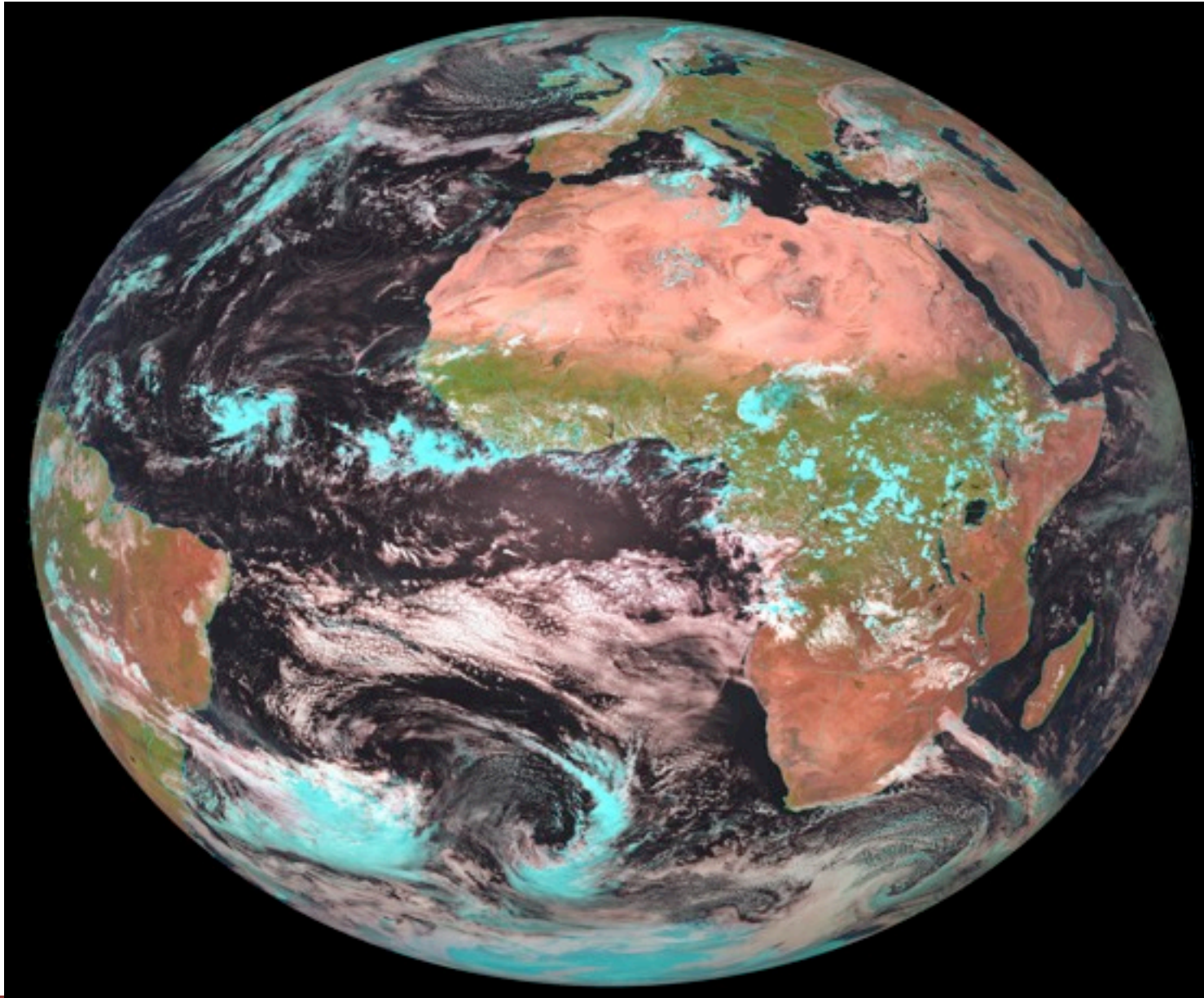


Co-Ordinated Regional Downscaling Experiment

C O R D E X - Africa



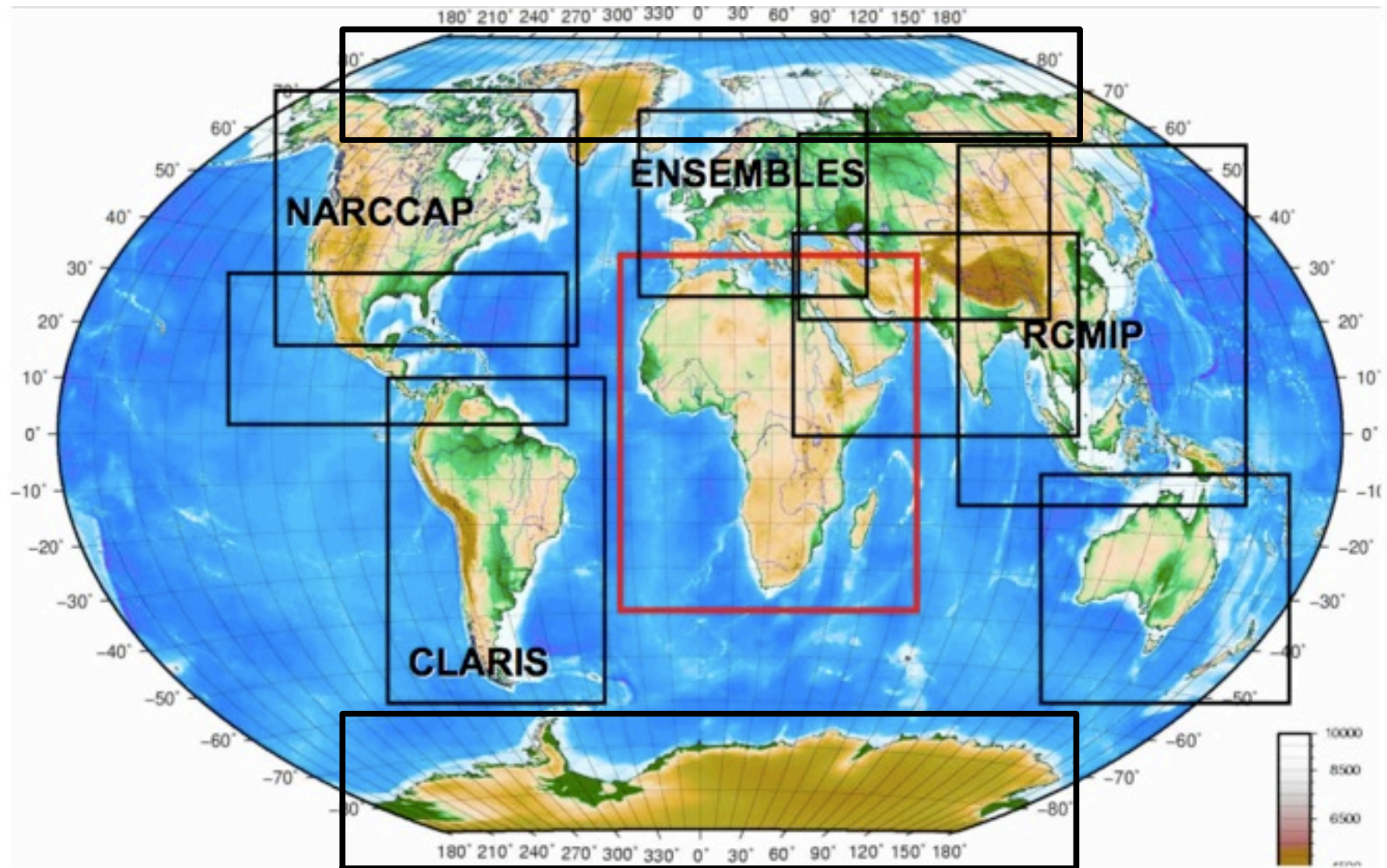
WCRP
World Climate Research Programme

START

SMHI

Chris
Lennard

Cordex regions



CORDEX Phase I experiment design

Model Evaluation
Framework

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

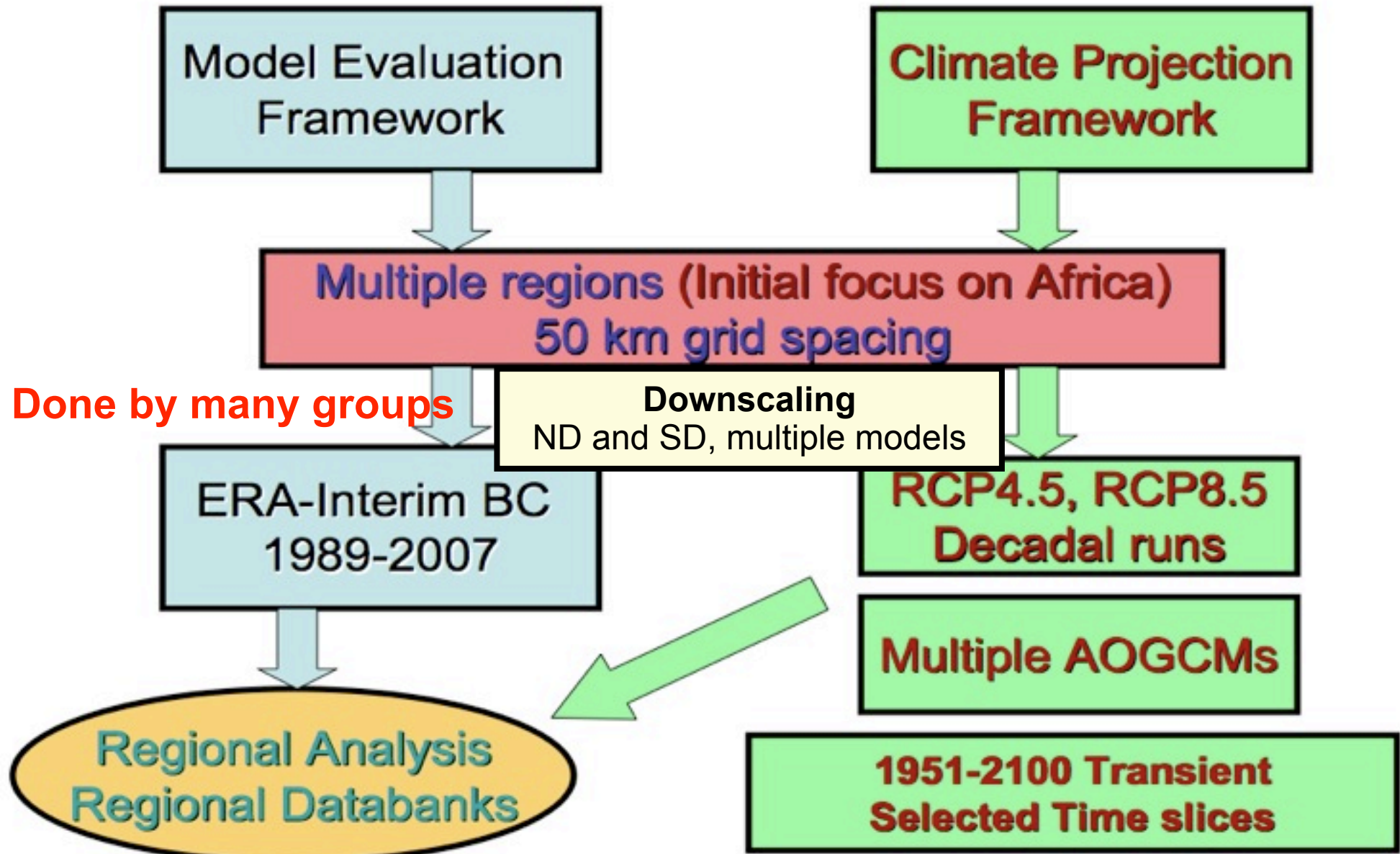
Done by many groups

Downscaling
ND and SD, multiple models

ERA-Interim BC
1989-2007

Regional Analysis
Regional Databanks

CORDEX Phase I experiment design



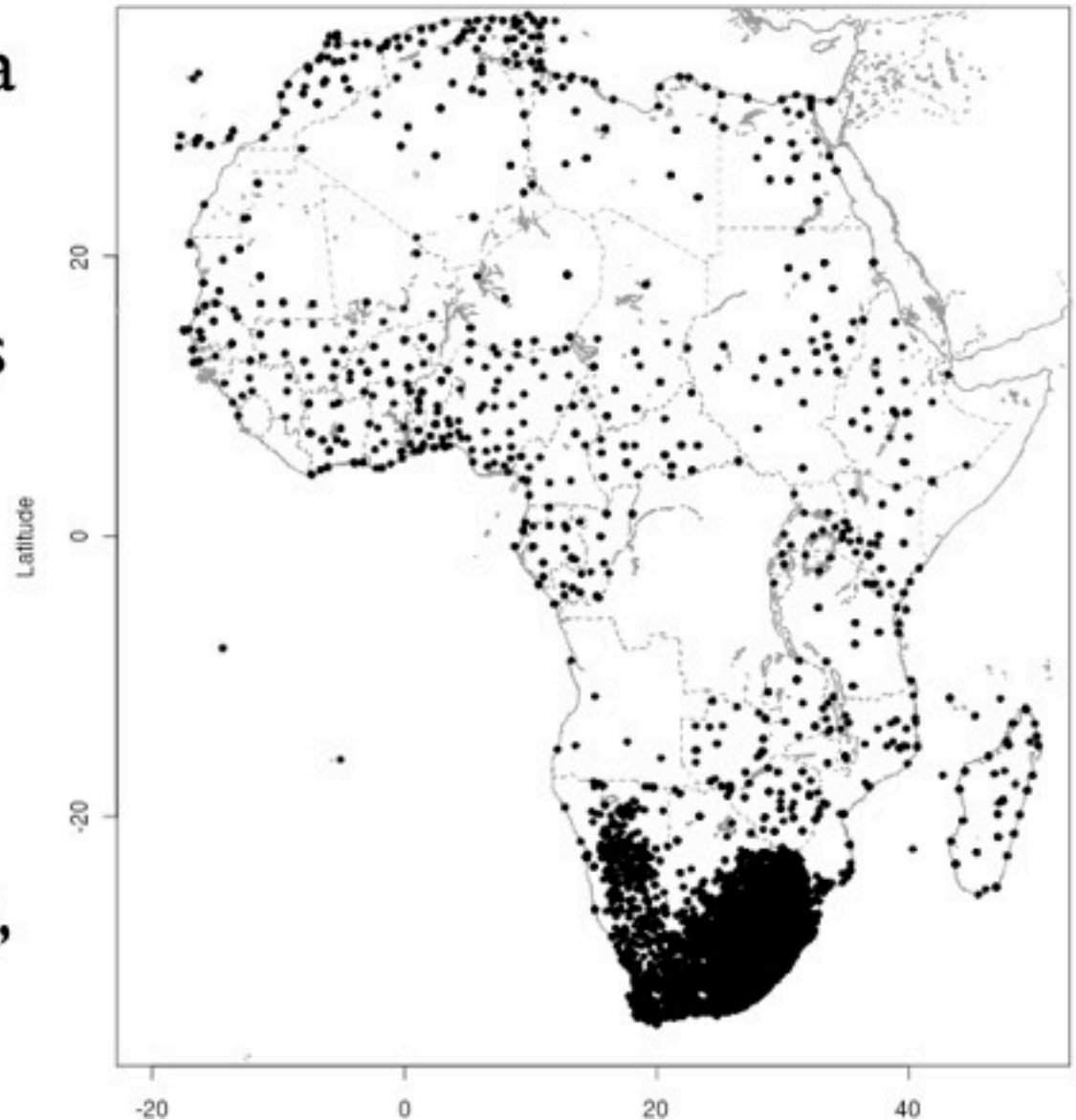
Cordex – Africa Analysis

Our observational data
problem

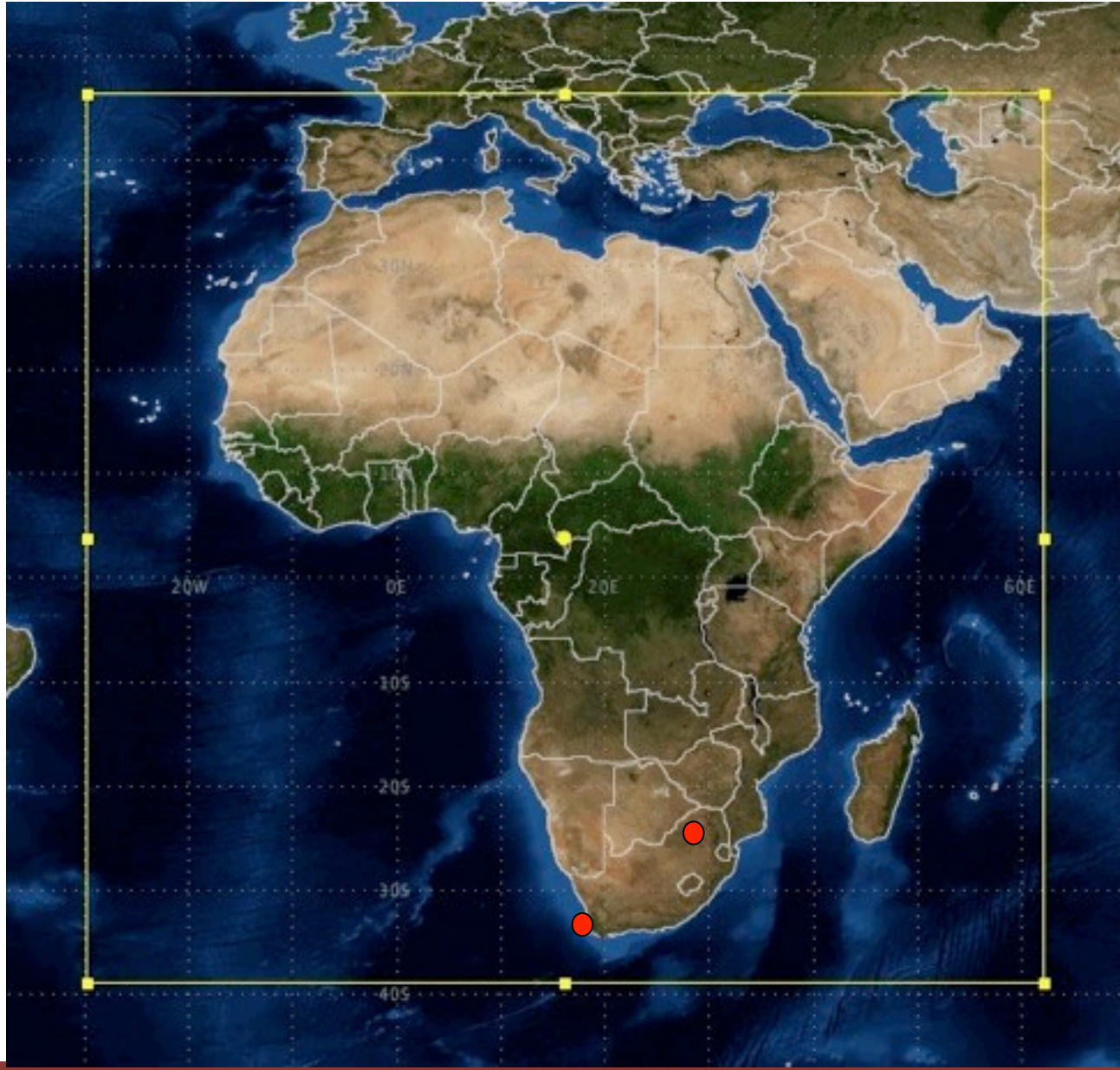
Some of these stations
are private/restricted
(e.g. Ghana)

or have closed down

These are ppt stations,
temperature fewer



Cordex - Africa



Cordex - Africa

Downscaling Groups

SMHI
ICTP
UKMO
DMI
Univ. Cantabria (Spain)
EU Joint Research Centre
ISU
IPSL
KNMI
CNRM
MPI
UQAM
CSAG – Univ. Cape Town
- Precis model
- WRF model (3 yrs to go)
- Statistical downscaling
(end 2012)
CSIR – Pretoria
- CCAM global model



Cordex – Africa Analysis



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Cordex – Africa Analysis

Ethos:

A – Analysis; Developing methods and tools to analyze atmospheric processes over Africa and how these may change into the future

F – Foci; Addressing key meteorological and impacts knowledge gaps

R – Regional messages; Presenting information for key regions of the continent

I – Integrated approach; Bringing together climate and vulnerability-impact-adaptation scientists to identify and address key climate vulnerabilities

C – Capacity development; Long-term collaboration between African scientists and key global institutions for career development

A – Application and Adaptation; Bridging the science-society divide through transforming climate data into actionable information



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Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



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Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops

April 2010

March 2011

July 2011

November 2011

February 2012

Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops

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February 2012

Cape Town
Planning

Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops

April 2010

March 2011

July 2011

November 2011

February 2012

Cape Town
Planning

- Discussed ERA-Interim runs
- Developed metrics
- Set regions
- Discussed observation data
- Discussed goals for first workshop
- Discussed data dissemination

Cordex - Africa

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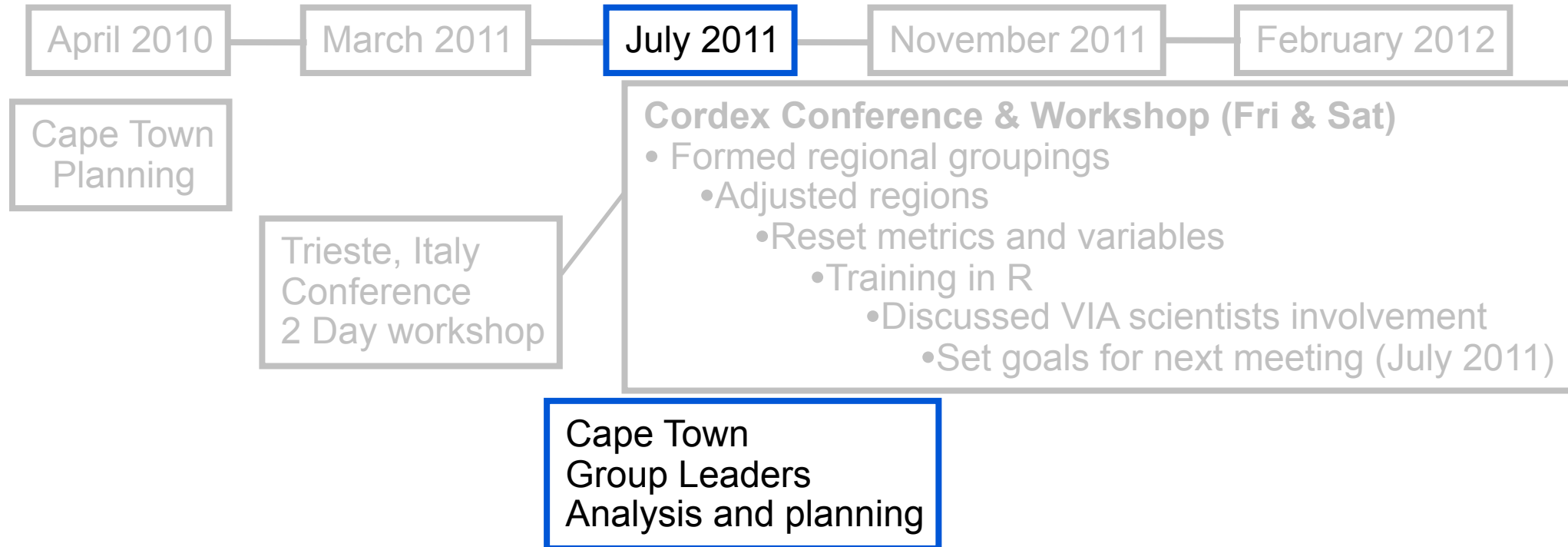
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



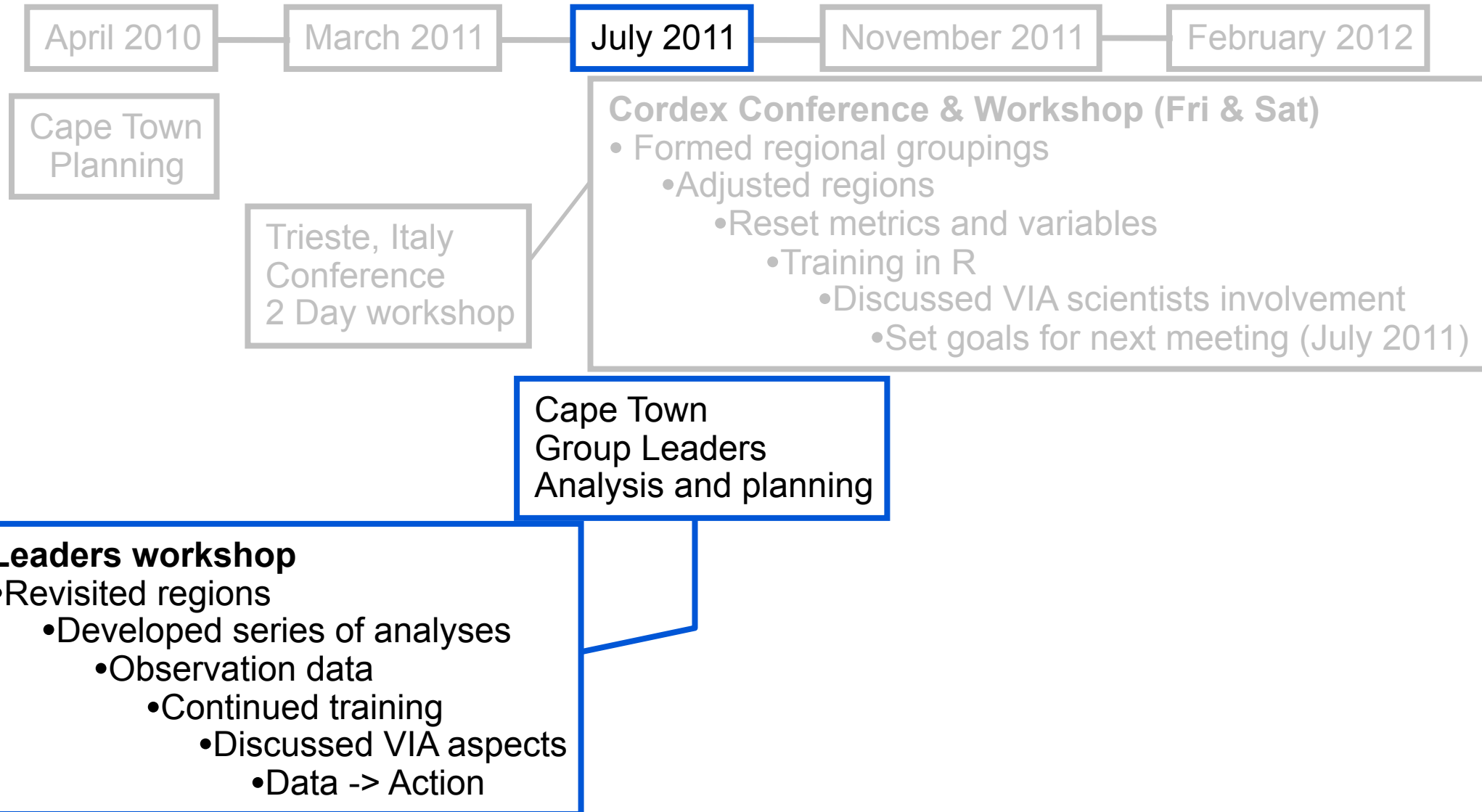
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



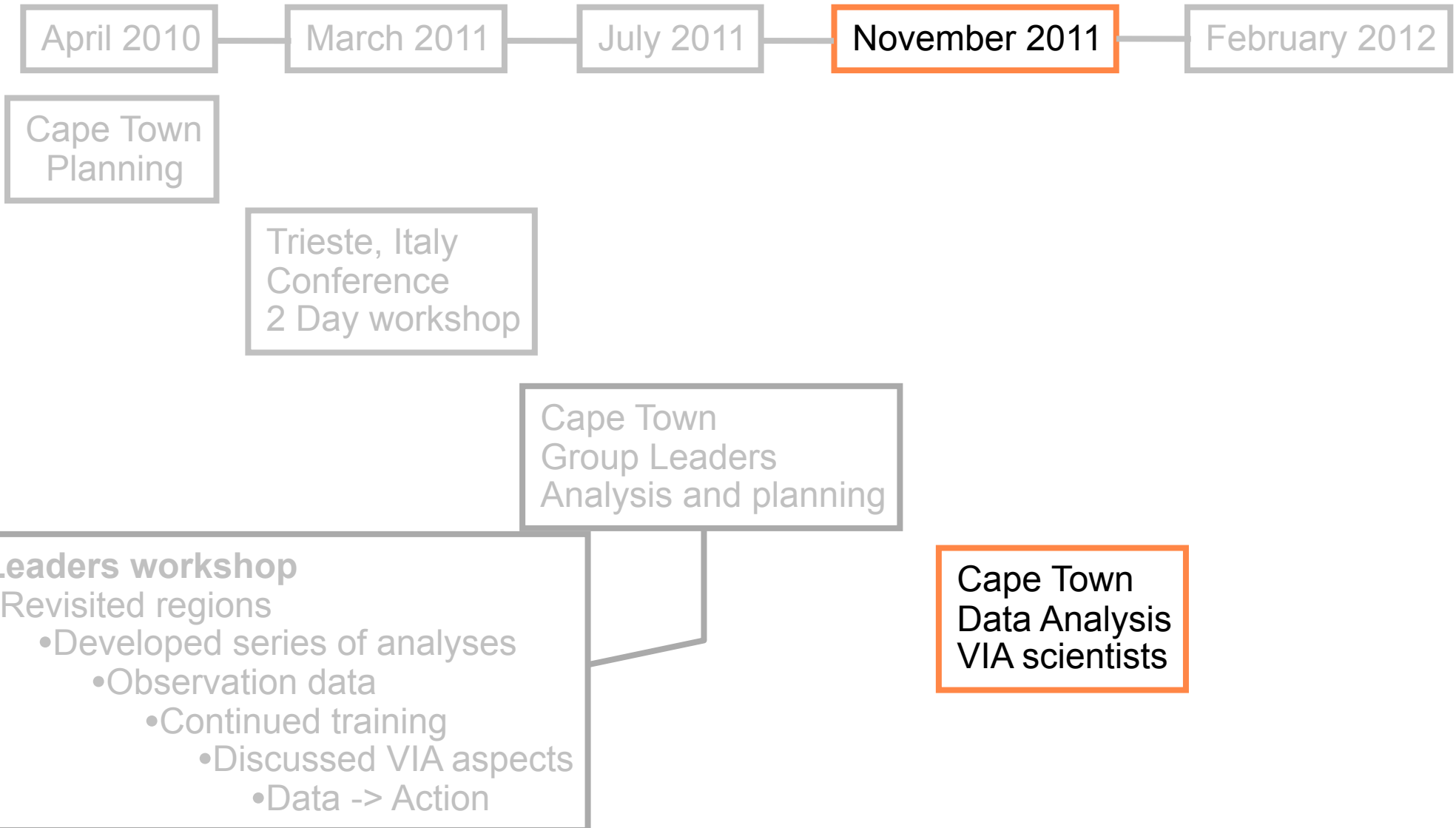
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



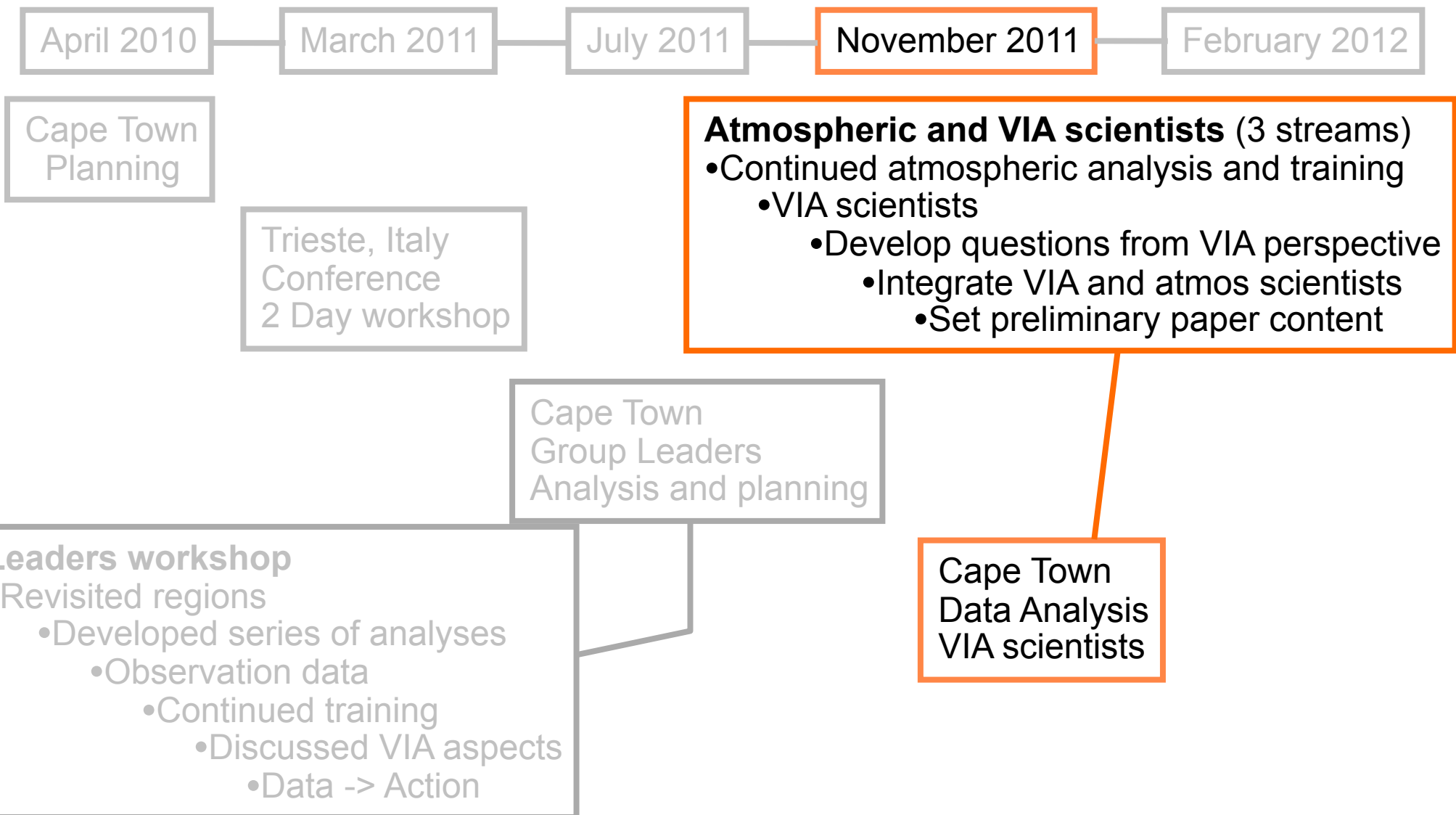
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



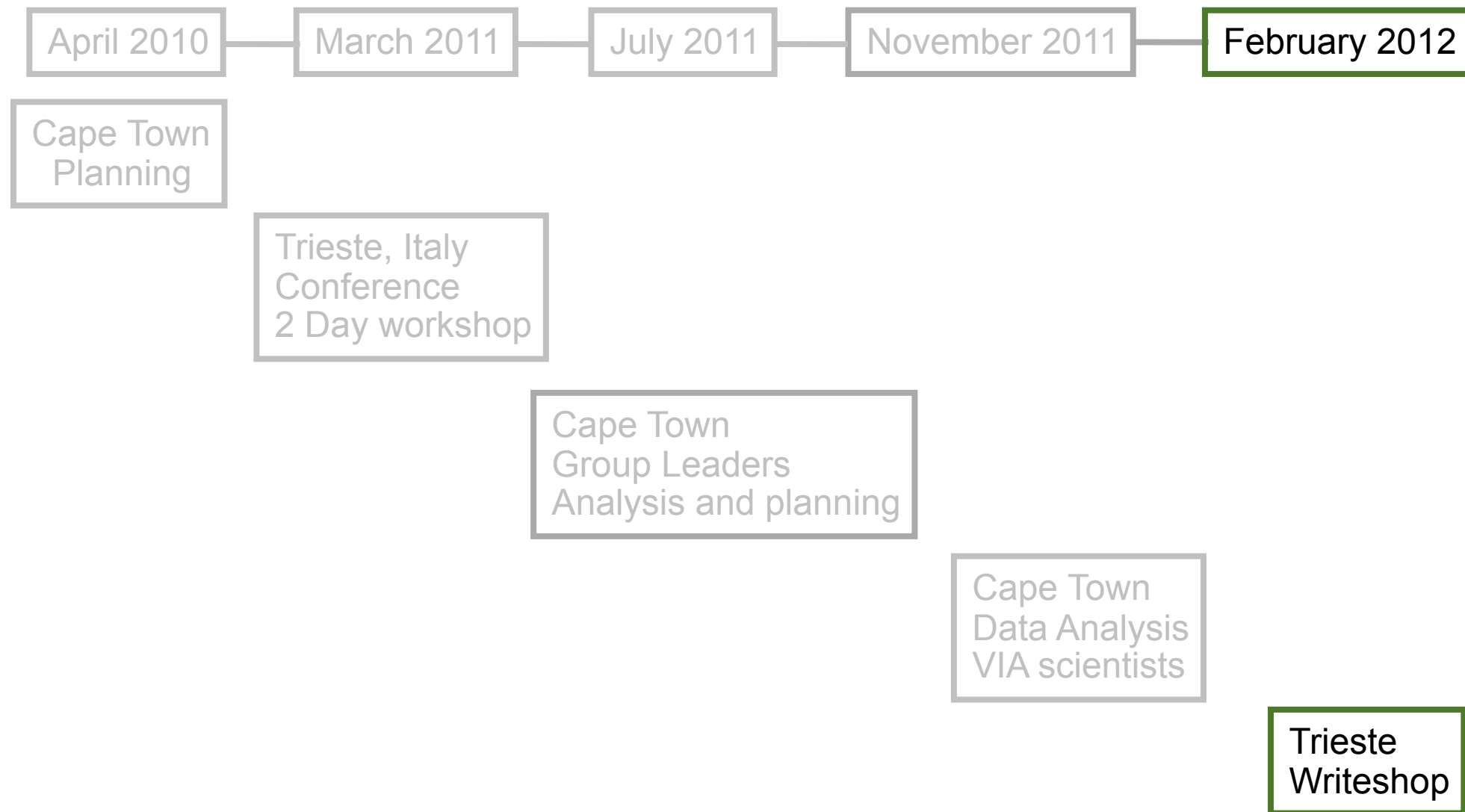
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



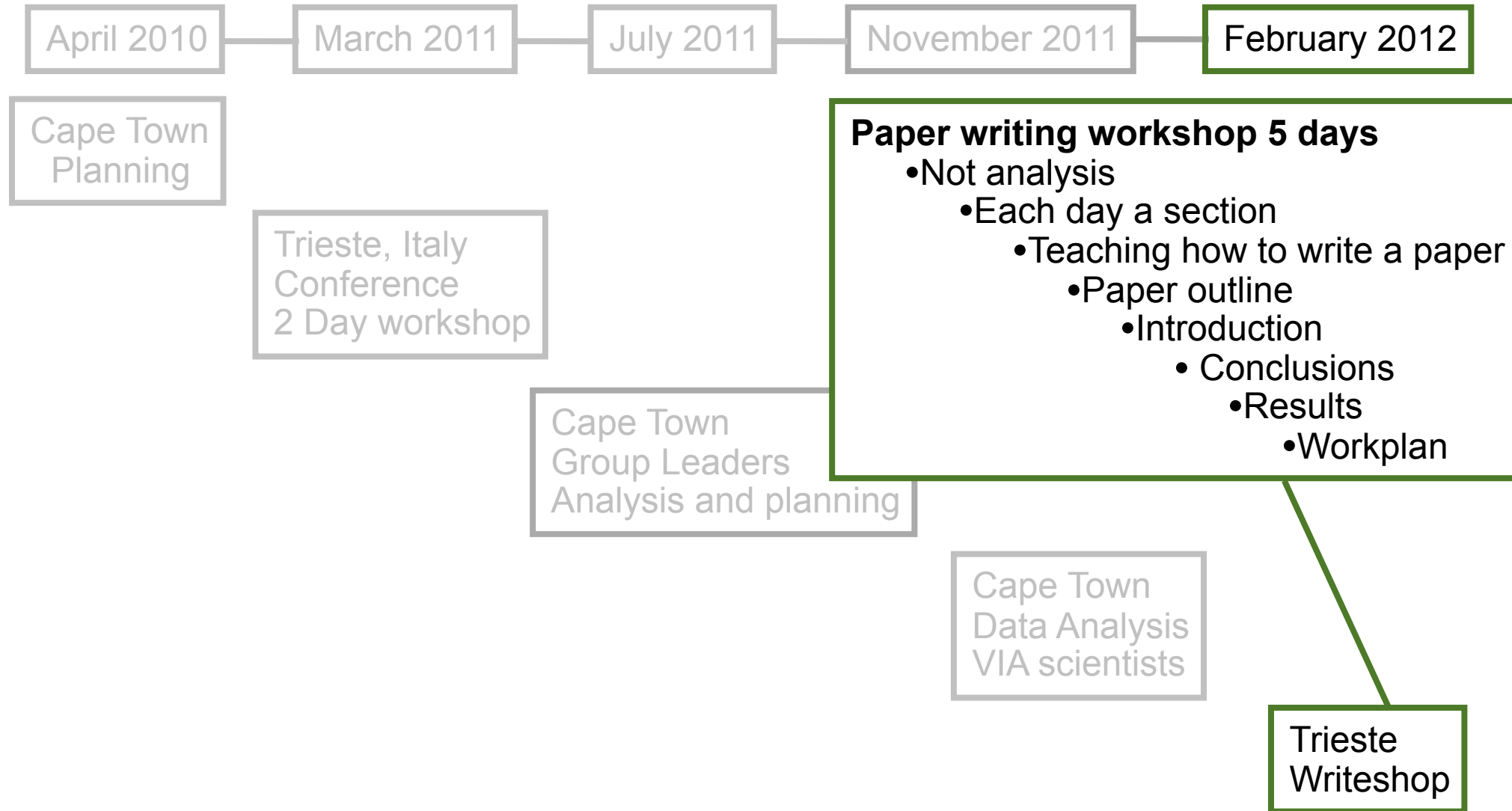
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



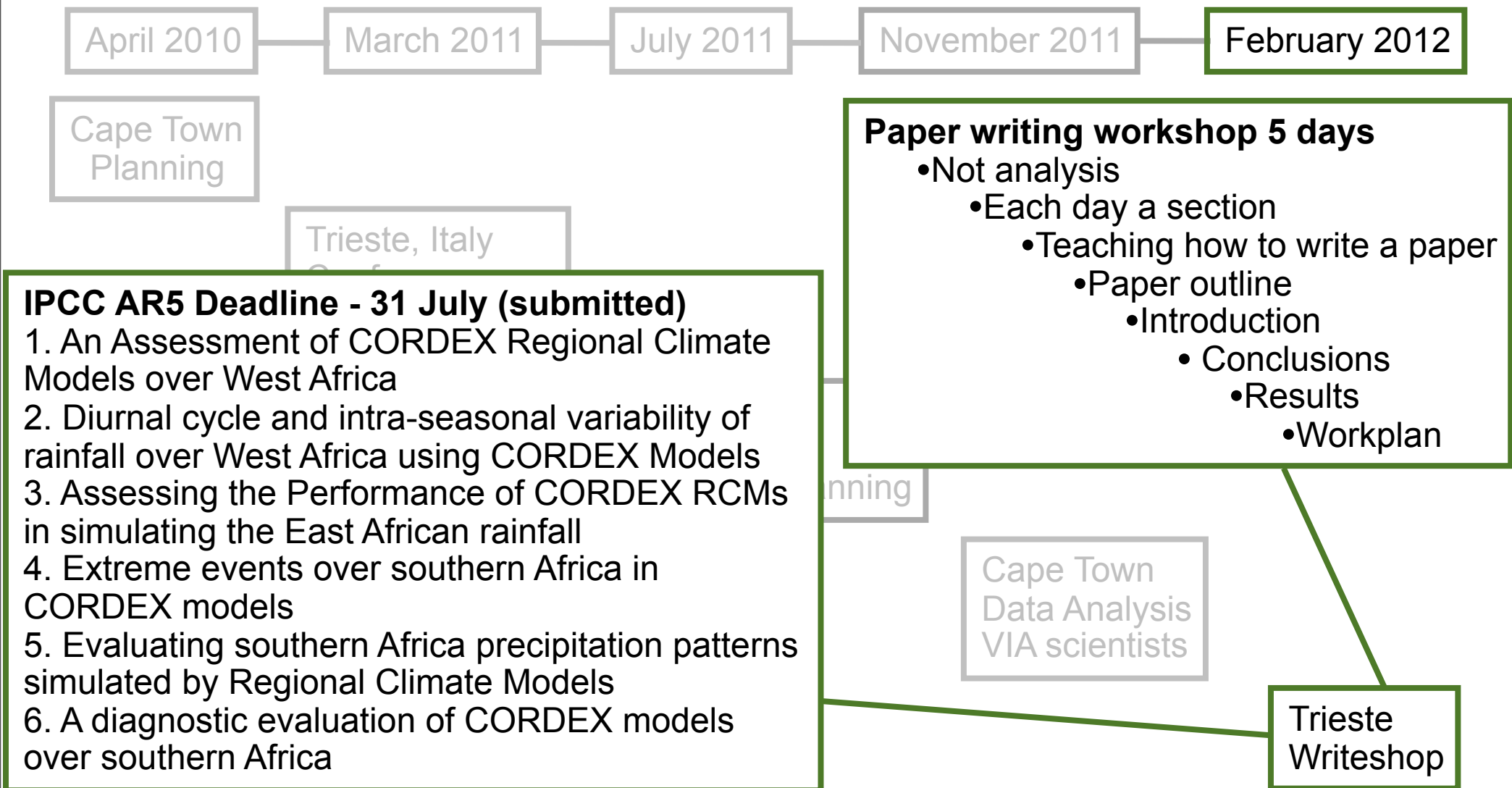
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops



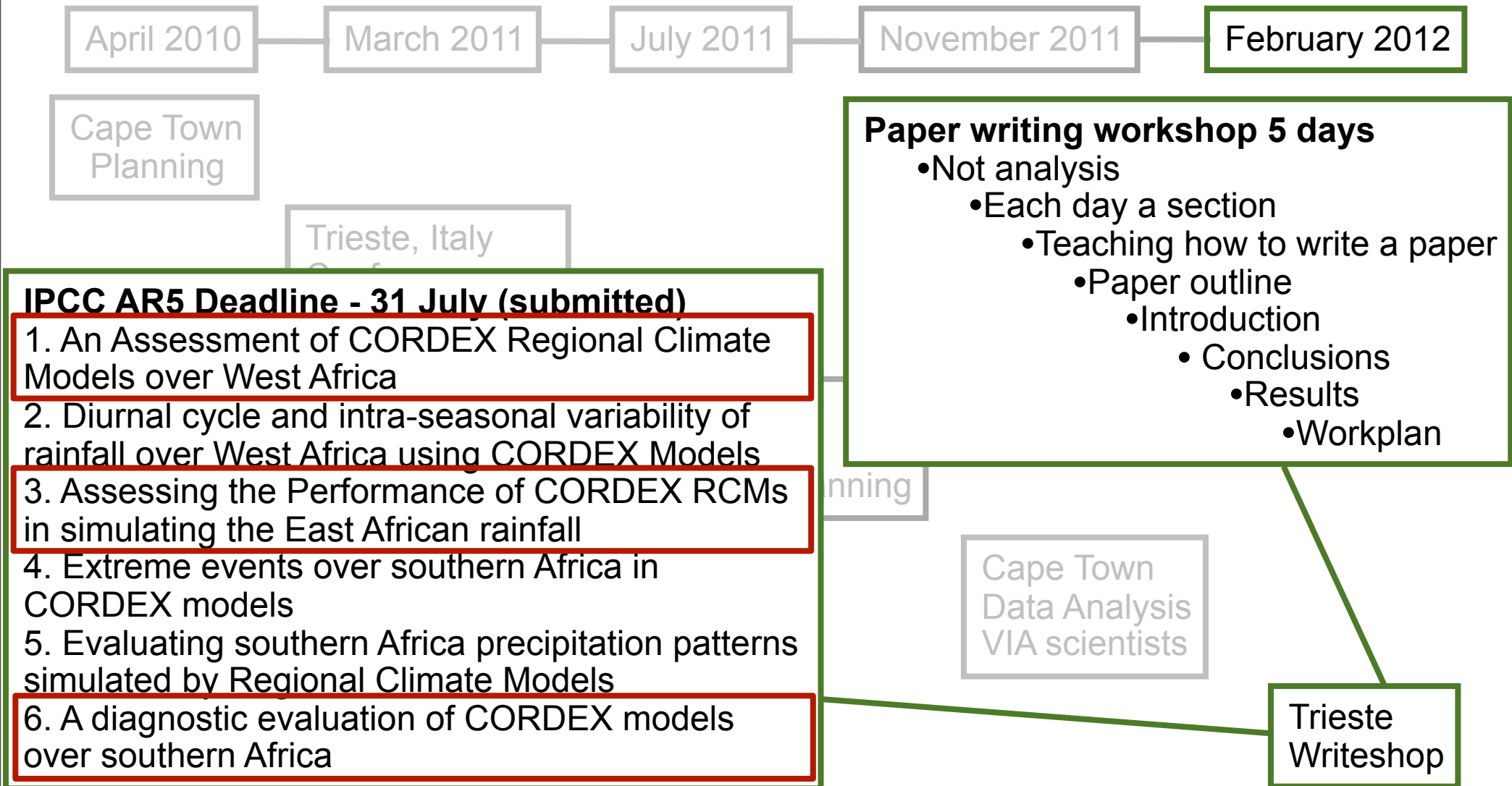
Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops

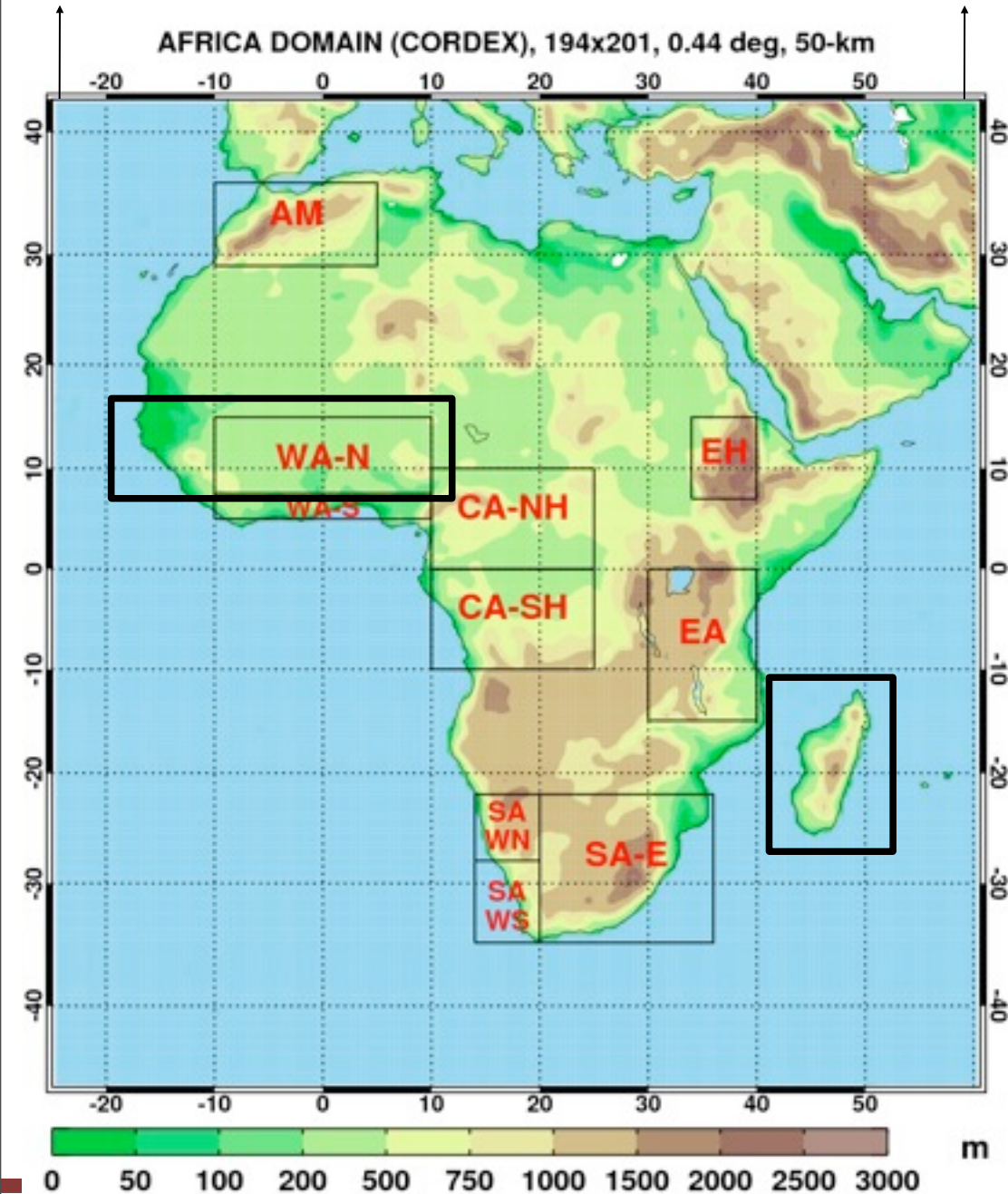


Cordex - Africa

Putting the 'CO' in CORDEX - Series of 4(5) Workshops

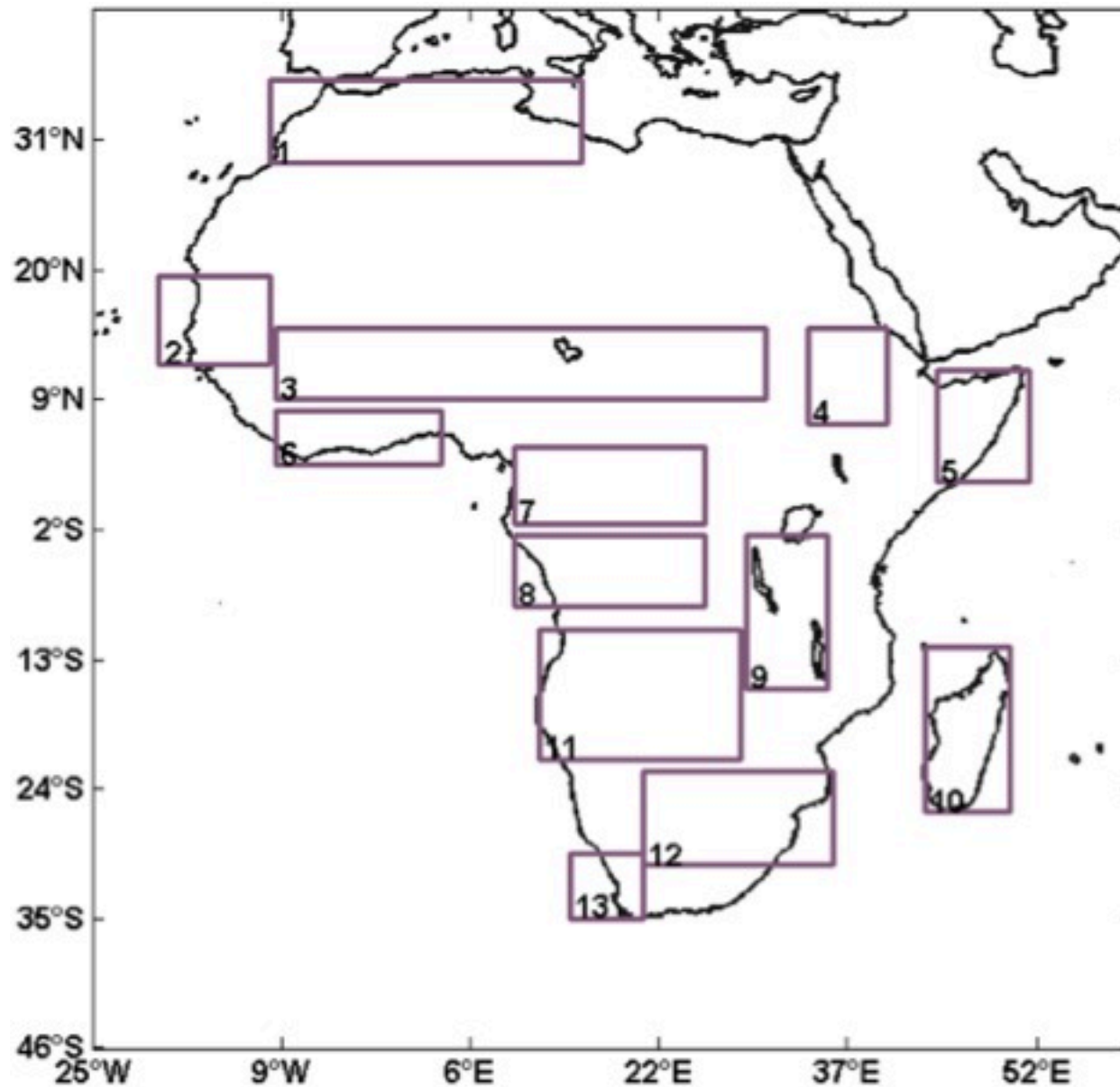


Cordex - Africa



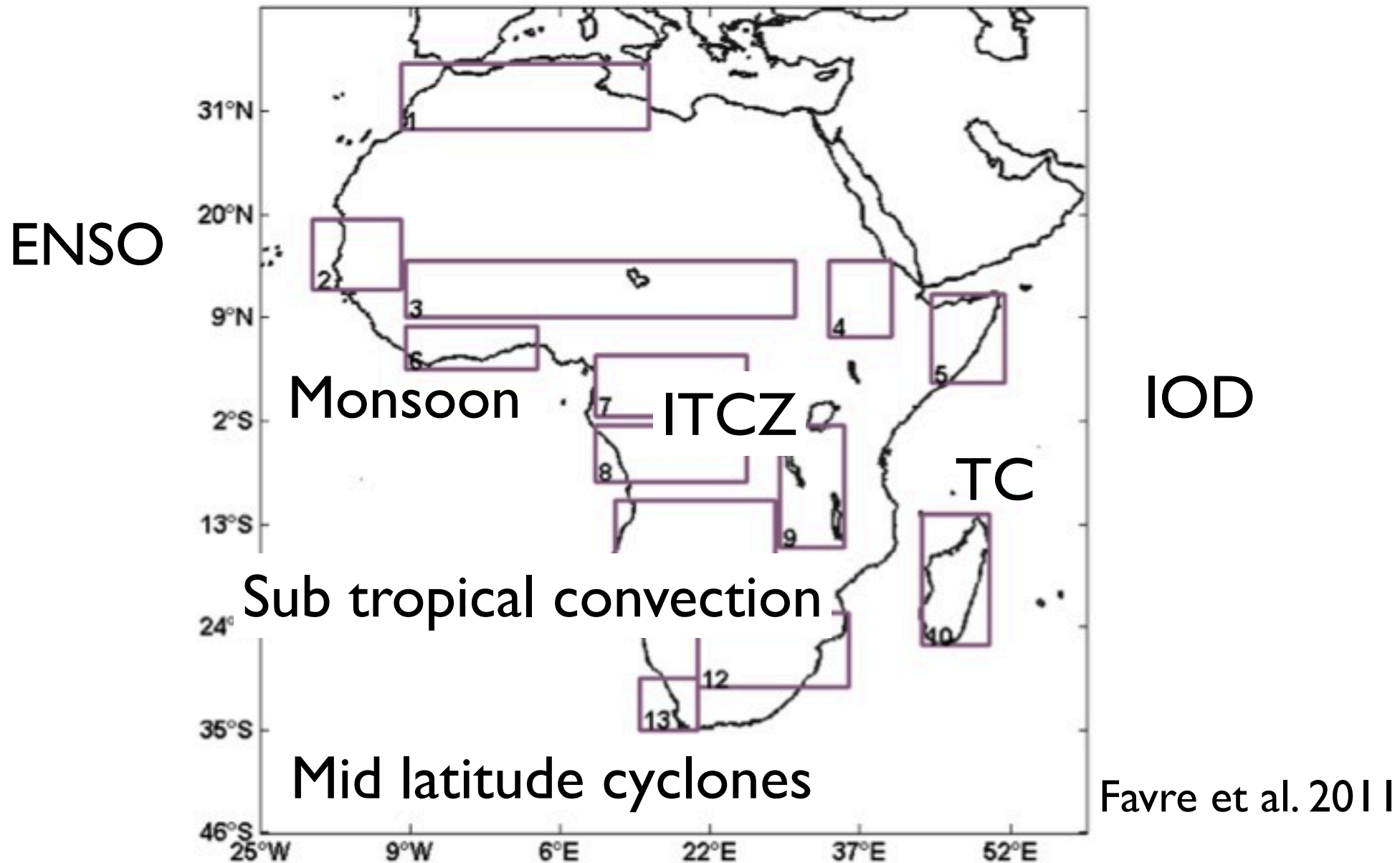
AM	Atlas Mountains
WA-N	West Africa - North
WA-S	West Africa - South
CA-N	Central Africa - North
CA-S	Central Africa-South
EH	Ethiopian Highlands
EA	East Africa
SA-E	South Africa East
SA-WN	South Africa West-North
SA-WE	South Africa West- South
MAD	Madagascar

Cordex - Africa

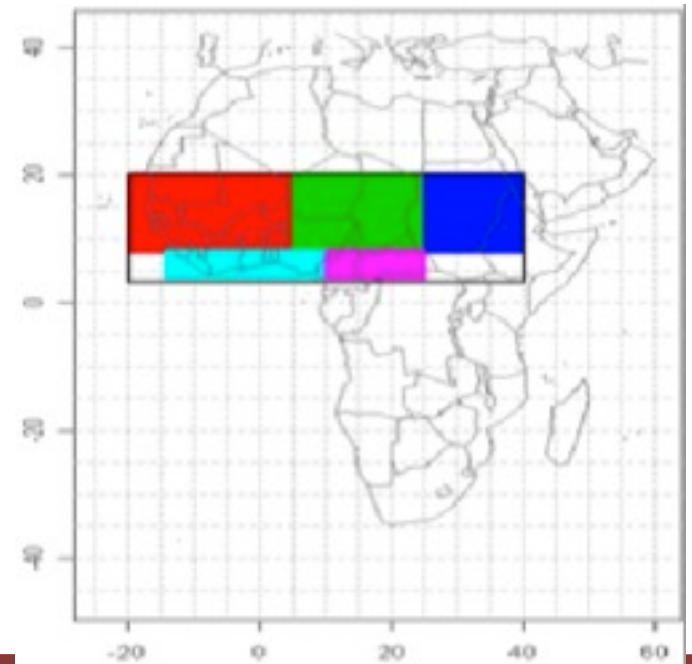


Favre et al. 2011

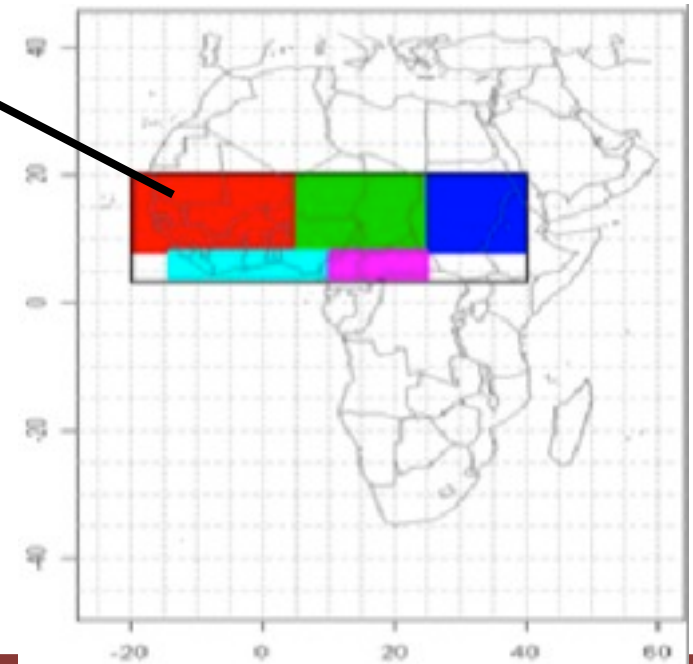
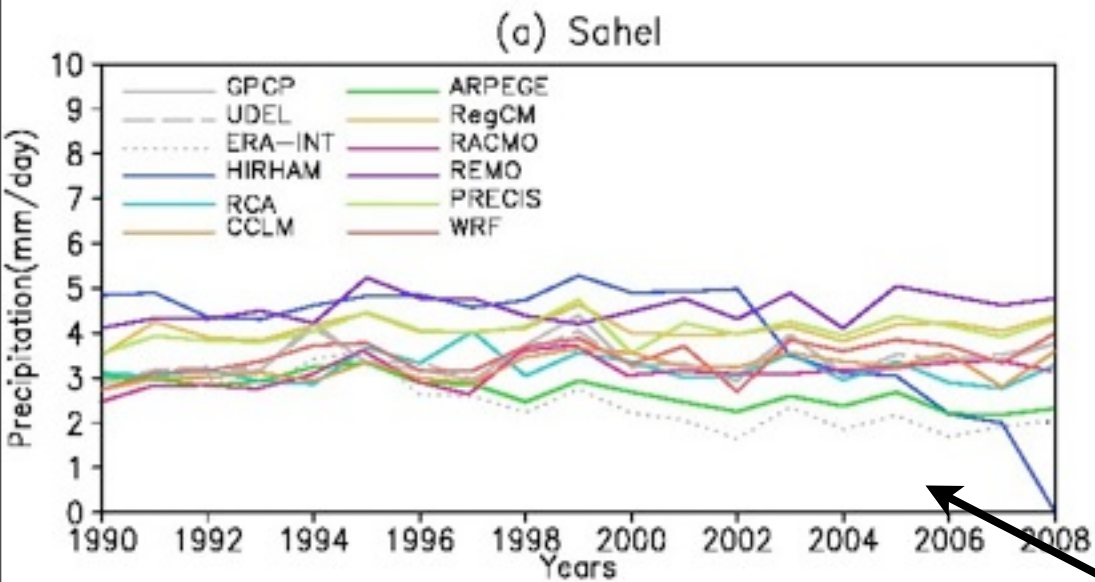
Cordex - Africa



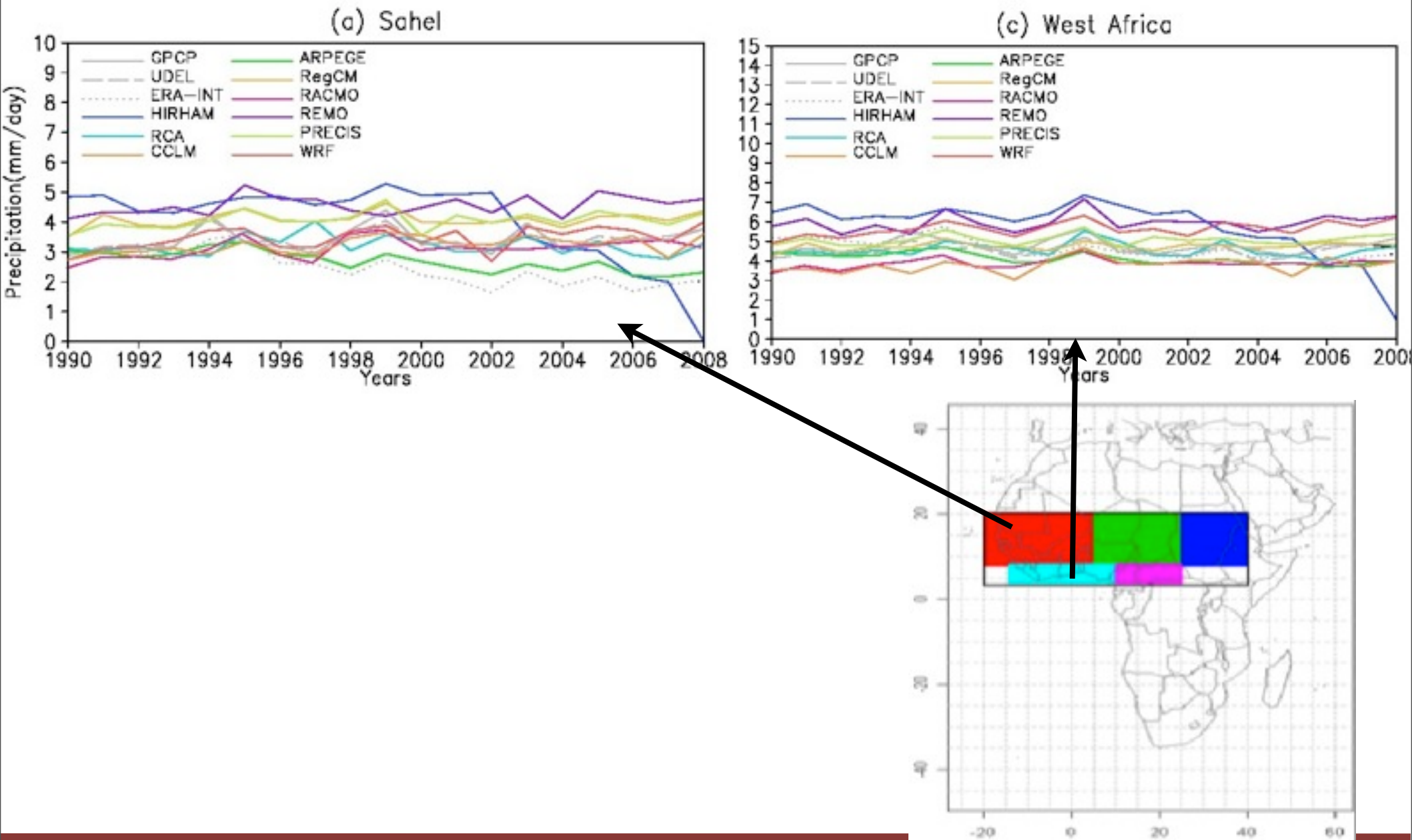
Cordex West Africa



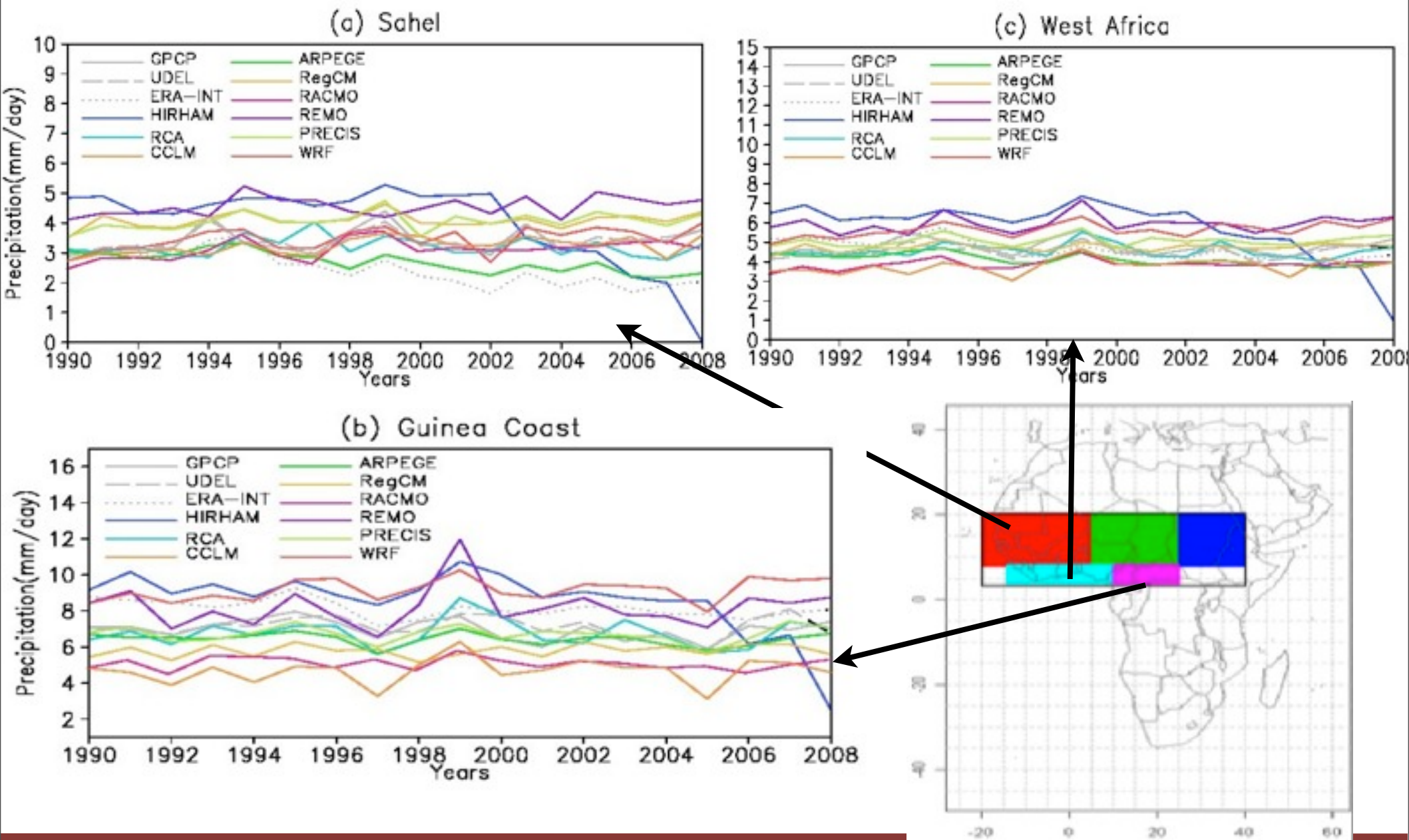
Cordex West Africa



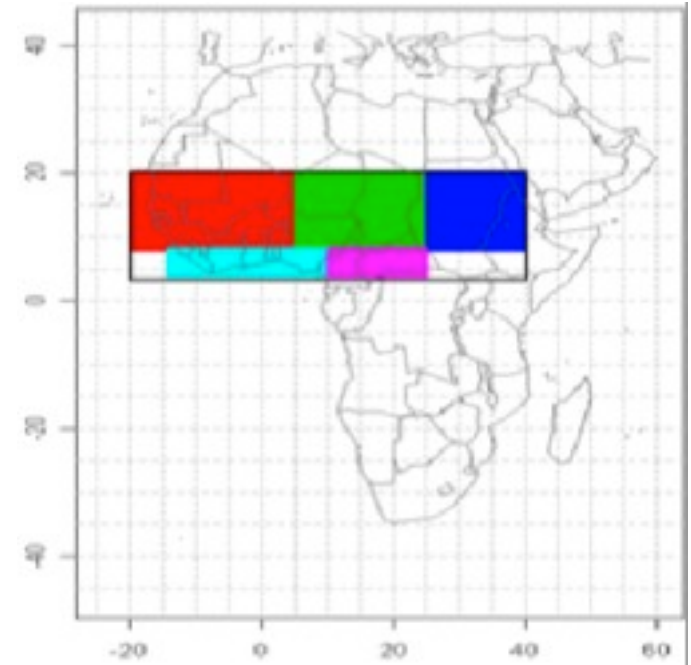
Cordex West Africa



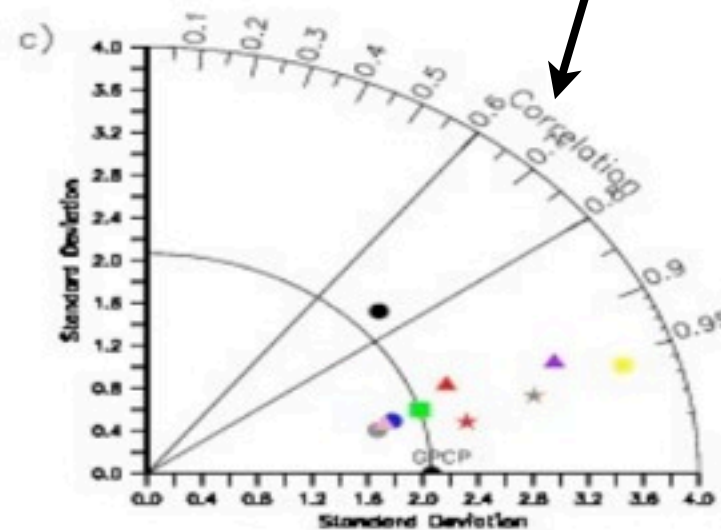
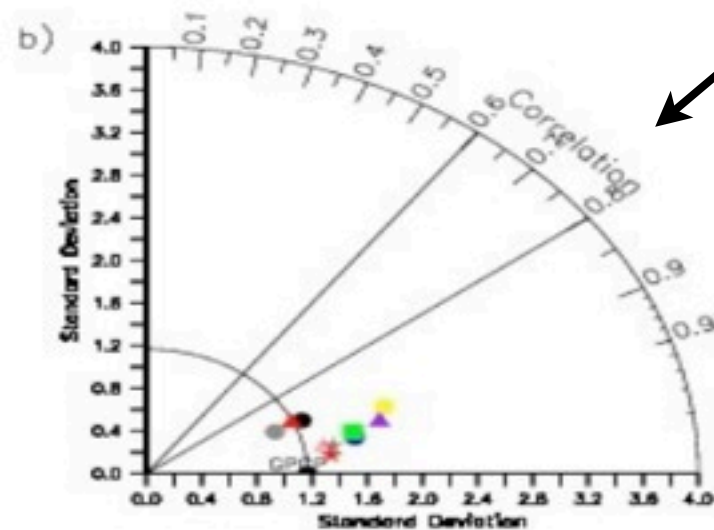
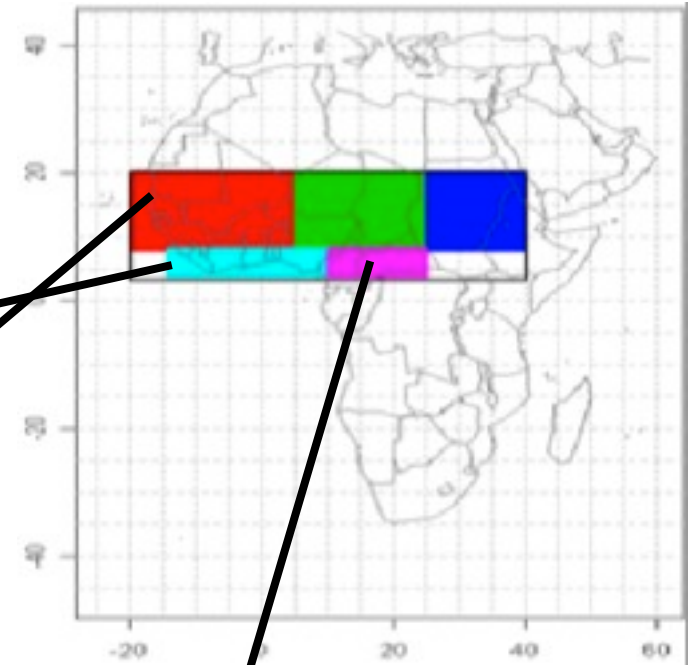
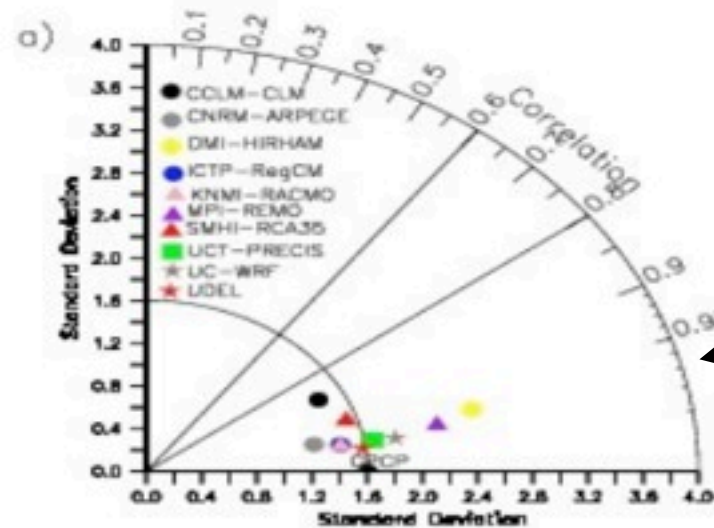
Cordex West Africa



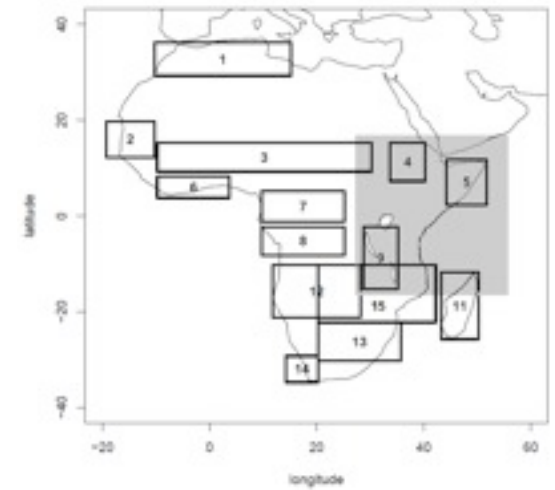
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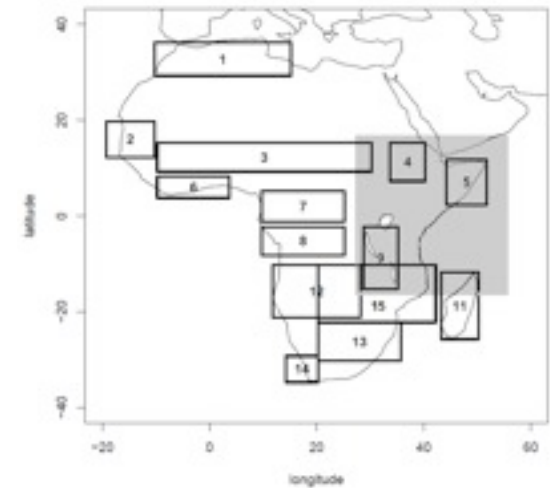
Cordex West Africa



Cordex East Africa

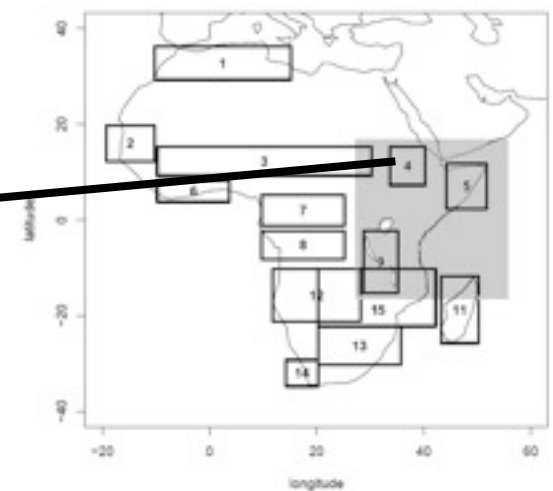
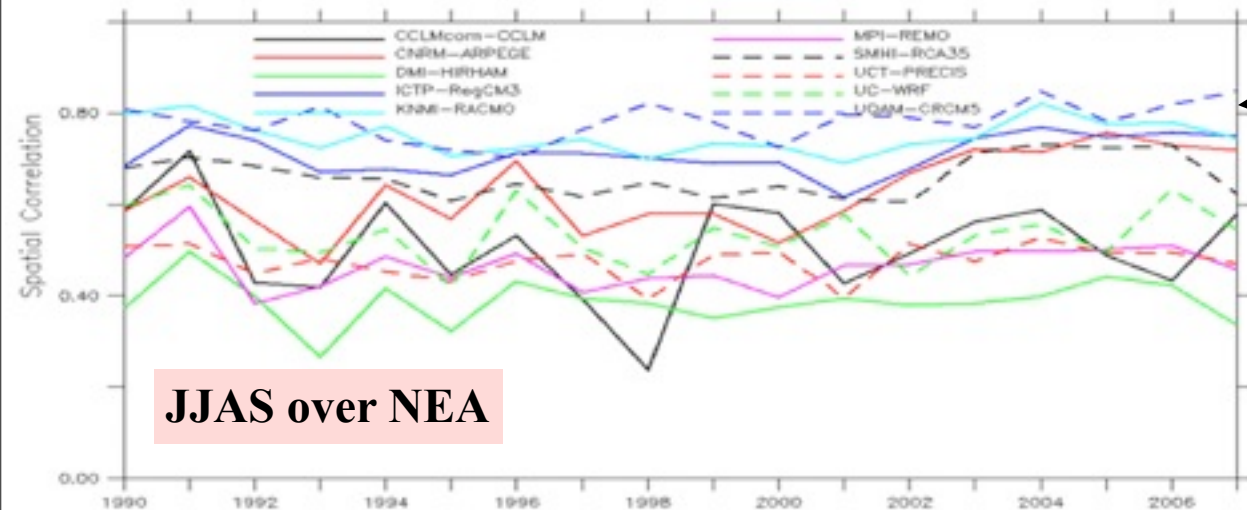


Cordex East Africa



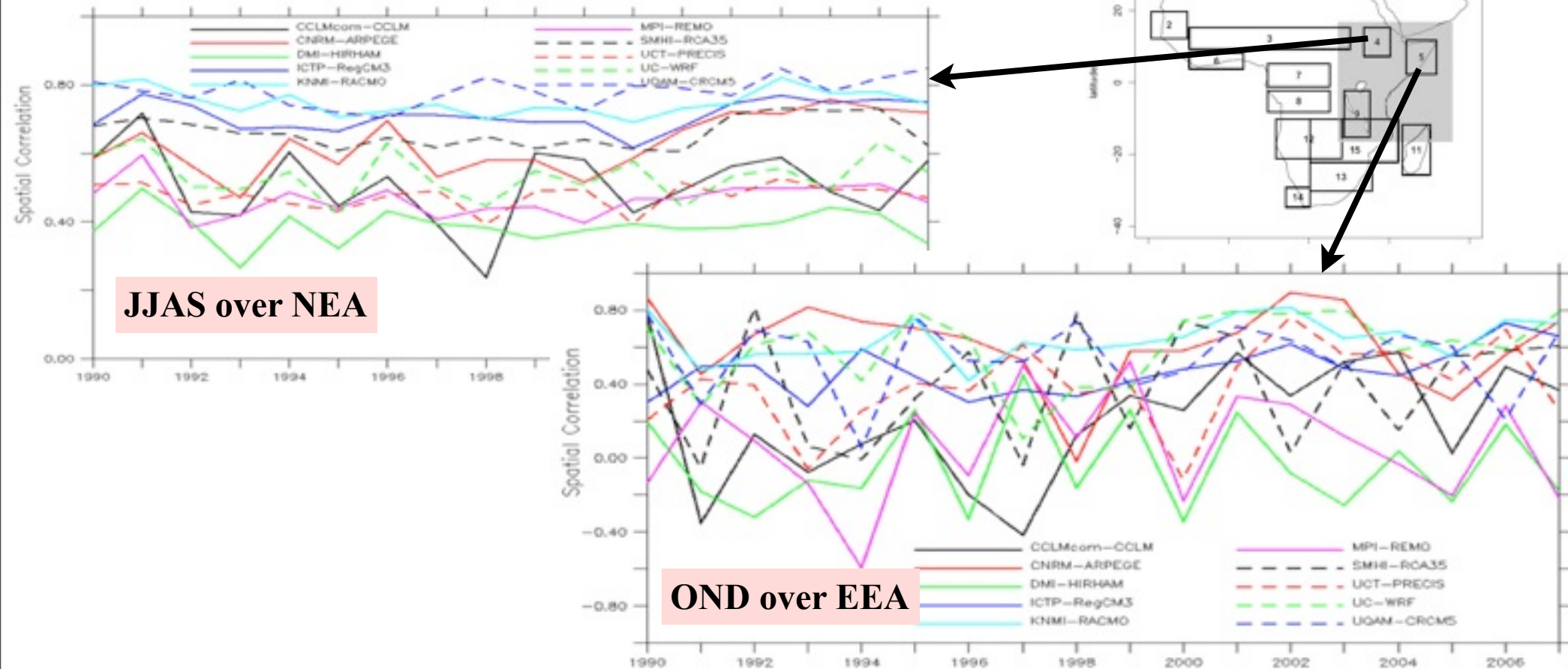
**Spatial Correlations
between GPCC and the
CORDEX RCMs over
the 3 study areas**

Cordex East Africa



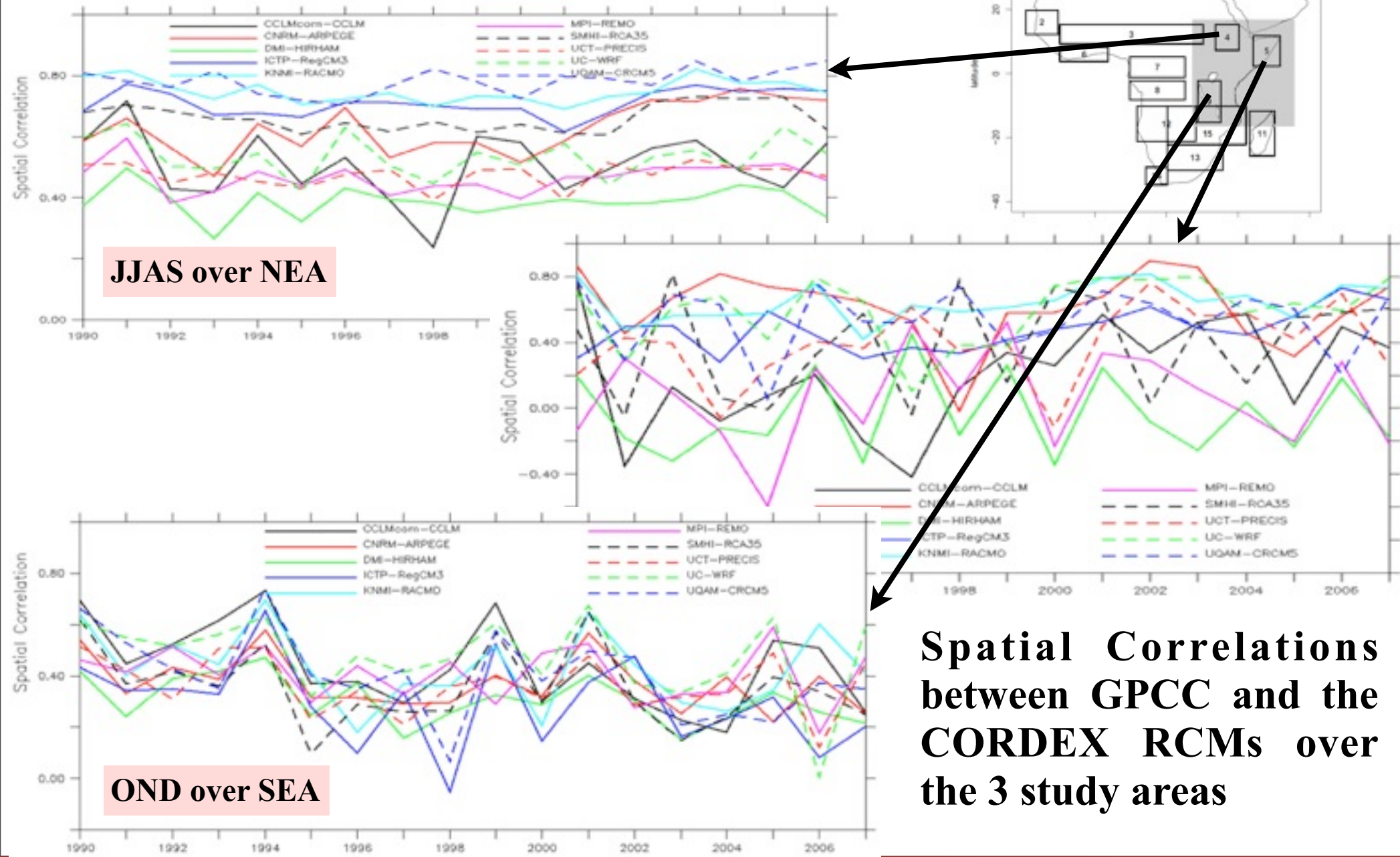
**Spatial Correlations
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Cordex East Africa

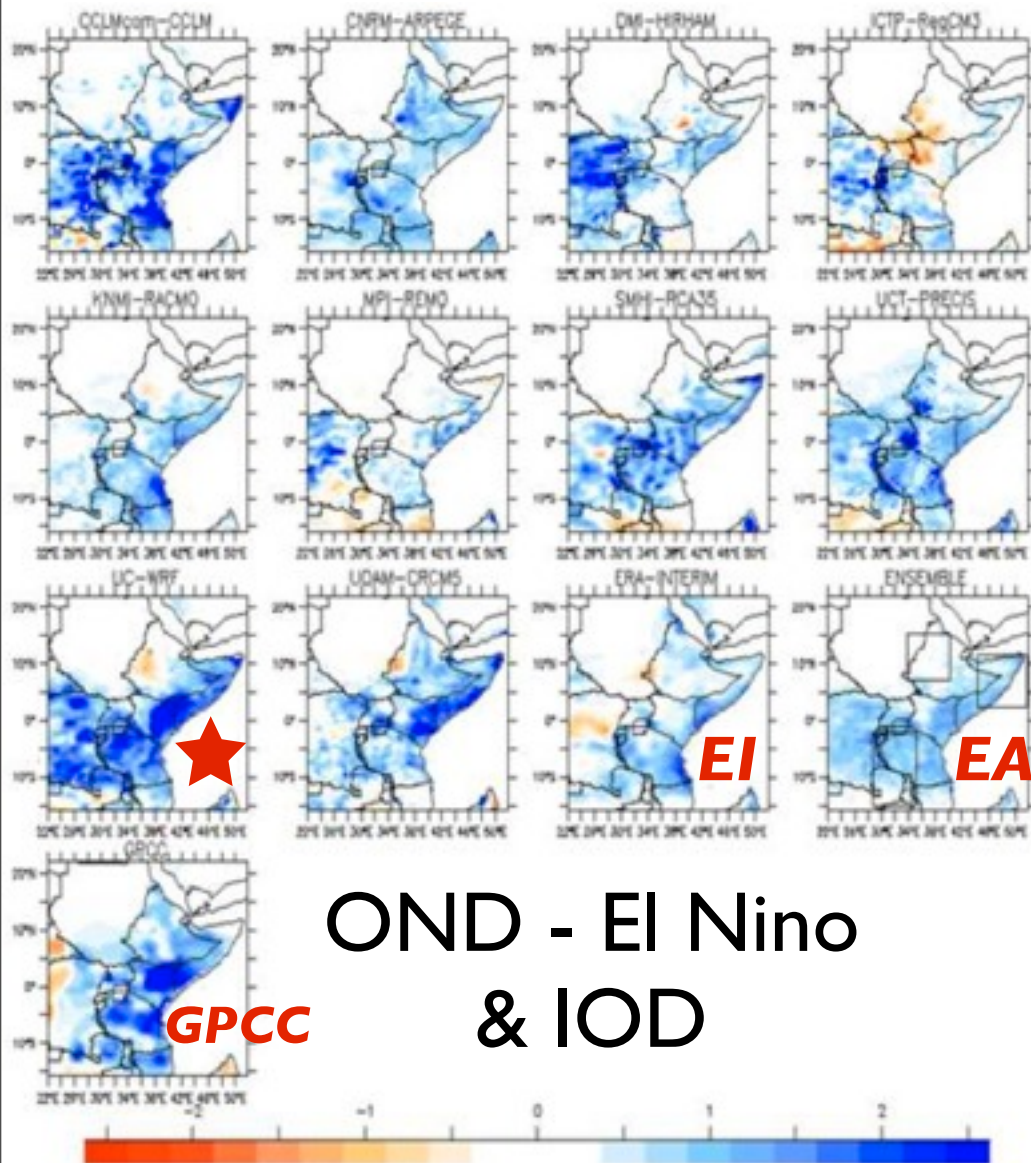


**Spatial Correlations
between GPCP and the
CORDEX RCMs over
the 3 study areas**

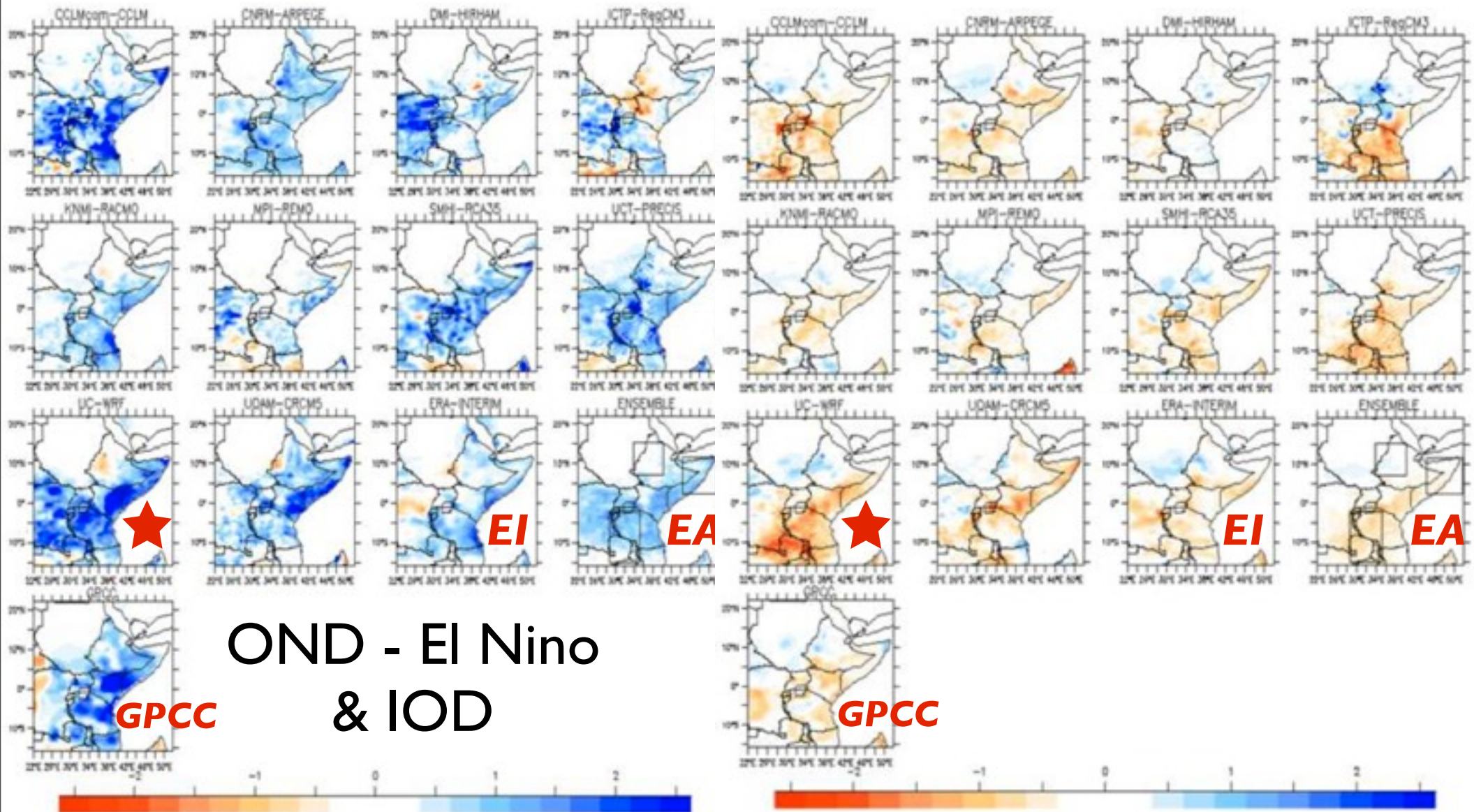
Cordex East Africa



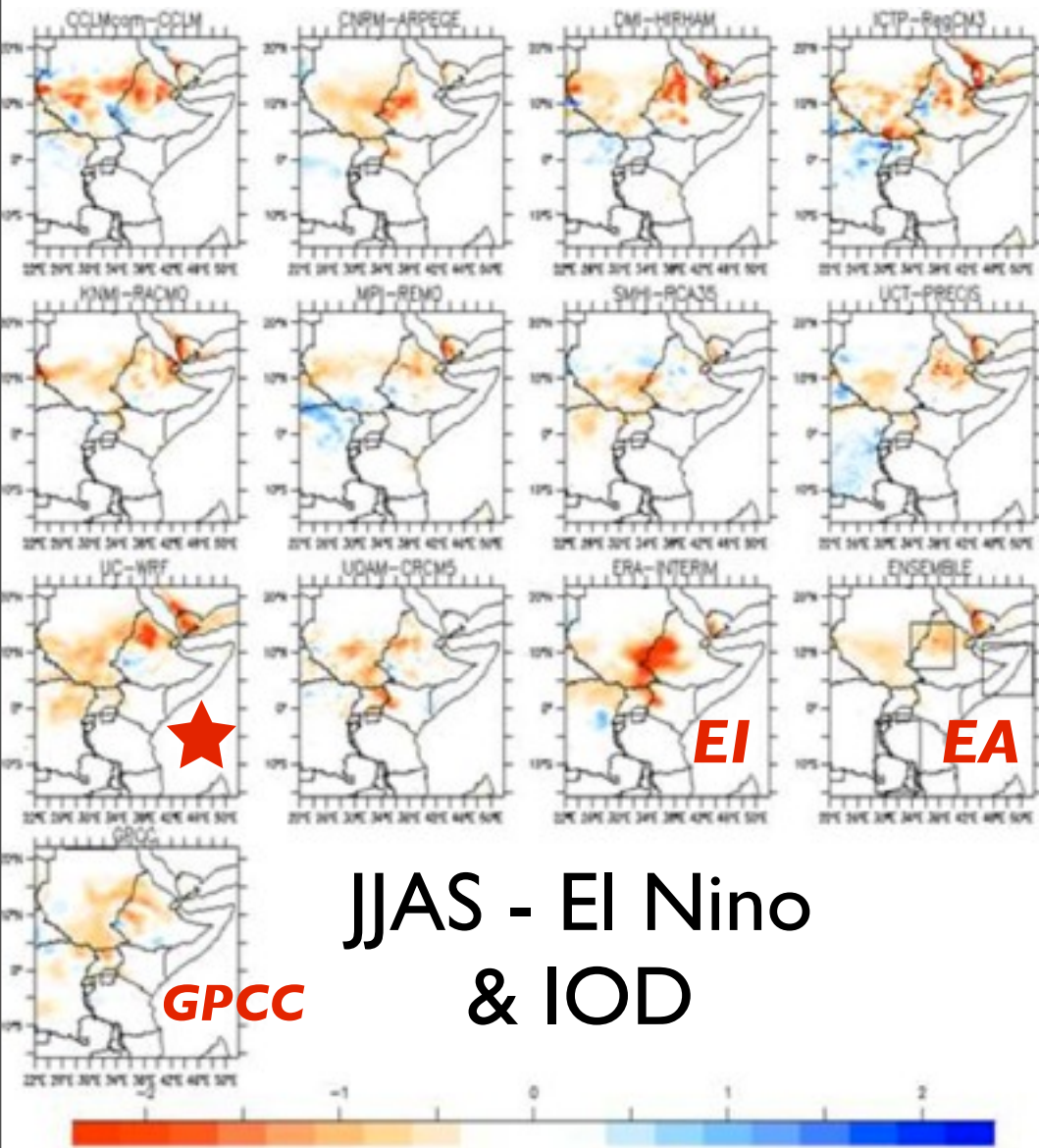
Cordex East Africa - ENSO & IOD



Cordex East Africa - ENSO & IOD



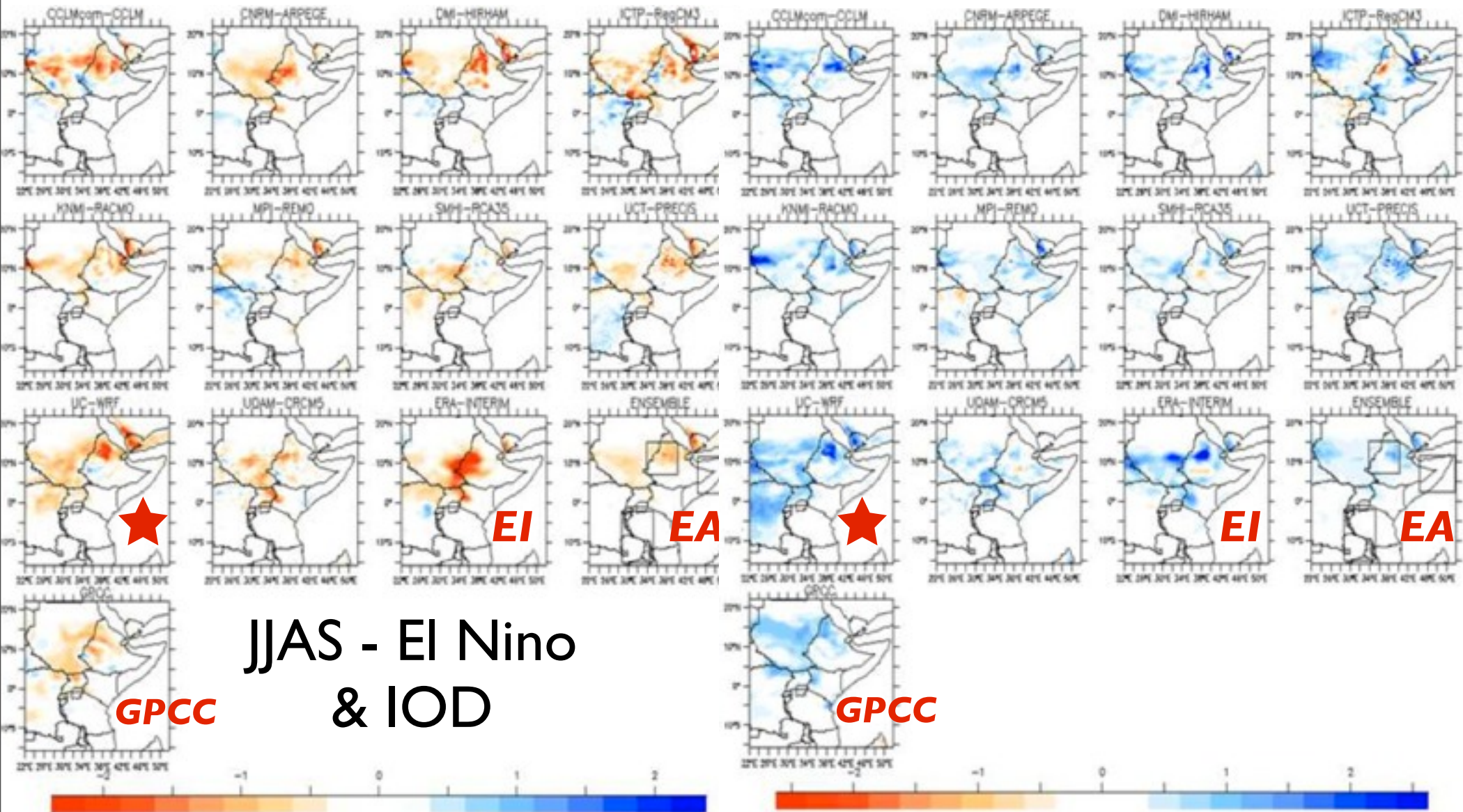
Cordex East Africa - ENSO & IOD



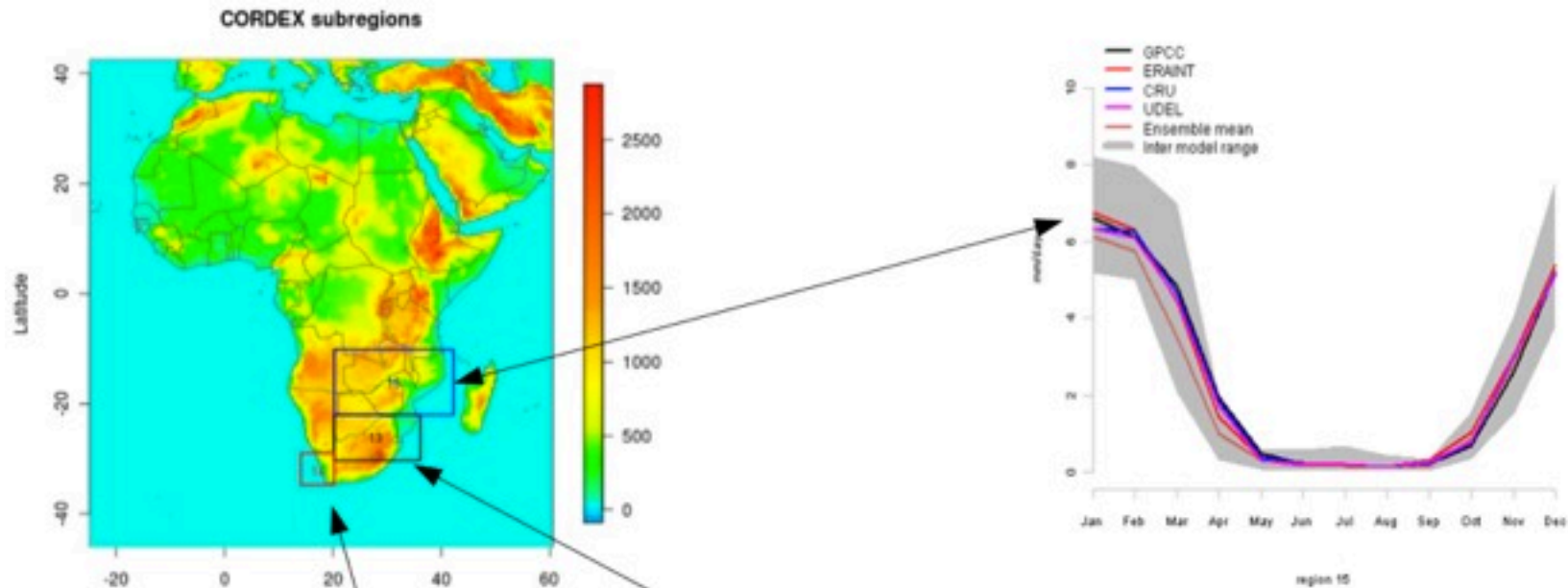
JJAS - El Nino
& IOD

JJAS - La Nina

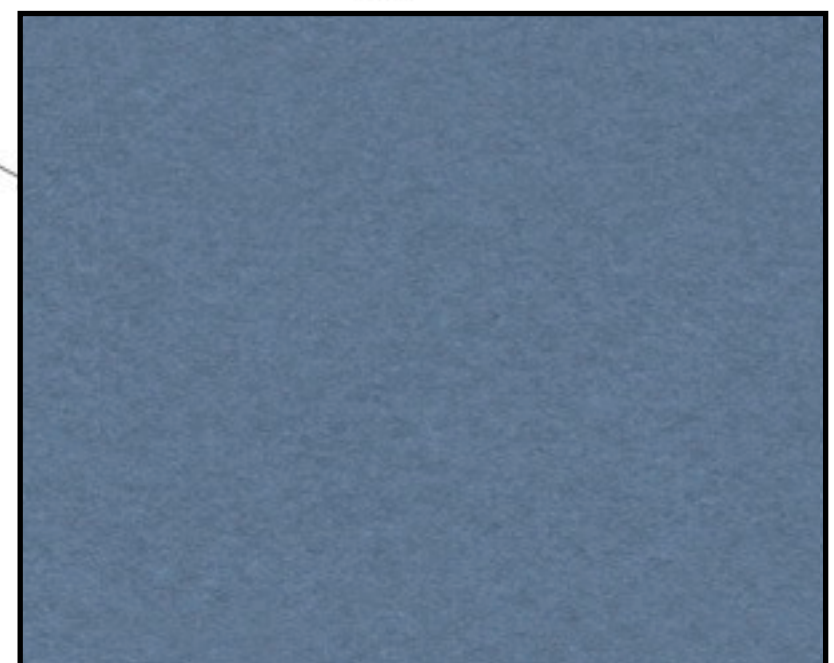
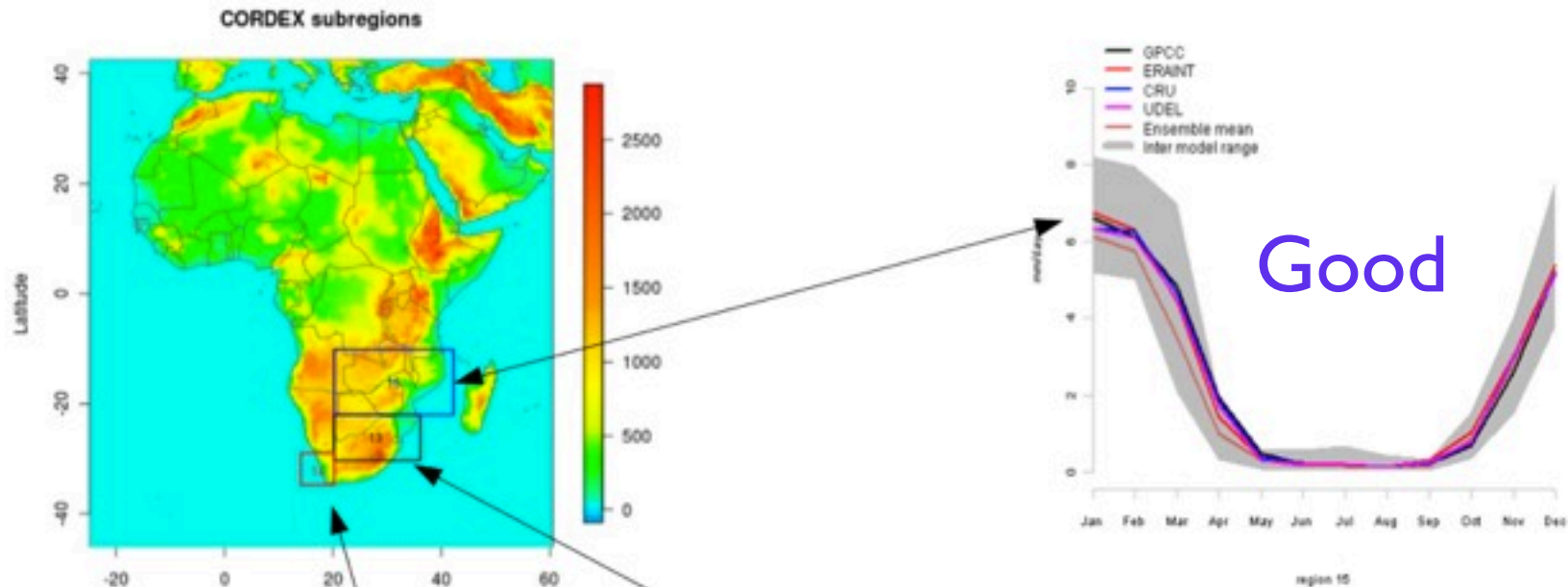
Cordex East Africa - ENSO & IOD



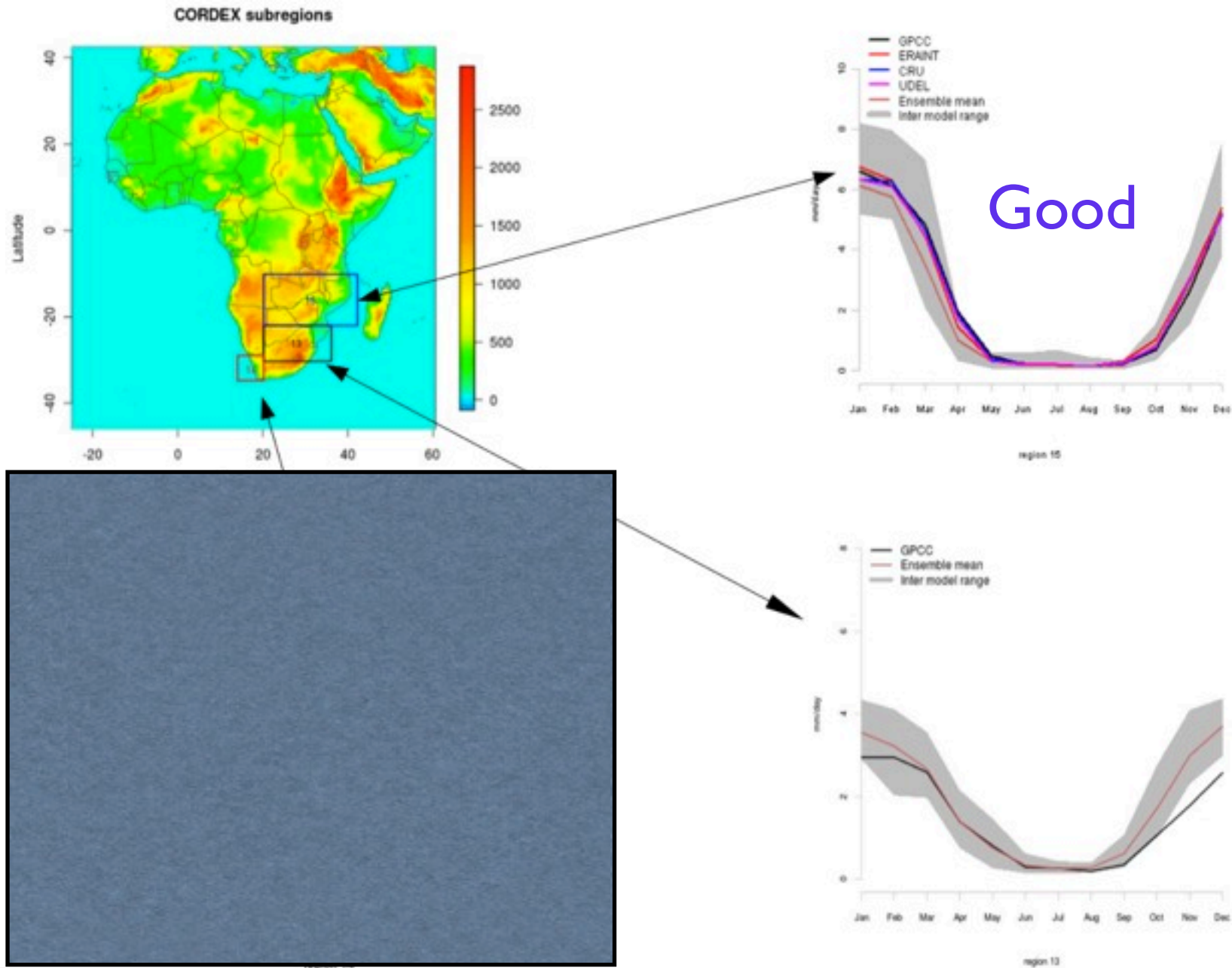
Cordex Southern Africa



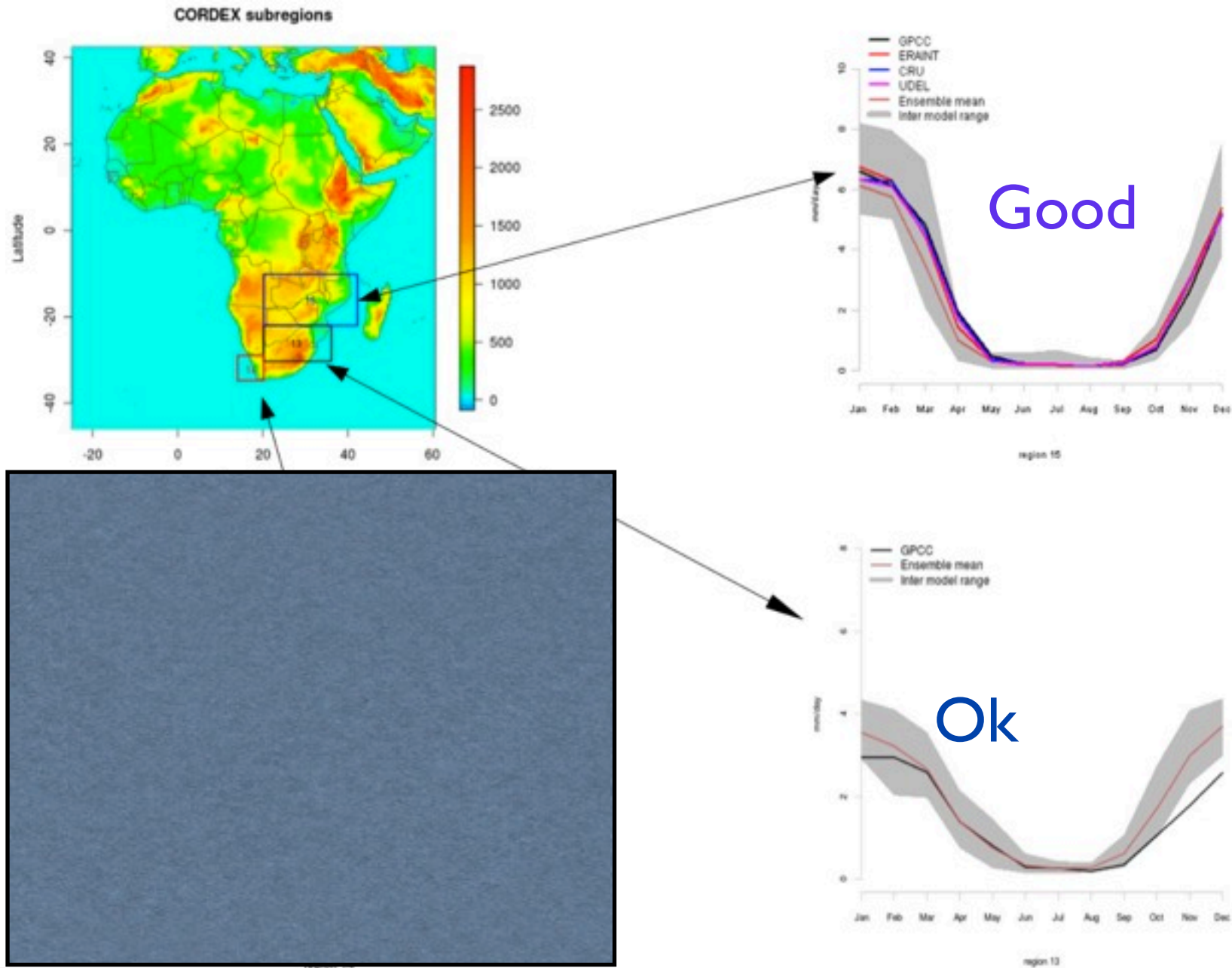
Cordex Southern Africa



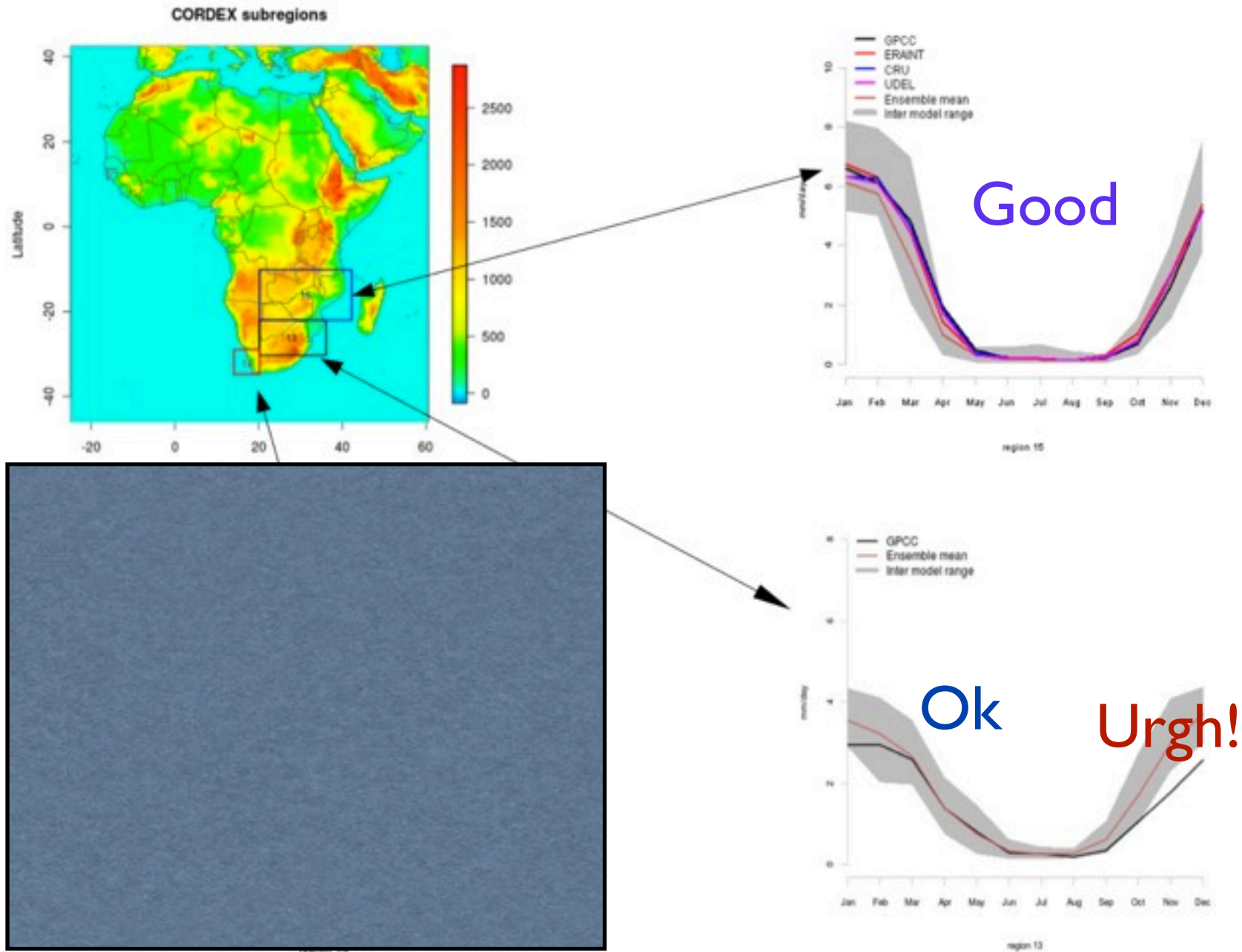
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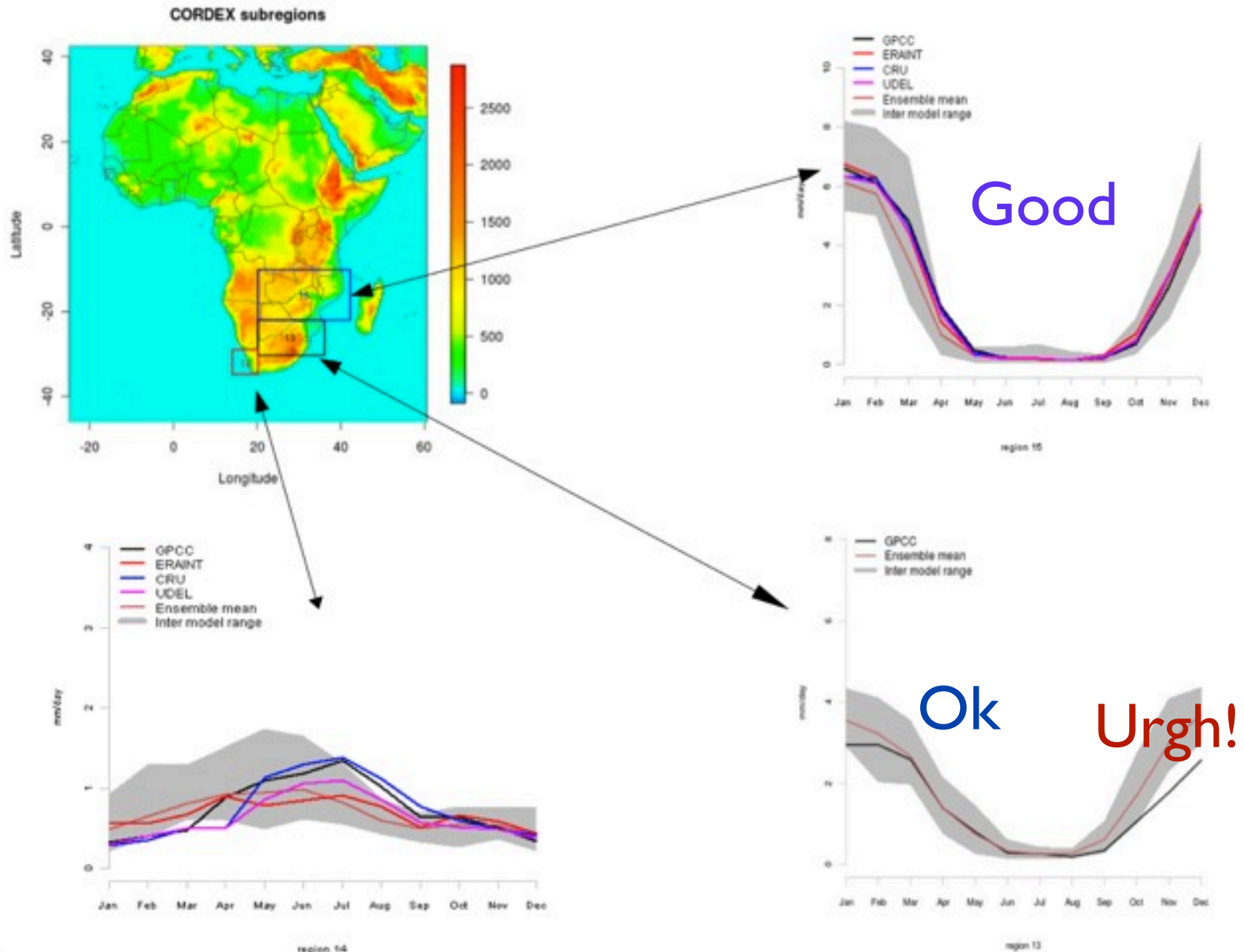
Cordex Southern Africa



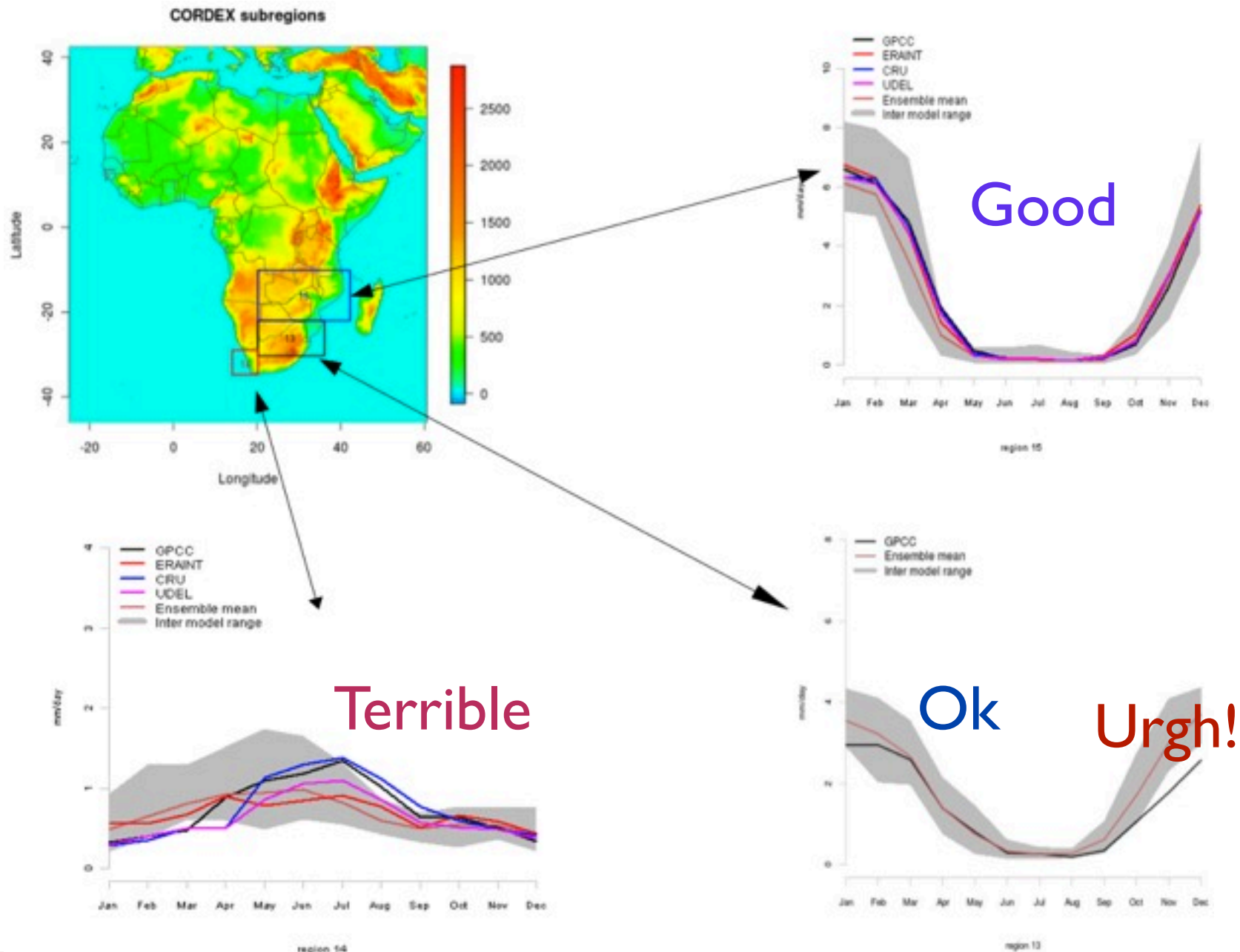
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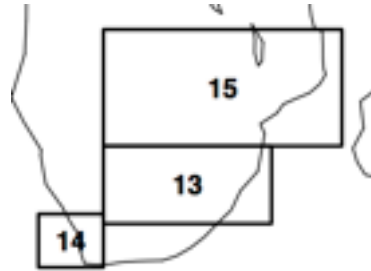
Cordex Southern Africa



Cordex Southern Africa

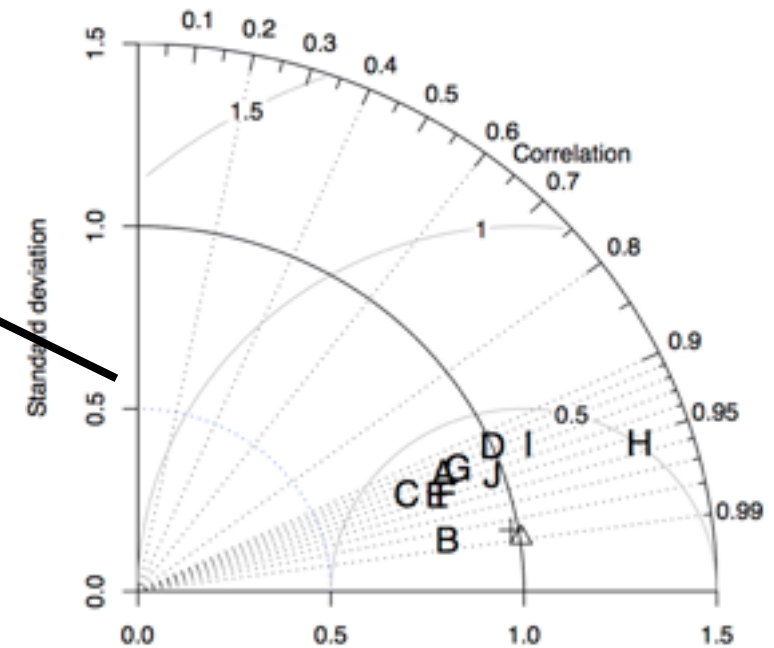
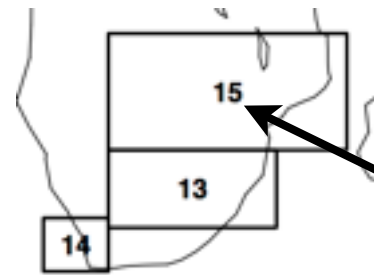


Cordex Southern Africa



Cordex Southern Africa

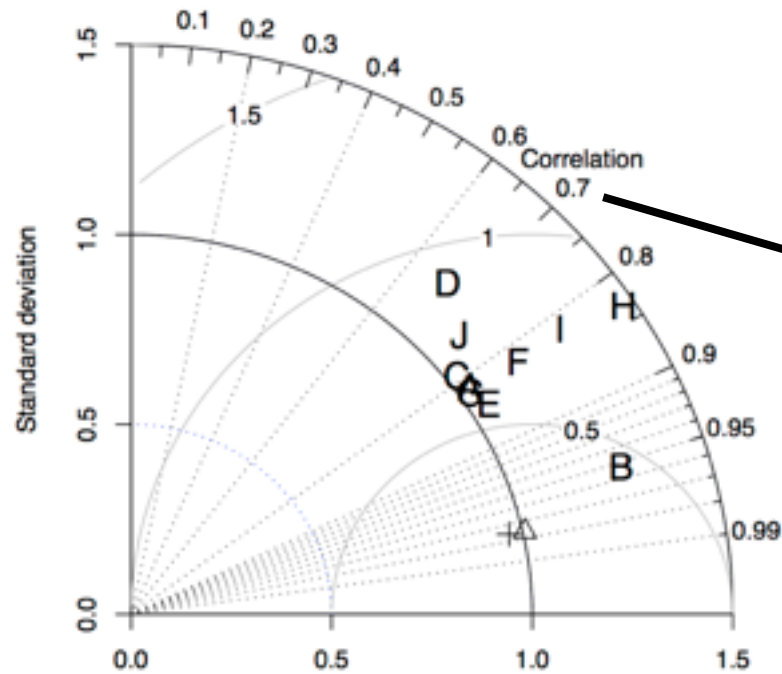
REG15_MM_1990_2006_INTER_ANNUAL_pr_NORMALISED



- GPCC
- WILLMOTT
- △ ECMWF
- + CRU
- A CCLMcom-CCLM
- B CNRM-ARPEGE51
- C DMI-HIRHAM
- D ICTP-REGCM3
- E KNMI-RACMO2.2b
- F MPI-REMO
- G SMHI-RCA35
- H UC-WRF311
- I UCT-PRECIS
- J UQAM-CRCM5

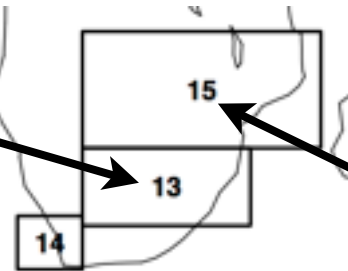
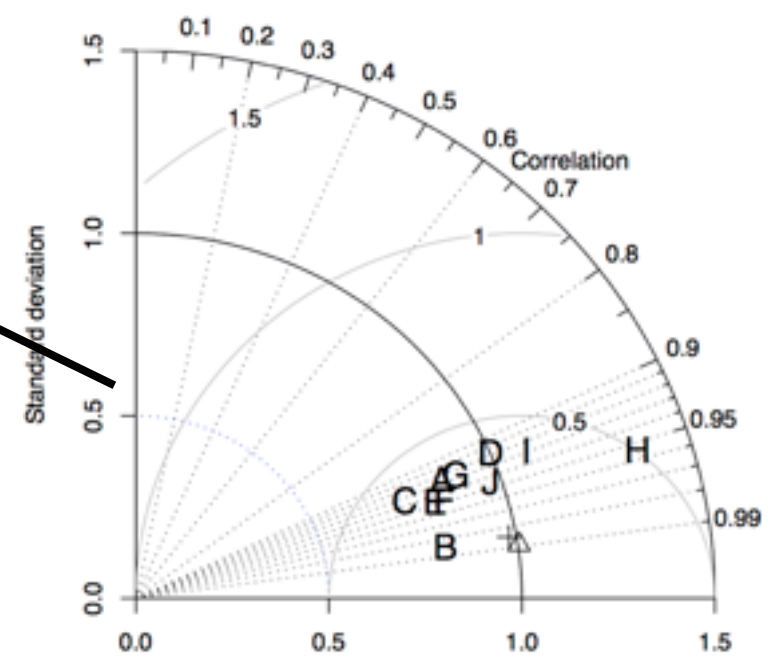
Cordex Southern Africa

REG13_MM_1990_2006_INTER_ANNUAL_pr_NORMALISED



- GPCC
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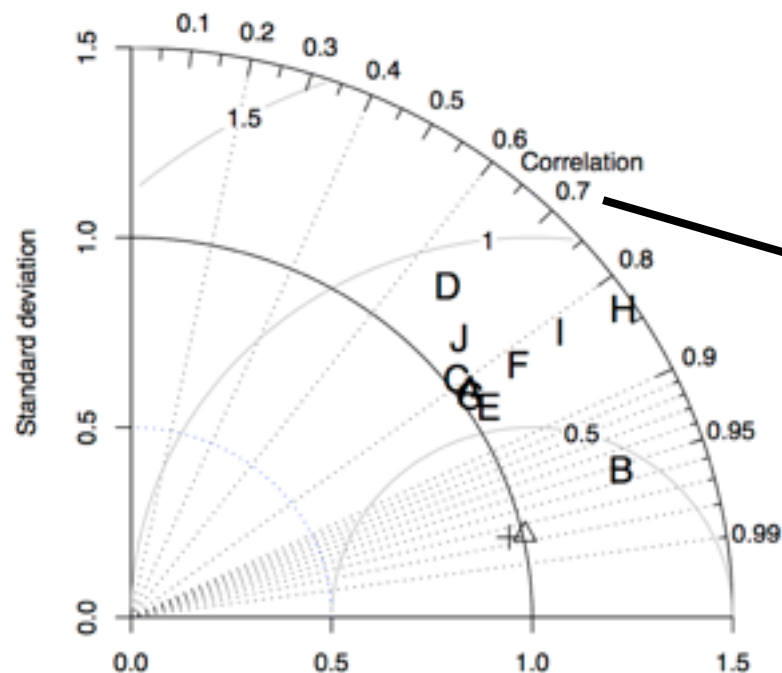
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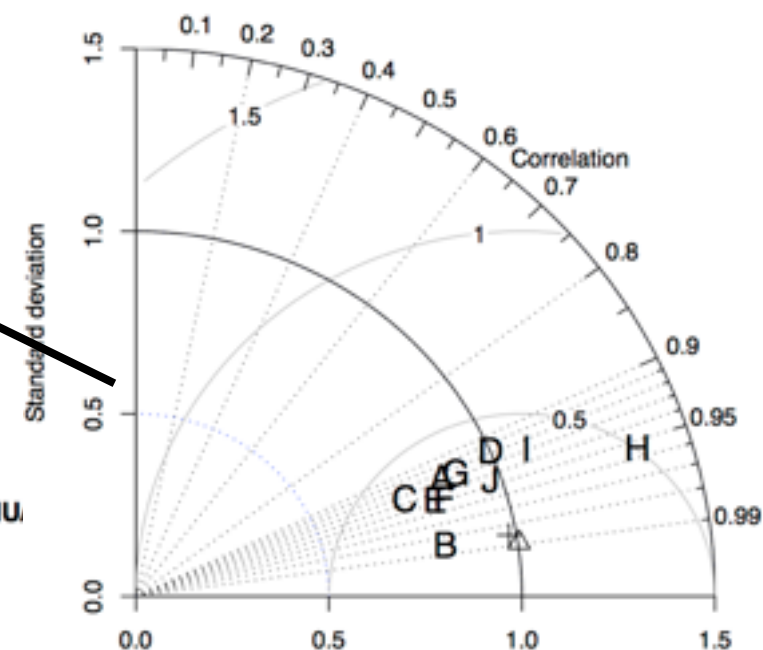
Cordex Southern Africa

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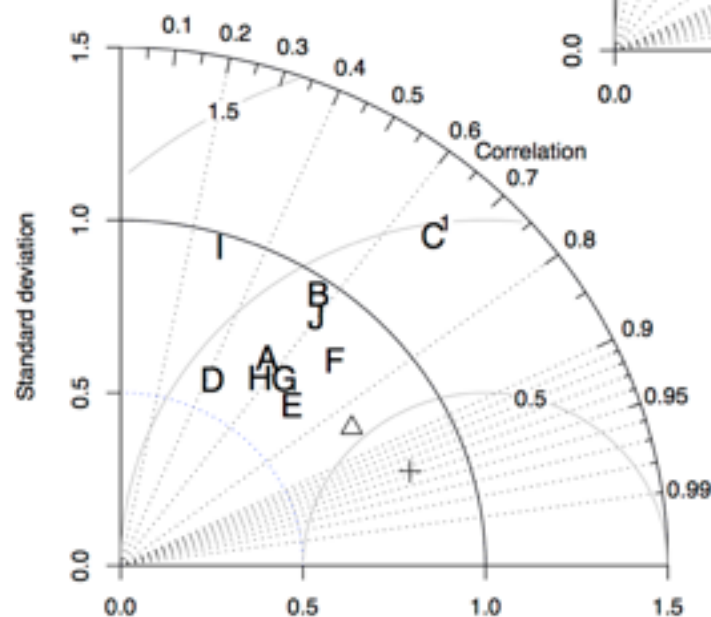


GPCC
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REG15_MM_1990_2006_INTER_ANNUAL_pr_NORMALISED



REG14_MM_1990_2006_INTER_ANNUAL_pr_NORMALISED



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Cordex - Africa

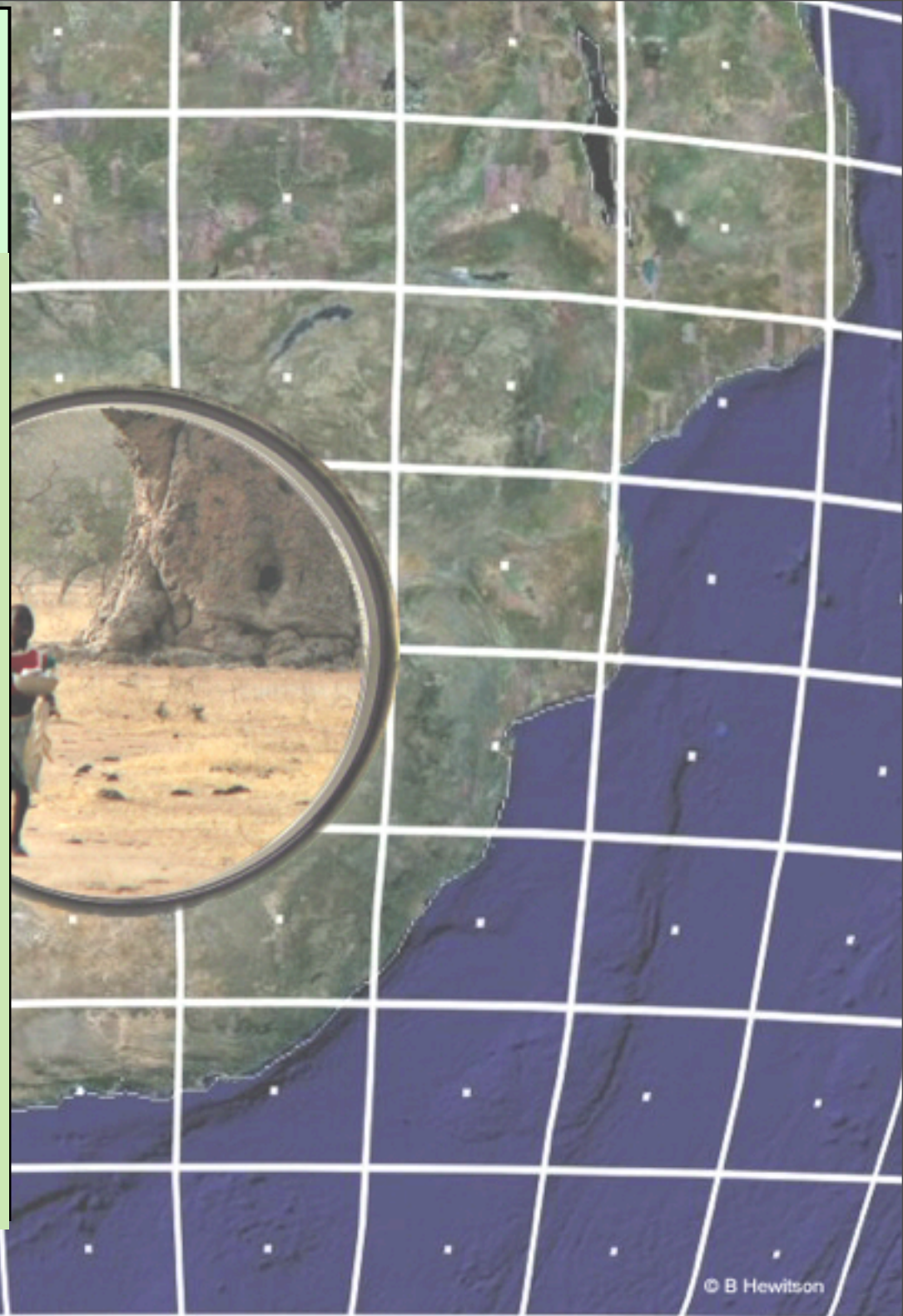
Mixing climate and VIA communities....



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Climate models, historical observations, trends, downscaling, projections, event frequency, ...

Climate models, historical observations, trends, downscaling, projections, event frequency, ...



Data

Climate models, historical observations, trends, downscaling, projections, event frequency, ...

Generated by models, analyses, downscaling... but observations?



Data

Climate models, historical observations, trends, downscaling, projections, event frequency, ...

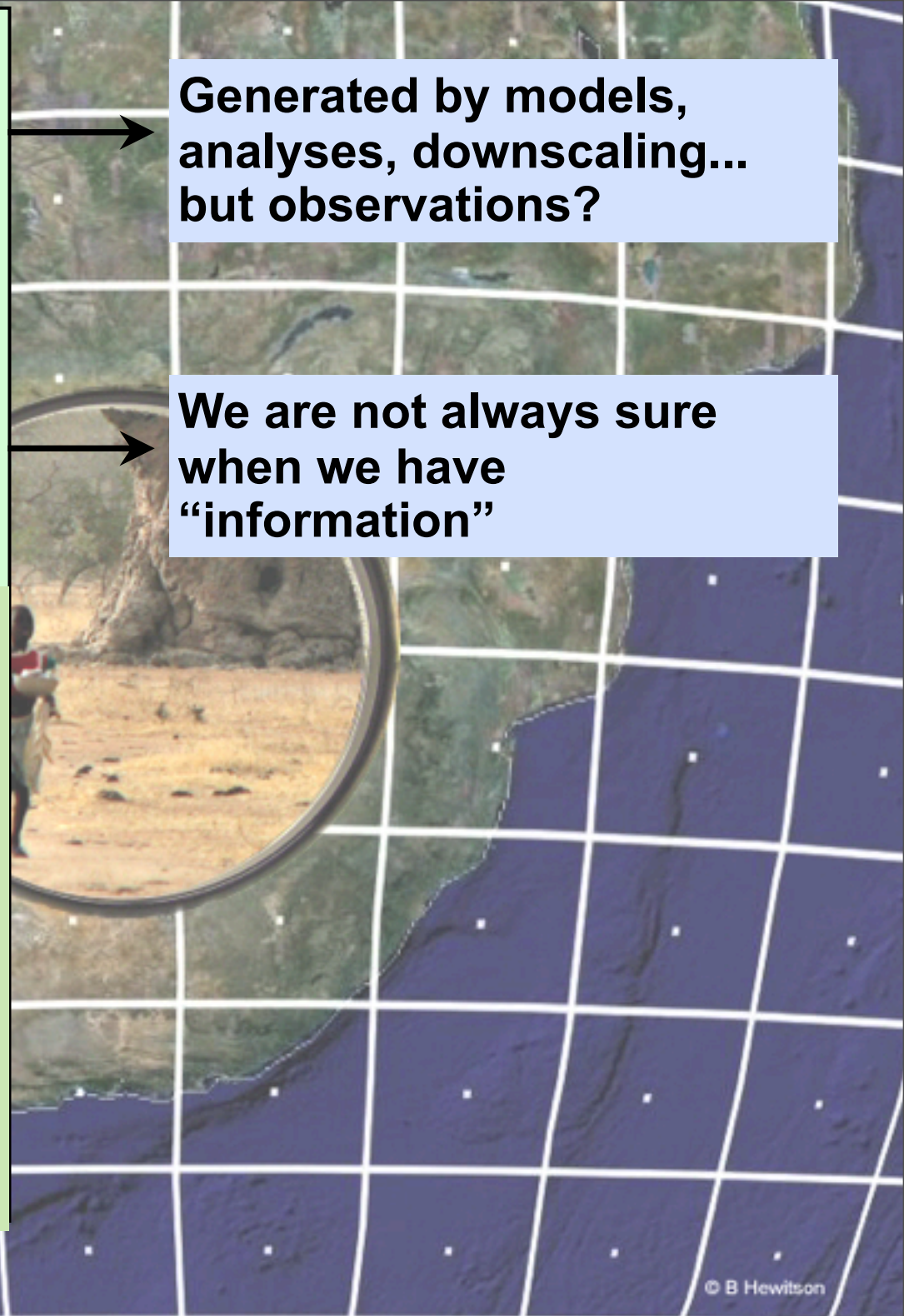


Information

Measures of vulnerability and risk, threshold exceedence, combinatory impacts, uncertainty and confidence, regional scale variations, ...

Generated by models, analyses, downscaling... but observations?

We are not always sure when we have “information”



Data

Climate models, historical observations, trends, downscaling, projections, event frequency, ...



Information

Measures of vulnerability and risk, threshold exceedence, combinatory impacts, uncertainty and confidence, regional scale variations, ...



Knowledge

Assessing options, understanding consequences, evaluating responses, informing decision making, ...

Generated by models, analyses, downscaling... but observations?

We are not always sure when we have "information"

Comes with close coupling between science and society - relationship based!

Data

Climate models, historical observations, trends, downscaling, projections, event frequency, ...



Information

Measures of vulnerability and risk, threshold exceedence, combinatory impacts, uncertainty and confidence, regional scale variations, ...



Knowledge

Assessing options, understanding consequences, evaluating responses, informing decision making, ...



A basis for action

Balance competing priorities, strategic investments in adaptation and mitigation, new research avenues, coordination of response frameworks, ...

Generated by models, analyses, downscaling... but observations?

We are not always sure when we have "information"

Comes with close coupling between science and society - relationship based!

Actions are risky, and takes place within a multi-stressor context

Needed by society

Data

Climate models, historical observations, trends, downscaling, projections, event frequency, ...



Information

Measures of vulnerability and risk, threshold exceedence, combinatory impacts, uncertainty and confidence, regional scale variations, ...



Knowledge

Assessing options, understanding consequences, evaluating responses, informing decision making, ...



A basis for action

Balance competing priorities, strategic investments in adaptation and mitigation, new research avenues, coordination of response frameworks, ...

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We are not always sure when we have "information"

Comes with close coupling between science and society - relationship based!

Actions are risky, and takes place within a multi-stressor context

**Delivered
by science**

Data
Climate models, historical observations, trends, downscaling, projections, event frequency, ...

Generated by models, analyses, downscaling... but observations?

Information
Measures of vulnerability and risk, threshold exceedence, combinatory impacts, uncertainty and confidence, regional scale variations, ...

We are not always sure when we have "information"

Knowledge
Assessing options, understanding consequences, evaluating responses, informing decision making, ...

Comes with close coupling between science and society - relationship based!

A basis for action
Balance competing priorities, strategic investments in adaptation and mitigation, new research avenues, coordination of response frameworks, ...

Actions are risky, and takes place within a multi-stressor context

**Needed
by society**

**Delivered
by science**

**Bridge
THE
GAP**

**Needed
by society**

Data

Climate models, historical observations, trends, downscaling, projections, event frequency, ...



Information

Measures of vulnerability and risk, threshold exceedence, combinatory impacts, uncertainty and confidence, regional scale variations, ...



Knowledge

Assessing options, understanding consequences, evaluating responses, informing decision making, ...



A basis for action

Balance competing priorities, strategic investments in adaptation and mitigation, new research avenues, coordination of response frameworks, ...

Generated by models, analyses, downscaling... but observations?

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Comes with close coupling between science and society - relationship based!

Actions are risky, and takes place within a multi-stressor context

Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector



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Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture



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Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture

Rain season characteristics including spatial variability, temperature thresholds, growing season length, scale (space and time - daily at a point?)

Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture

Rain season characteristics including spatial variability, temperature thresholds, growing season length, scale (space and time - daily at a point?)

Ecology

Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture

Rain season characteristics including spatial variability, temperature thresholds, growing season length, scale (space and time - daily at a point?)

Ecology

Thresholds, effects on ecosystem services and productivity

Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture

Rain season characteristics including spatial variability, temperature thresholds, growing season length, scale (space and time - daily at a point?)

Ecology

Thresholds, effects on ecosystem services and productivity

Water resource management

Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture

Rain season characteristics including spatial variability, temperature thresholds, growing season length, scale (space and time - daily at a point?)

Ecology

Thresholds, effects on ecosystem services and productivity

Water resource management

Extreme rainfall and early warning; wind and humidity; supply questions (strategic planning)

Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture

Rain season characteristics including spatial variability, temperature thresholds, growing season length, scale (space and time - daily at a point?)

Ecology

Thresholds, effects on ecosystem services and productivity

Water resource management

Extreme rainfall and early warning; wind and humidity; supply questions (strategic planning)

Health

Cordex – Africa Analysis

Vulnerability, Impacts, Adaptation Sector

Agriculture

Rain season characteristics including spatial variability, temperature thresholds, growing season length, scale (space and time - daily at a point?)

Ecology

Thresholds, effects on ecosystem services and productivity

Water resource management

Extreme rainfall and early warning; wind and humidity; supply questions (strategic planning)

Health

Space and time scales; communication; identifying useful type of climate data

Cordex – Africa Analysis

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ClimAfrica - Climate Change Prediction in sub-Saharan Africa



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Cordex - Africa

Mixing climate and VIA communities....it's complicated!



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Mixing climate and VIA communities....it's complicated!

April 2010

March 2011

July 2011

November 2011

February 2012

Burkina Faso: 28-30 May 2012

Health, media and climate
specialists

Many lessons learned by all
delegates

How do we communicate
uncertainty????? Not certain.

Even more lessons learned by
organizers!



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Some of the lessons we have learned...



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Some of the lessons we have learned...

1. Continually assess your assumptions about what you think you know...scientific capacity, cross sectoral collaboration...



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Cordex - Africa

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3. The importance of defining the question: design the questions that the analysis intends to answer, in very specific terms, and articulate the value that is achieved and for who it is achieved in answering the question. Limit this to a only 3-5 questions in order to force prioritization

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7. Design the process with long term continuity in mind

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What is next.....



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What is next.....

April 2010

March 2011

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February/March 2013

Analysis workshop

- SMHI - RCA4
 - 6 GCMs - Historical & 6 Future
- Others...?
- Re-evaluate regions
- Data dissemination
- How do we deal with so much data?
- How do we evaluate ND vs SD?
- Engagement of user communities?

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February/March 2013

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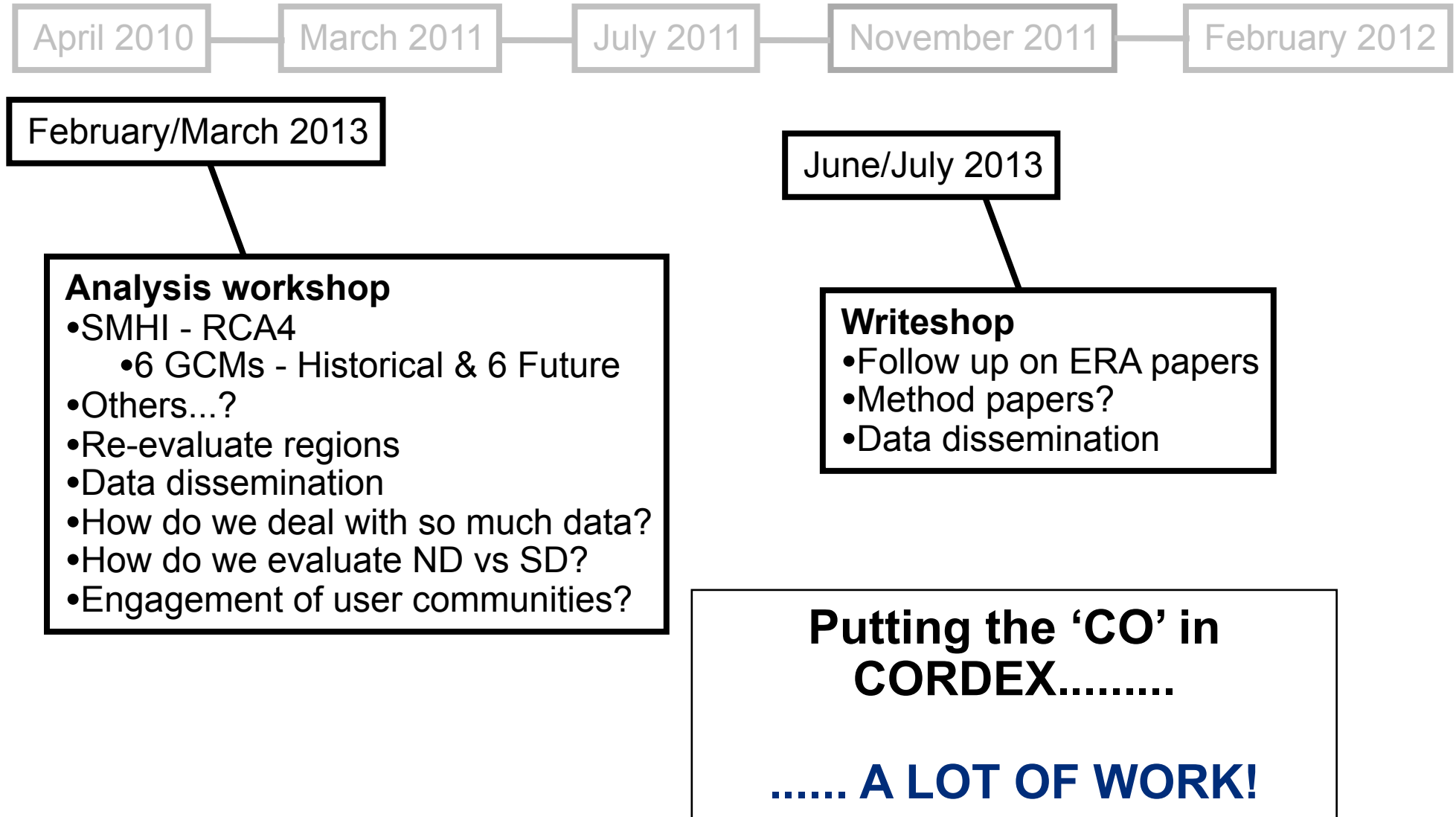
June/July 2013

Writeshop

- Follow up on ERA papers
- Method papers?
- Data dissemination

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What is next.....



Cordex Web Presence

The official WCRP CORDEX page

<http://wcrp.ipsl.jussieu.fr/cordex/about.html>

START

<http://start.org/cordex-africa>

CSAG Cordex-Africa

<http://www.csag.uct.ac.za/cordex>

CORDEX Europe

<http://www.eurocordex.com>

DMI Archive

<http://cordex.dmi.dk/joomla/>

