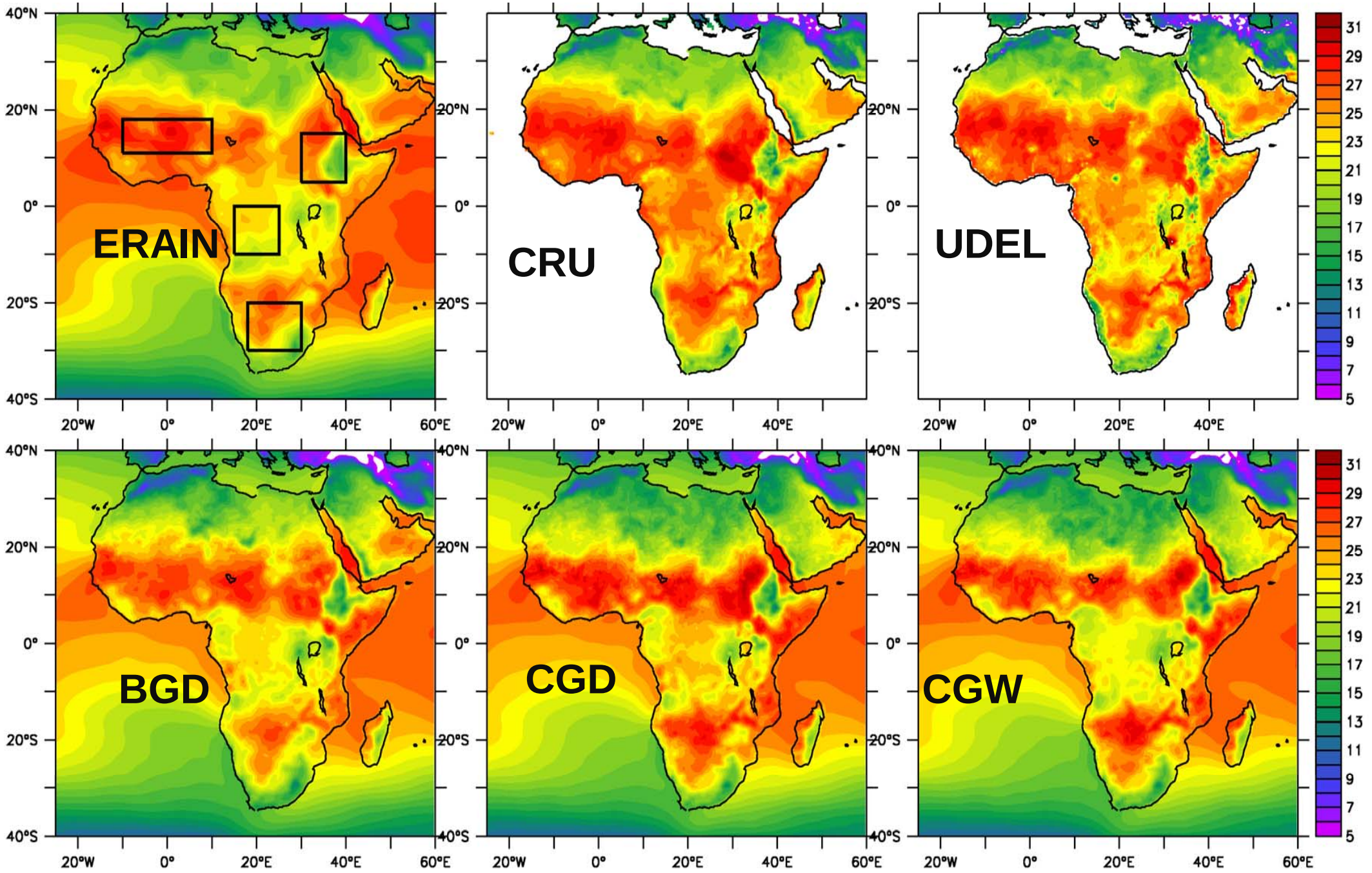
RAINFALL OND



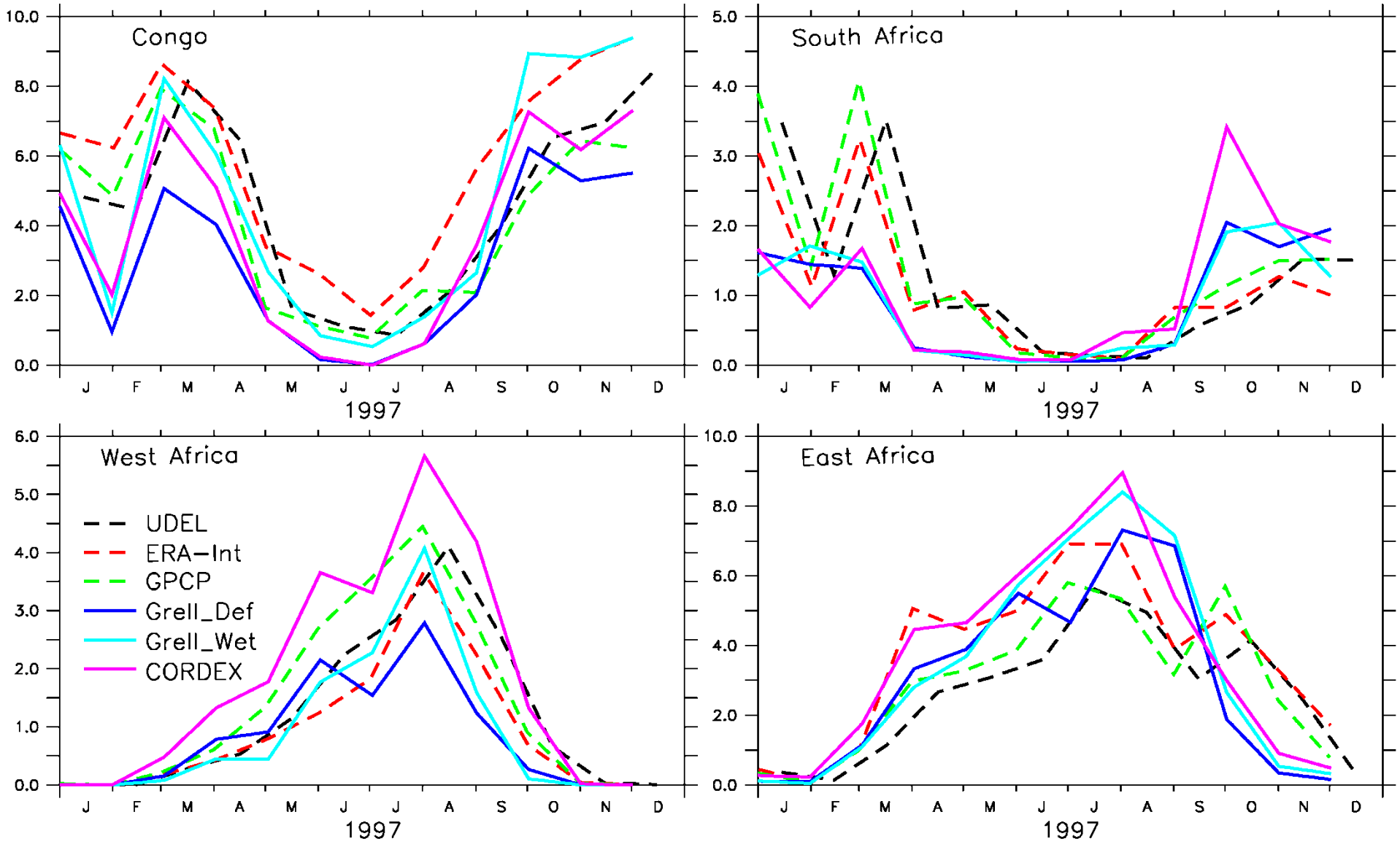
TEMPERATURE JJAS



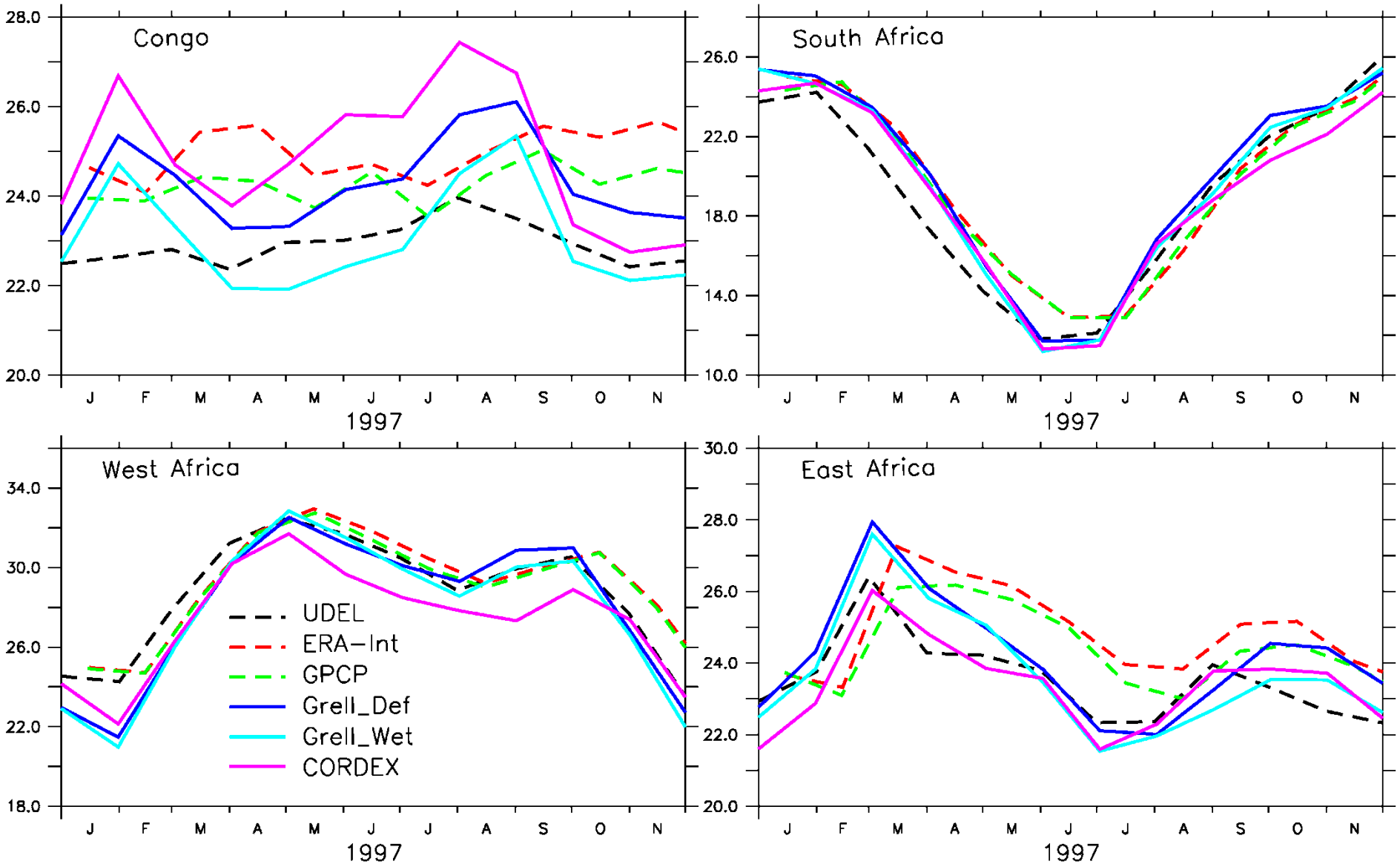
TEMPERATURE OND



RAINFALL (Annual Cycle)



Temperature Annual Cycle



Sensitivity of RegCM-CLM to Tiedtke convection Scheme

- Sensitivity to Entrainment rate:

  CTKD = entrpen=1.0D-4

  ENTH = 0.5D-4

  ENTD = 2.0D-4

  Sensitivity to CAPE adjustment time scale

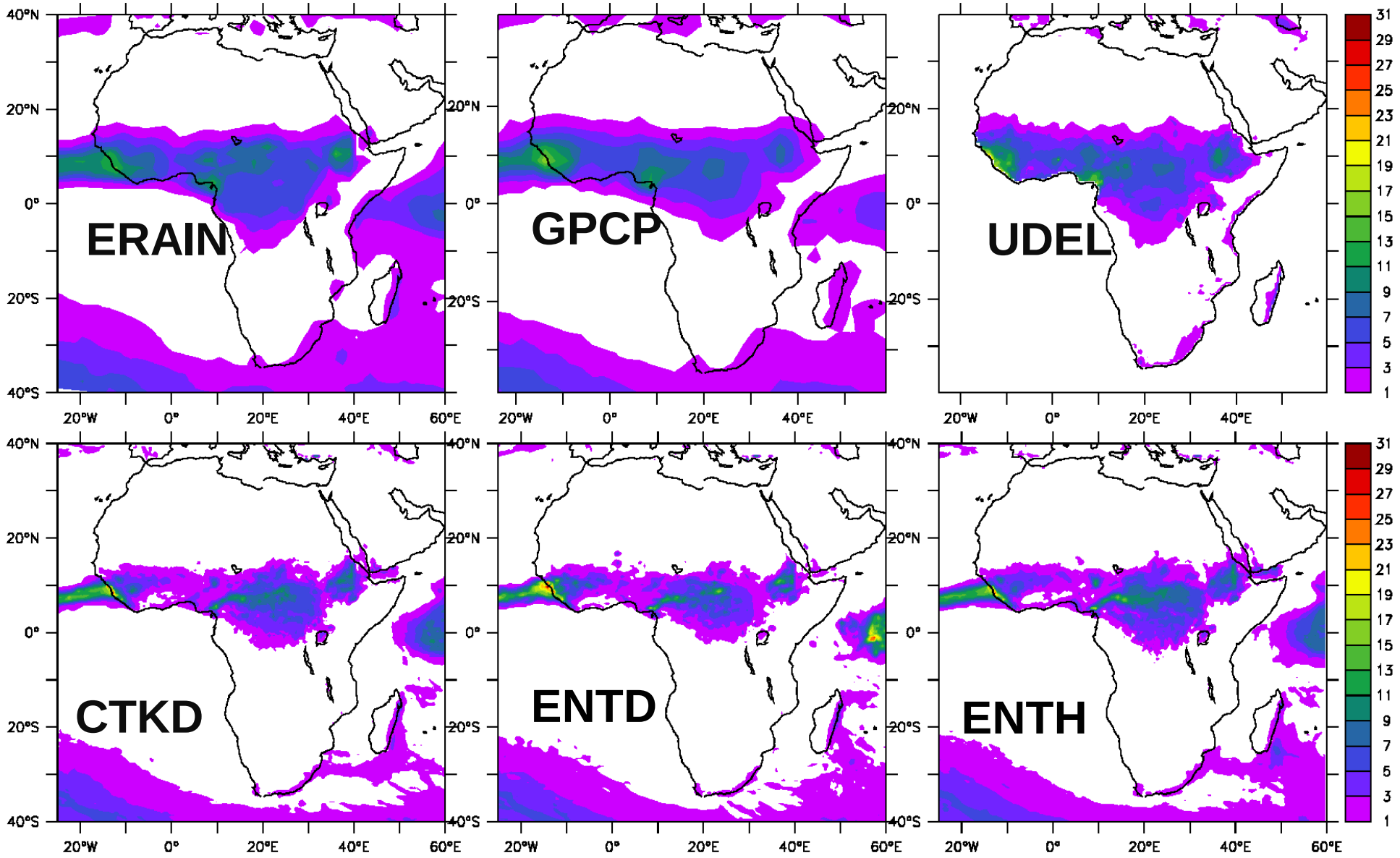
  CTKD =40.0

  CAPTD =80.0

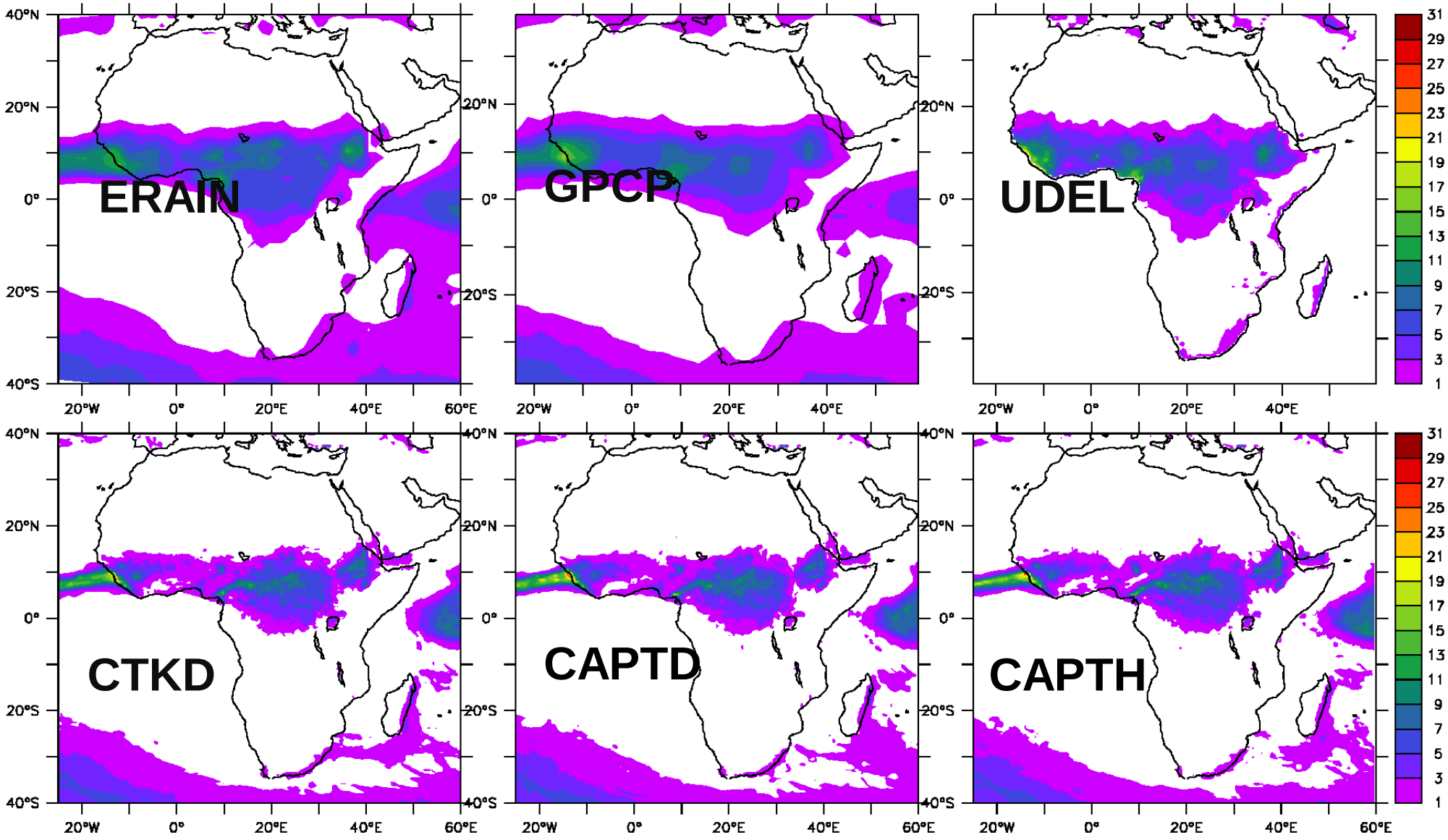
  CAPTH =20.0

Sensitivity to Entrainment rate

RAINFALL JJAS



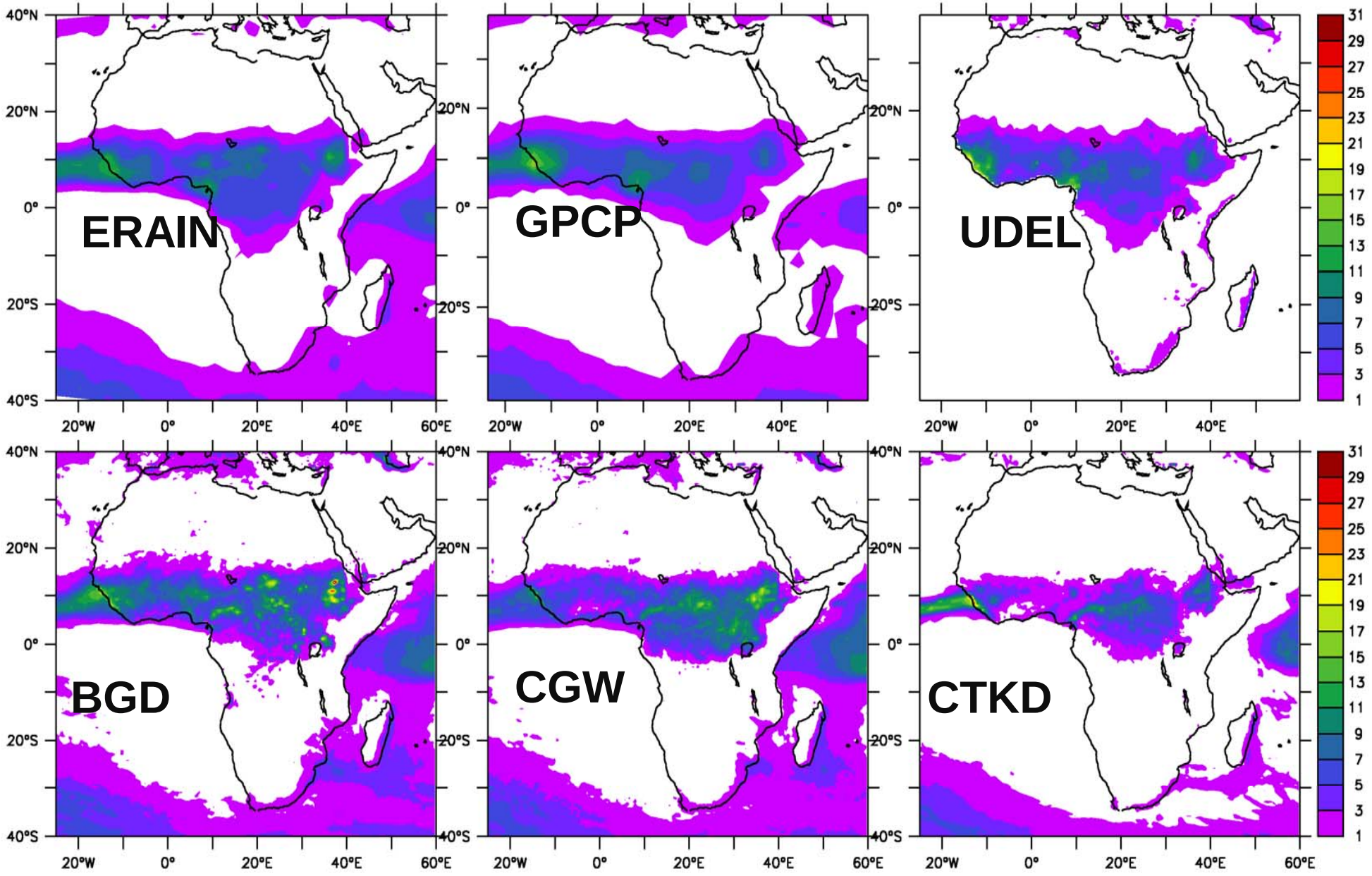
Sensitivity to CAPE Time Scale
RAINFALL (JJAS)



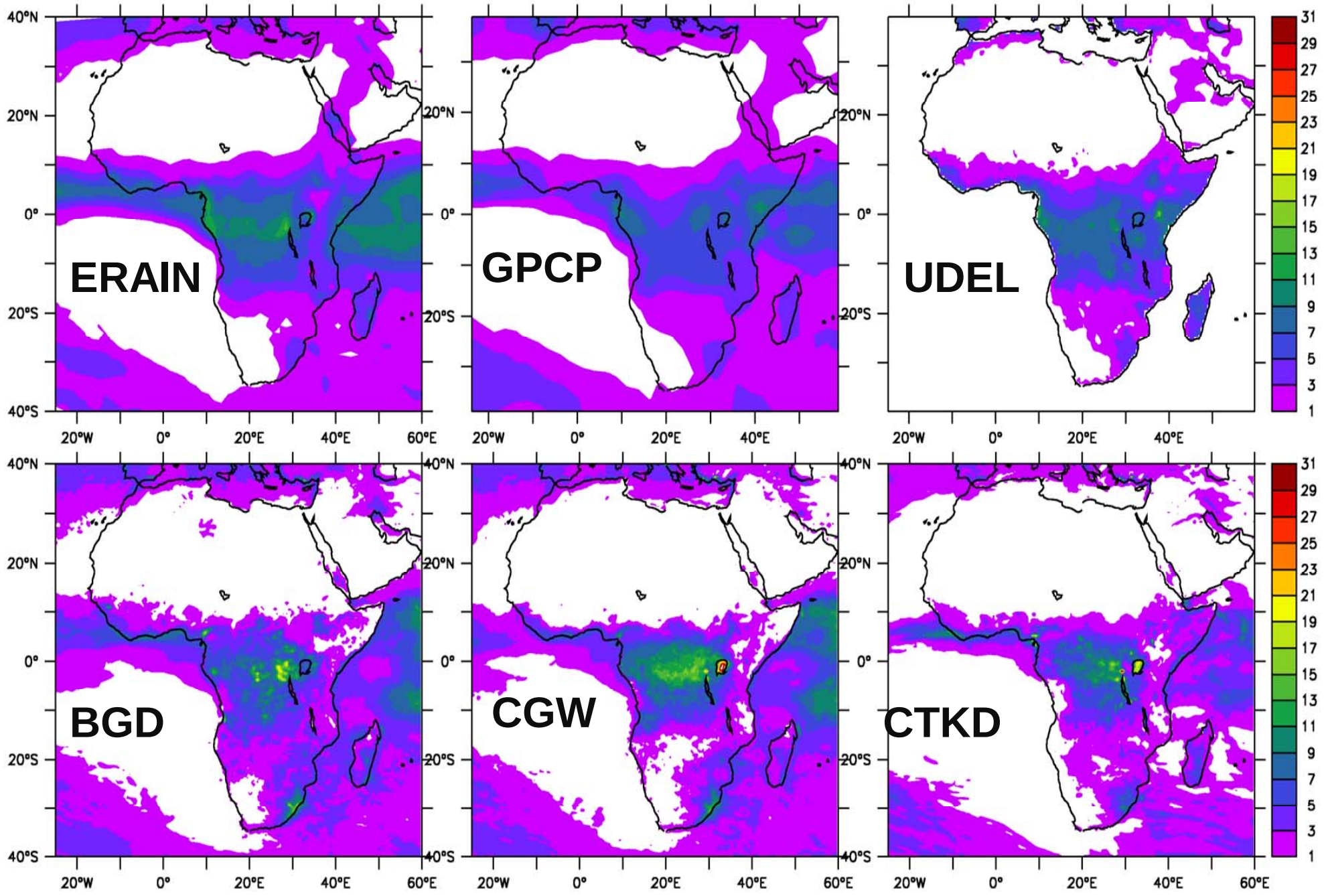
Validation of RegCM-CLM Comparison of Grell and Tiedtke Scheme

BGD = Default (BAT + Grell)
CGW = CLM + Grell (wet)
CTKD = CLM + Tiedtke (Default)

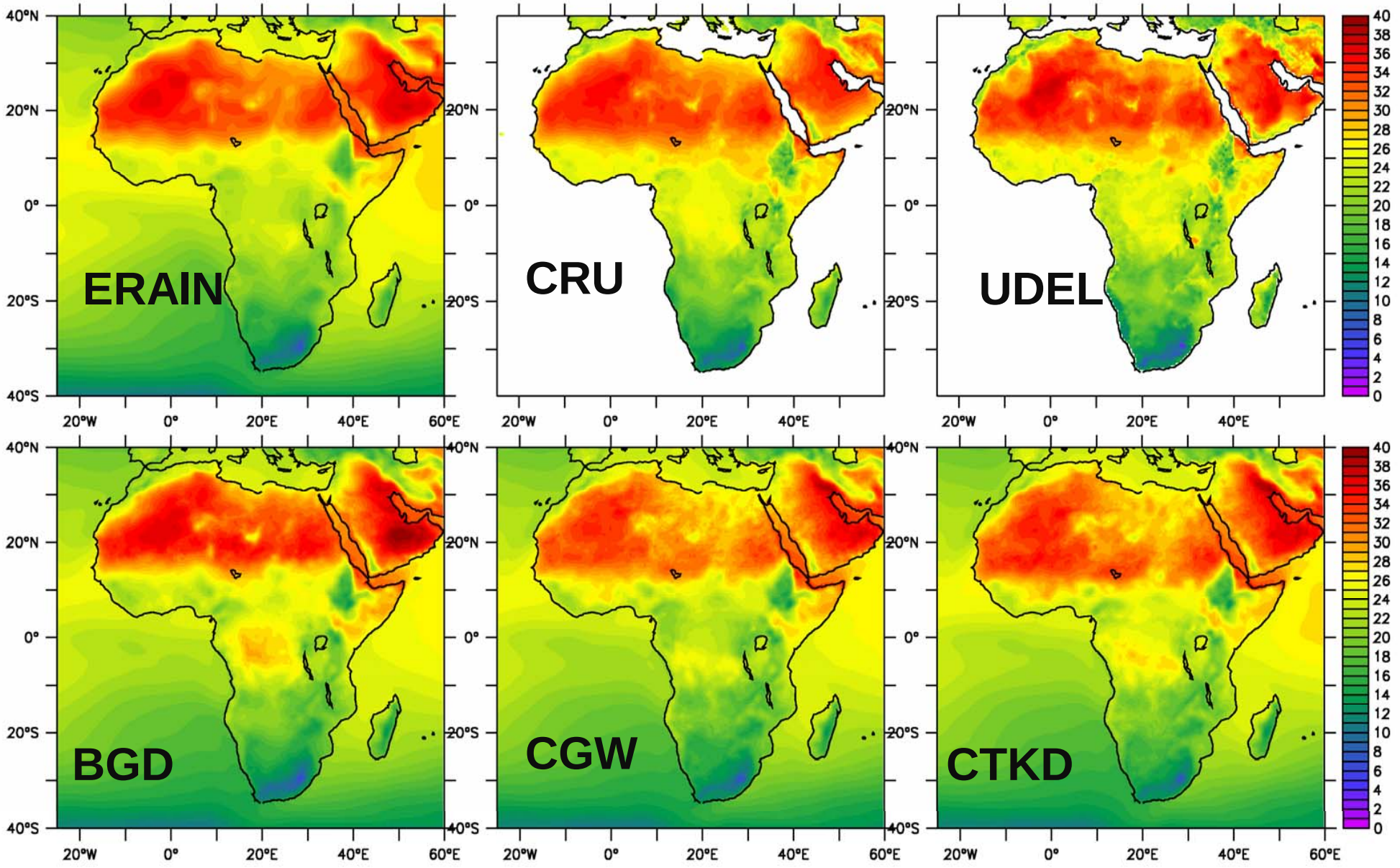
RAINFALL JJAS



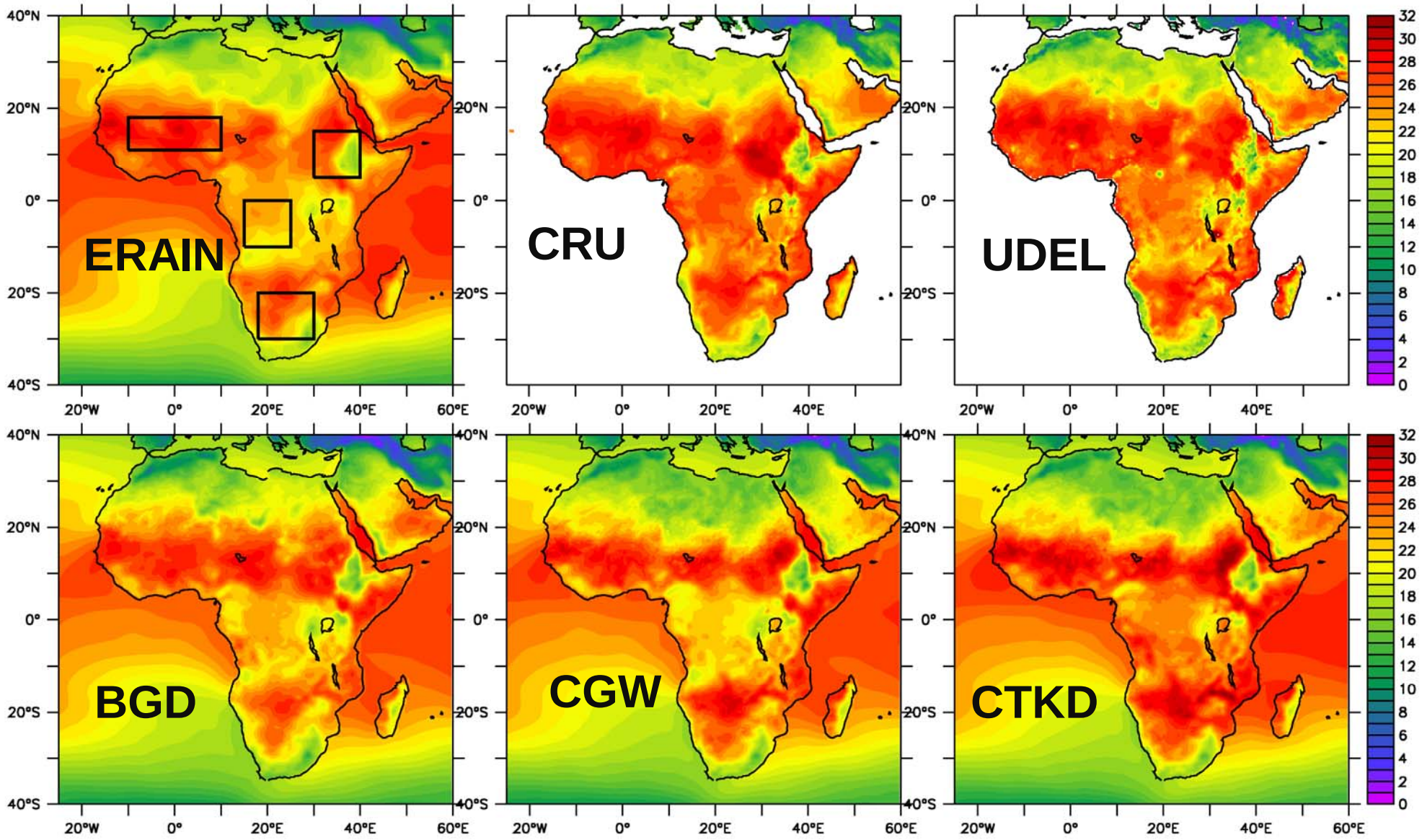
RAINFALL OND



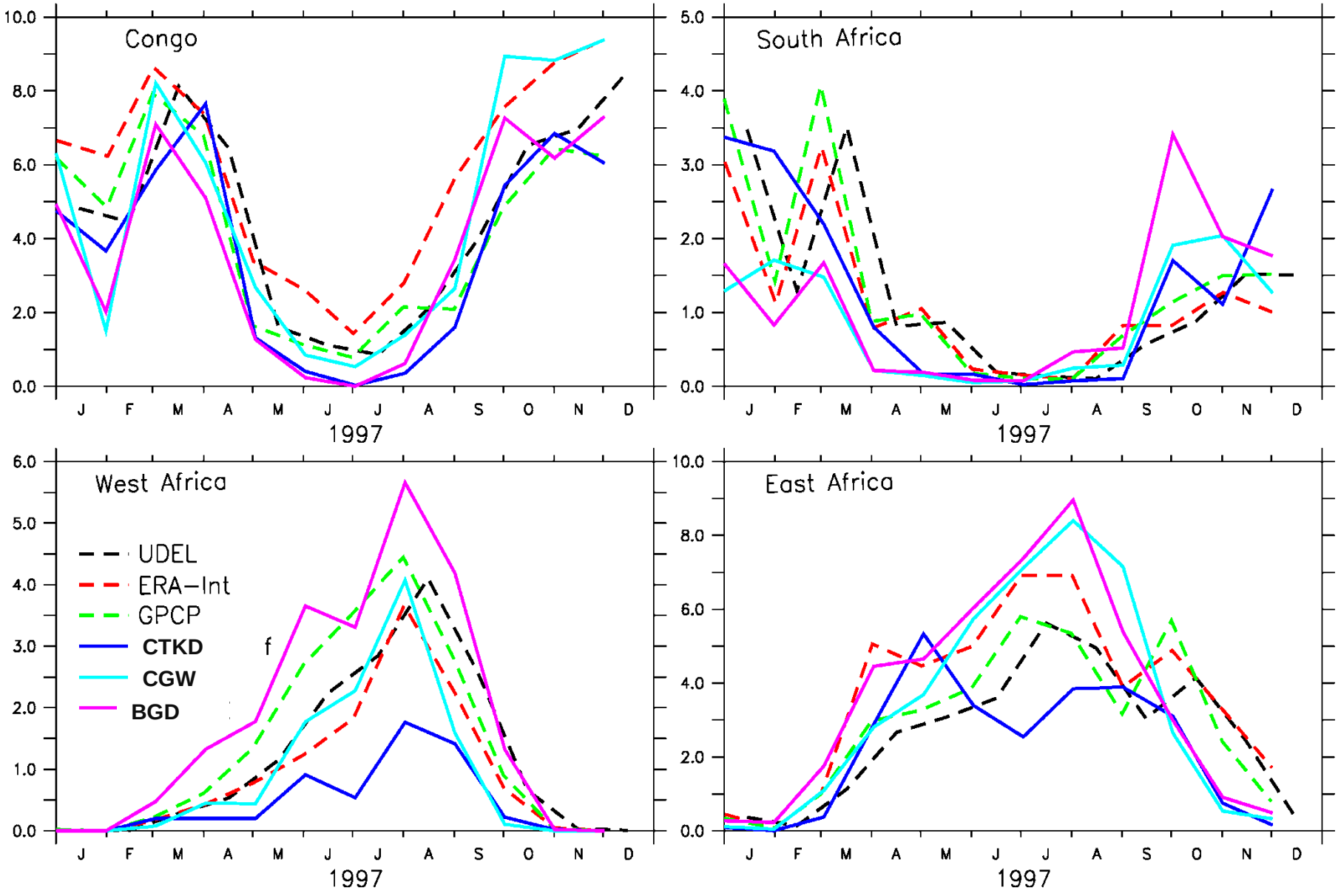
TEMPERATURE JJAS



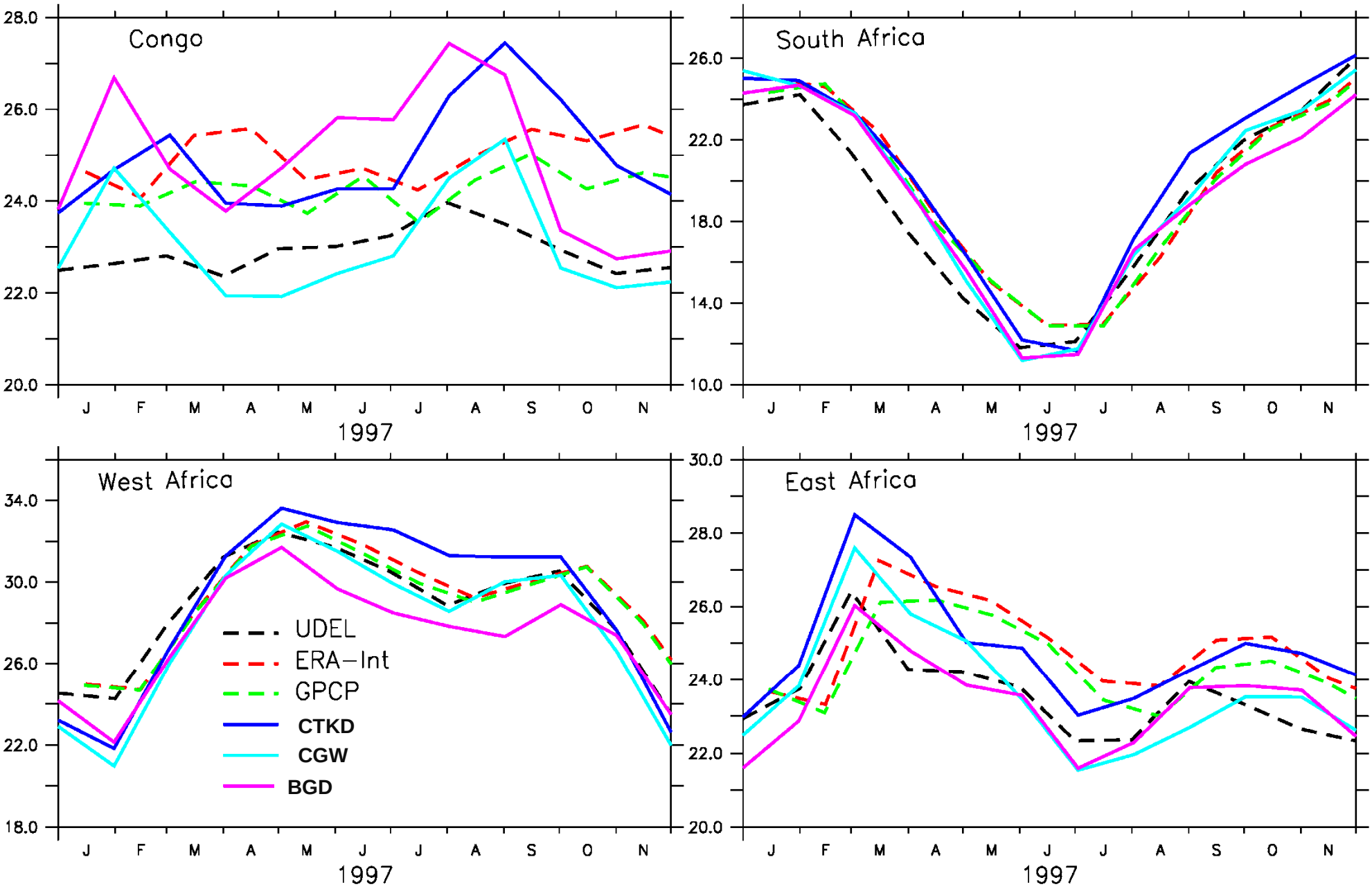
TEMPERATURE OND



RAINFALL Annual Cycle



Temperature Annual Cycle



Conclusion

The study found that:

- The combination of CLM + Grell (wet) gives a comparable result with BATS+Grell (dry) over African

- The combination of CLM+Tiedtke (default) produces dry climate over African domain, and Tiedtke does not show appreciable sensitivity to entrainment rate and CAPE adjustment time scale.

- Nevertheless, longer simulations are needed to establish these tentative results

THANK YOU

GRAZIE