

# **CORDEX: The Coordinated Regional Downscaling Experiment**

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*With input from F. Giorgi, M. Rixen, C. Jones*

Details at:

<http://wcrp-cordex.ipsl.jussieu.fr/>  
(Search: "WCRP CORDEX climate")

# General Aims and Plans for WCRP CORDEX

Provide a set of regional climate scenarios covering the period 1950-2100, for the majority of the populated land-regions of the globe.

Make these data sets readily available and useable to the impact and adaptation communities.

Provide a generalized framework for testing and applying regional climate models and downscaling techniques for both the recent past and future scenarios.

Foster coordination between regional downscaling efforts around the world and encourage participation in the downscaling process of local scientists/organizations

# CORDEX Science Advisory Team

		Region/Specialty
<b>Filippo Giorgi</b> (co-chair)	Earth System Physics Section The Abdus Salam International Centre for Theoretical Physics - Trieste, ITALY	JSC, Med-COR
<b>William Gutowski</b> (co-chair)	Dept. of Geological & Atmospheric Sciences Iowa State University - Ames, Iowa, USA	North America
<b>Silvina Solman</b>	Universidad de Buenos Aires Fac. Ciencias Exactas Y Nat.- Buenos Aires, ARGENTINA	South America
<b>R. Krishnan</b>	Centre for Climate Change Research (CCCR) Indian Institute of Tropical Meteorology - Pune, INDIA	South Asia
<b>Won-Tae Kwon</b>	National Institute of Meteorological Research Korea Meteorological Administration - Seoul, REPUBLIC OF KOREA	East Asia
<b>Isabelle Anguelovski</b>	Universitat Autònoma de Barcelona – Barcelona, SPAIN	VIA
<b>Chris Lennard</b>	University of Cape Town – Cape Town, SOUTH AFRICA	Africa
<b>Grigory Nikulin</b>	SMHI, Rossby Center – Norrköping, SWEDEN	Data Management
<b>Tannecia Stephenson</b>	University of West Indies – JAMAICA, TRINIDAD & TOBAGO, BARBADOS	Statistical Downscaling Central America
<b>Bertrand Timbal</b>	Bureau of Meteorology – Melbourne, AUSTRALIA	Statistical Downscaling

# WCRP Working Group on Regional Climate

(<http://www.wcrp-climate.org/index.php/regional-climate>)

Bruce Hewitson, CSAG/Univ of Cape Town (Co-Chair)

Clare Goodess, Univ of E Anglia (Co-Chair)

Tim Carter, Finland Environment Institute

David Behar, San Francisco Public Utility (U.S.A.)

Seita Emori, National Inst. for Environmental Studies (Japan)

Kendra Gotango, Ateneo de Manila University (Phillippines)

Fernanda Zermoglio, Sector Azul (Chile)

Igor Shkolnik, Dynamic Meteorology Dept. (Russia)

Filippo Giorgi, CORDEX SAT Co-Chair (Italy)

**First meeting - Vienna, April 6-7, 2013**

# CORDEX Phase I experiment design

Model Evaluation Framework

Climate Projection Framework

AMIP-  
like

Multiple regions (Initial focus on Africa)  
50 km grid spacing

CMIP-  
like

ERA-Interim LBC  
1989-2007

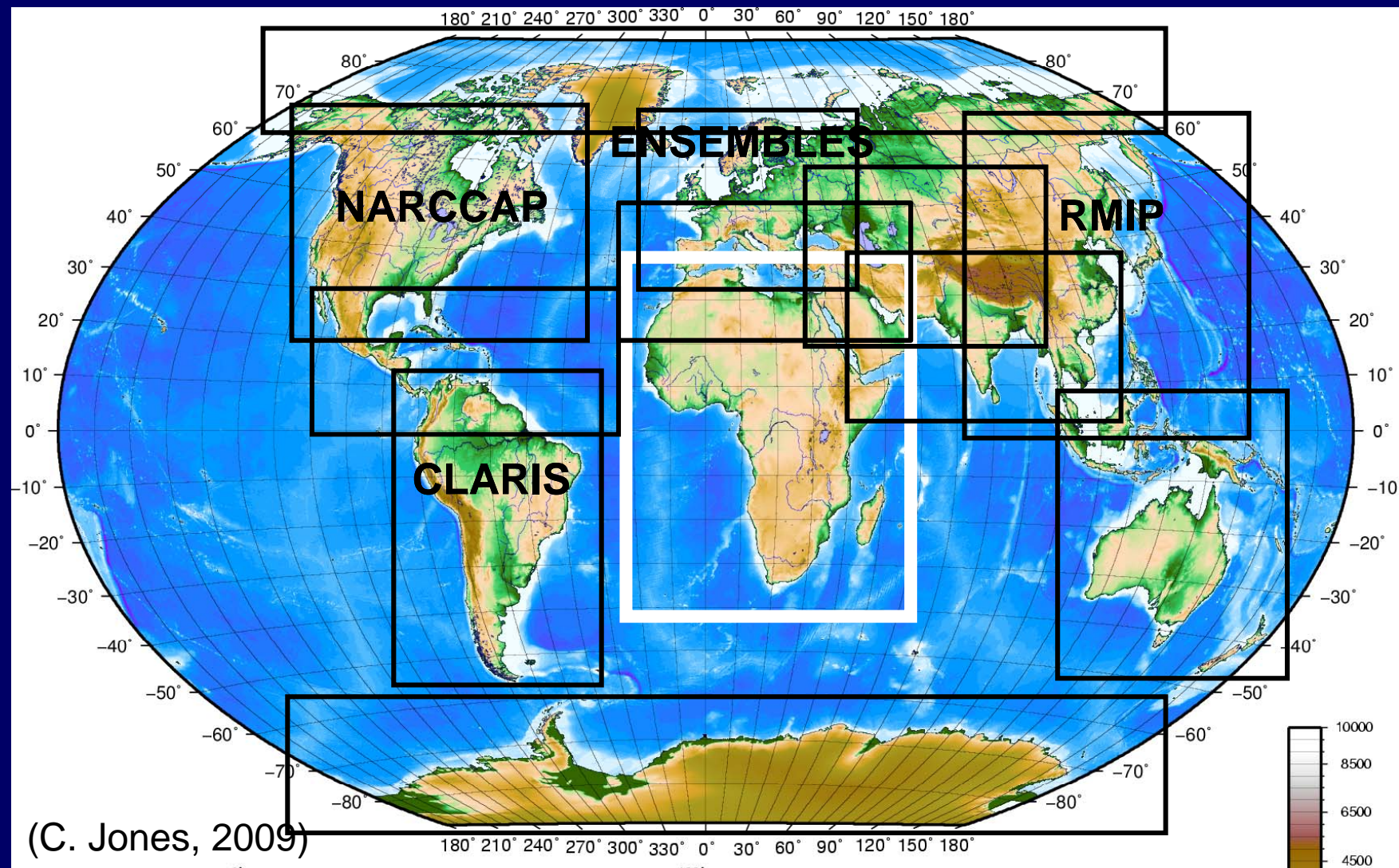
RCP4.5, RCP8.5  
1951-2100 or 1980-2050

Decadal predictions  
1980-2010, 1990-2000, 2005-2035

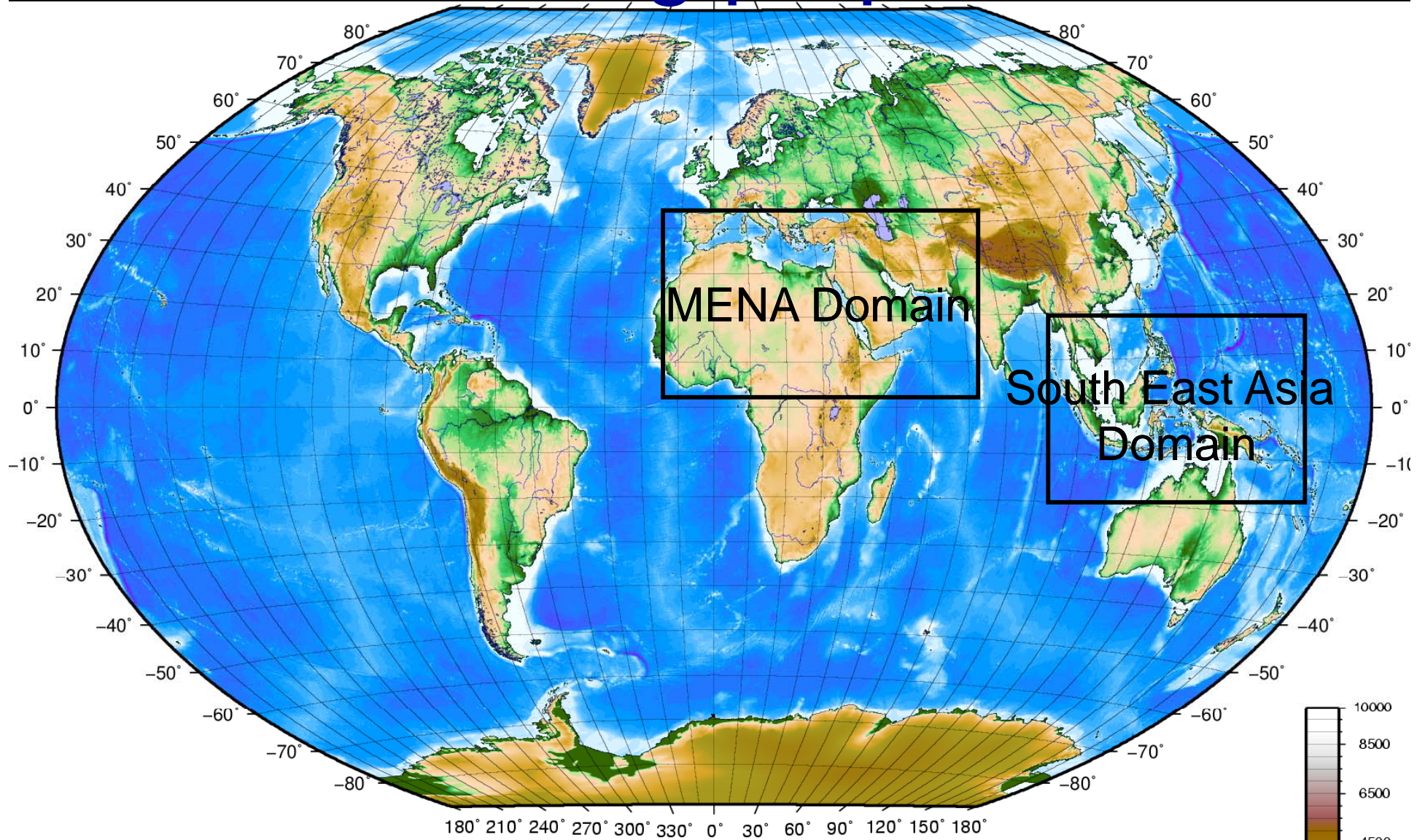
Regional Analysis  
Regional Databanks

Multiple AOGCMs

# Coordinated Regional Downscaling Experiment (CORDEX) ~ Regions ~



# Two new CORDEX domains are being proposed



# Progress in Various Regions (Examples)

1. Africa (10 RCMs)
  - Initial focus
  - Workshops promoting analyses by Africans
2. Euro-CORDEX (9 distinct RCMs + variants)
  - Runs at  $0.44^\circ$ ,  $0.22^\circ$  and (in process)  $0.11^\circ$
3. South America (7 RCMs)
  - Built off CLARIS
  - Publications submitted
4. CORDEX South Asia
  - Workshop Feb 2012
  - Workshop Aug 2013



# Progress in Various Regions (Examples)

## 5. CORDEX Arctic (~ 5 RCMs)

- Workshop March 2012
- Mtg. @ WCRP CORDEX Brussels (Nov 2103)

## 6. Med-CORDEX (9 RCMs, 12 A-O RCMs)

- Add to original regions
- Built off funded program

## 7. East Asia (7 RCMs)

- Built partly off APN RMIP program
- Workshops: Sep 2011, Nov 2012, Brussels 2013

## Plus: CORDEX Statistical Downscaling Workshop

- ICTP Trieste, 26-27 September 2013

# Where is North America?

1. UQAM (René Laprise) – 0.44°  
1989 – 2008: ERA-Interim  
1950 – 2100: CanESM & MPI GCMs  
Test runs at 0.11°
2. Météo-France (Philippe Lucas-Picher) – 0.5°  
1989 – 2008: ERA-Interim  
M-Fr may do GCM-driven case(s)
3. Canadian Climate Center, CCCma – 0.44° and 0.22°  
- CanESM2 driving CanRCM4
4. Related activities at UK Met Office, Argonne and Univ. AZ

Planning workshop for U.S. program in development, with support from U.S. Department of Energy (and potentially other U.S. federal agencies).

# CORDEX Data Management

- CORDEX output will use the Earth System Grid (ESG), like CMIP5
- Substantial development of output formatting, metadata, file structure, etc.
- New: file/format compliancy checker prior to data upload
- CORDEX nodes planned at BADC, DKRZ, DMI, SMHI, ENEA (MedCORDEX), UCT, IITM, KMA
- Current testing of the system by SMHI



# WCRP

World Climate Research Programme



# ipcc

INTERGOVERNMENTAL PANEL ON  
climate change



**International Conference on Regional Climate - CORDEX 2013**  
A partnership between WCRP, the European Commission and IPCC  
4 - 7 November 2013 - Brussels, Belgium

The Conference will bring together the international community of regional climate scientists to present and discuss results from WCRP regional climate studies, with a particular emphasis on the CORDEX initiative.

#### **4 Nov: High-Level Session**

- High-Level Session: key findings from the IPCC AR5 WGI: The Physical Science Basis
- Stakeholder Dialogue: regional climate information for decision-makers

#### **5-7 Nov: Science Segment**

- Key results from Regional Climate Research and Phase I of the CORDEX project



# ICRC-CORDEX 2013 conference

- Venue and dates: Brussels, 4-7 November 2013
- Two segments
  - Day 1: High level IPCC segment
  - Day 2-4: Scientific conference
- Expected attendance
  - Over 500 registrations
  - ~470 abstracts submitted
- Plenary + Poster sessions+ side focused meetings
  - CORDEX progress/achievements
  - Issues in dynamical and statistical downscaling
  - Application to IAV work
  - Future developments/directions
- Co-sponsorship by the EU Com. and other agencies

## Further Issues

- Needed: Mechanism for better coordination across activities in the different CORDEX domains and more generally across the wider CORDEX community
- Better communication across the CORDEX community (ongoing)
- Improvement in the CORDEX web-site management (ongoing)
- Mechanism for approving new CORDEX domains and activities
- Search for some core funding (CORDEX activities currently on voluntary basis)

# Looking to the Future: CORDEX 2?

- ★ Assess much more rigorously the added value of downscaling.
  - ★ Signal versus “noise” as a function of scale (temporal/spatial)
  - ★ Quantification of confidence levels
- ★ Perform cross comparison of methods: RCMs, statistical downscaling, high-resolution GCMs (stretched & uniform grids), hybrid approaches.
- ★ Produce more rigorously defined regions: VAMOS can help guide this.
- ★ Develop a co-learning community among all participants.
  - More guidance in design from VIA community and from operational practitioners (e.g., water managers, health officials, etc.)
  - User-oriented diagnostic and graphic tools

Thank You!

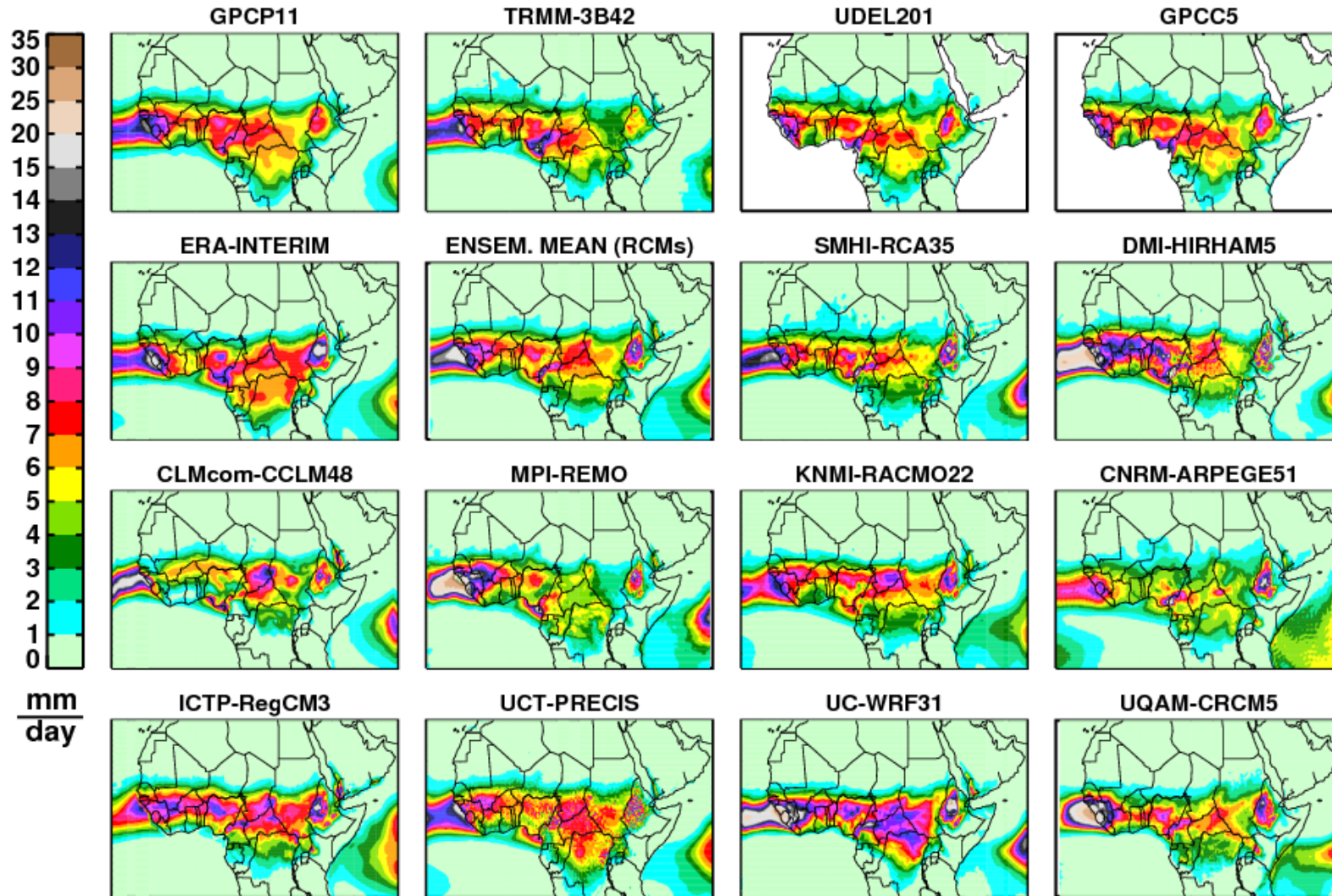




**Additional Slides**

# ERA-Interim Africa CORDEX multi-RCM matrix

Precipitation (pr) | JAS | 1998-2008



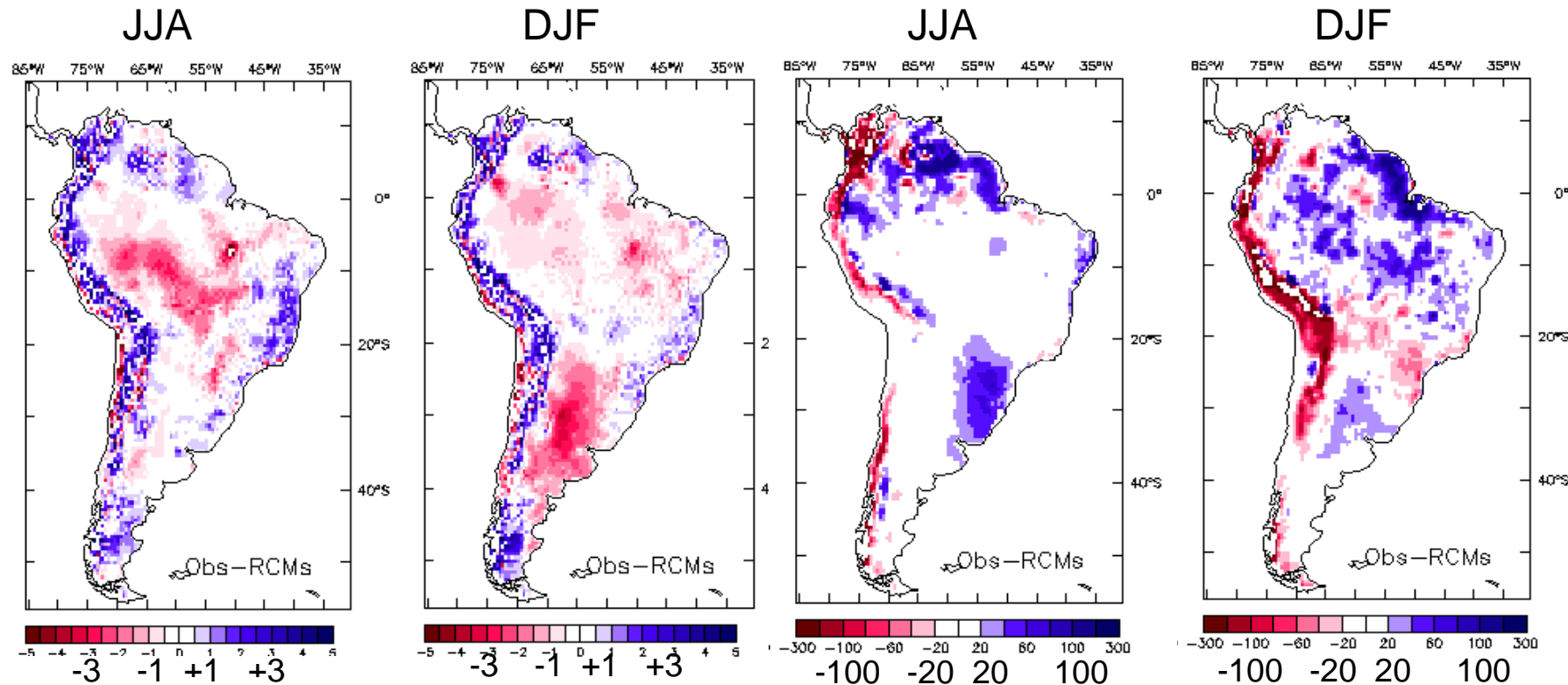
(C. Jones, 2012)

# South America

## 7 RCMs using ERA-Interim boundary conditions (1990-2008)

Temperature Bias (°C)

Precipitation Bias (mm/month)



Ensemble vs. (CRU & UDEL)

Ensemble vs. (GPCCC, CRU, UDEL & CPC)

(Solman et al., 2012 - submitted)