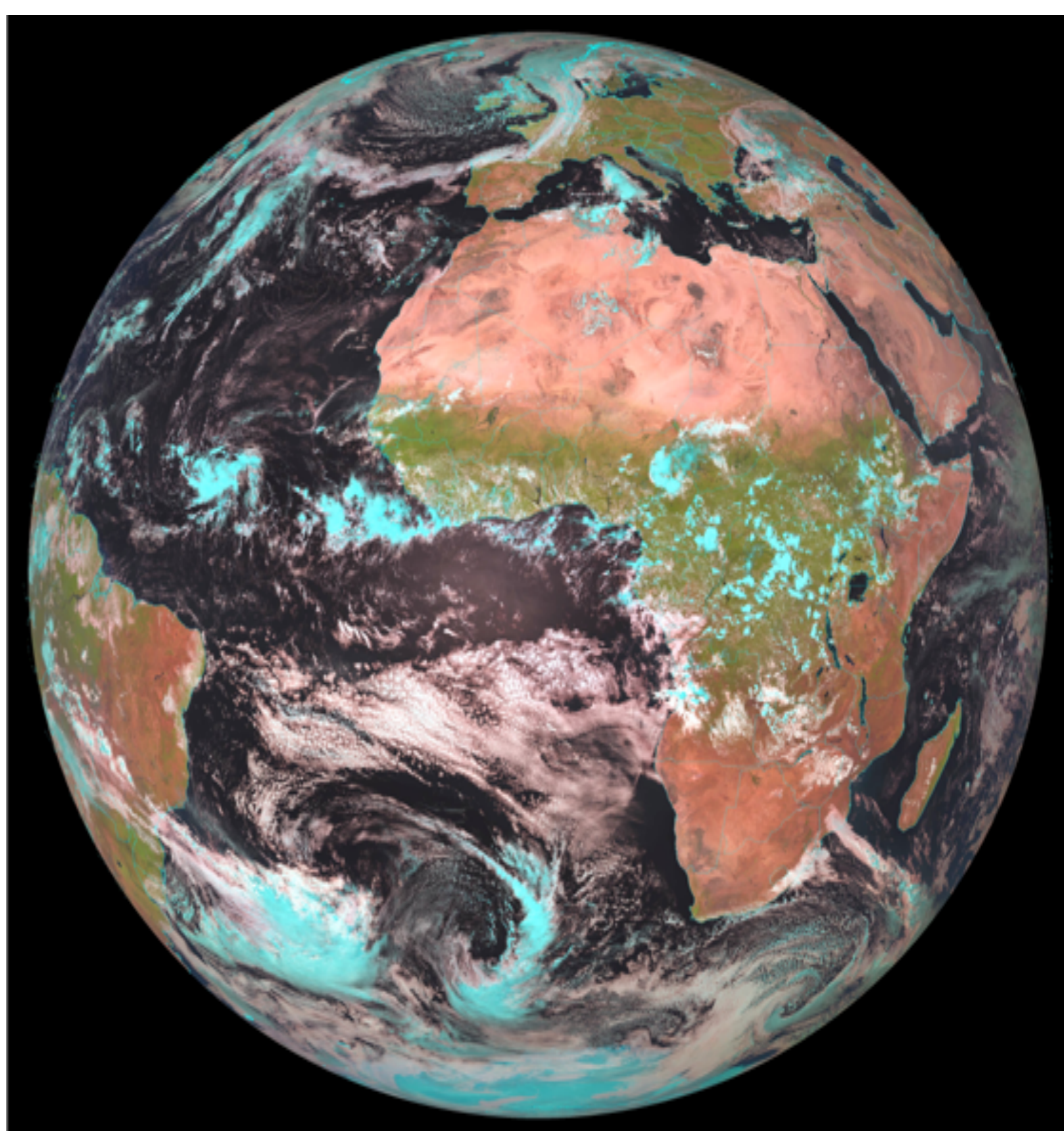




CORDEX-Africa

*Improving climate
information for
societal benefit over
Africa*



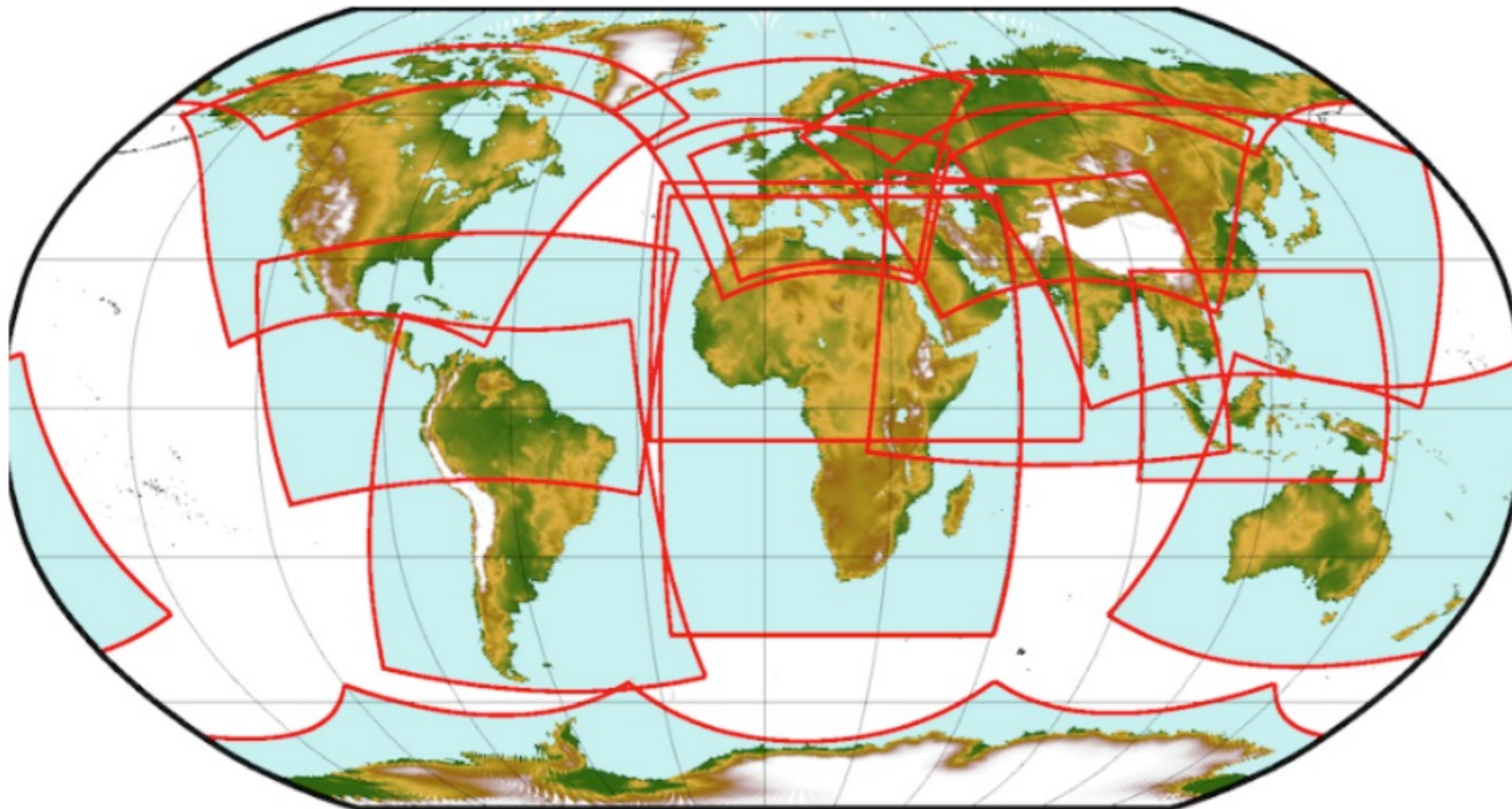
<http://www.csag.uct.ac.za/cordex-africa>



WCRP
World Climate Research Programme

CORDEX
Coordinated Regional Climate Downscaling Experiments

CORDEX



- Region 1: South America
- Region 2: Central America
- Region 3: North America
- Region 4: Africa
- Region 5: Europe (EURO)
- Region 6: South Asia
- Region 7: East Asia
- Region 8: Central Asia
- Region 9: Australasia
- Region 10: Antarctica
- Region 11: Arctic
- Region 12: Mediterranean (MED)
- Region 13: Middle East North Africa (MENA)
- Region 14: South-East Asia (SEA)

<https://www.csag.uct.ac.za/cordex-africa>

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

Cordex – Africa Analysis

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Cordex – Africa Analysis

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

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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

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

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

Cordex - Africa

Putting the 'CO' in CORDEX

Phase 1 - Series of 4(5) Workshops

Cordex - Africa

Putting the 'CO' in CORDEX

Phase 1 - Series of 4(5) Workshops

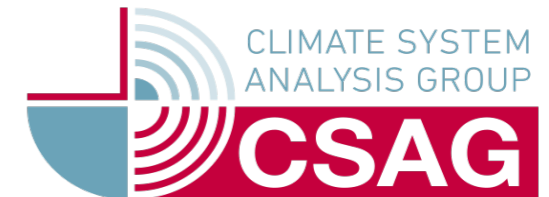
April 2010

March 2011

July 2011

November 2011

February 2012



The CORDEX vision is to advance and coordinate the science and application of regional climate downscaling through global partnerships.

- Workshops were funded primarily by START, with additional funding from CDKN, WCRP, SMHI and CSAG
- Finding funding to run these workshops is a continuing challenge for CORDEX-Africa

Cordex - Africa

Putting the 'CO' in CORDEX

Phase 1 - 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

Putting the 'CO' in CORDEX

Phase 1 - Series of 4(5) Workshops

April 2010

March 2011

July 2011

November 2011

February 2012

Cape Town
Planning

Trieste, Italy
Conference
2 Day workshop

Cordex Conference & Workshop (Fri & Sat)

- Formed regional groupings
- Adjusted regions
- Reset metrics and variables
- Training in R
- **Discussed VIA scientists involvement**
- Set goals for next meeting (July 2011)

- Discussed ERA-Interim runs
 - Developed metrics
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Cordex - Africa

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- Discussed VIA scientists involvement
- Set goals for next meeting (July 2011)

Cape Town
Group Leaders
Analysis and planning

Leaders workshop

- Revisited regions
- Developed series of analyses
 - Observation data
 - Continued training
 - **Discussed VIA aspects**
 - Usable data?

Cordex - Africa

Putting the 'CO' in CORDEX

Phase 1 - Series of 4(5) Workshops

July 2011

November 2011

February 2012



- **Atmospheric and VIA scientists (3 streams)**
- Continued atmospheric analysis and training
- **VIA scientists**
 - Develop questions from VIA perspective
 - Integrate VIA and atmos scientists
- Set preliminary paper content



Cape Town
Data Analysis
VIA scientists

Cordex - Africa

Putting the 'CO' in CORDEX

Phase 1 - Series of 4(5) Workshops

April 2010

March 2011

July 2011

November 2011

February 2012

Cape Town
Planning

Trieste, Italy
Conference

IPCC AR5 Deadline - 31 July (submitted)

1. An Assessment of CORDEX Regional Climate Models over West Africa
2. Diurnal cycle and intra-seasonal variability of rainfall over West Africa using CORDEX Models
3. Assessing the Performance of CORDEX RCMs in simulating the East African rainfall
4. Extreme events over southern Africa in CORDEX models
5. Evaluating southern Africa precipitation patterns simulated by Regional Climate Models
6. A diagnostic evaluation of CORDEX models over southern Africa

Paper writing workshop 5 days

- Not analysis
- Each day a section
 - Teaching how to write a paper
 - Paper outline
 - Introduction
 - Conclusions
 - Results
- Workplan

Cape Town
Data Analysis
VIA scientists

Trieste
Writeshop

Cordex Africa Phase 1 achievements ...

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

AMERICAN METEOROLOGICAL SOCIETY
AMS Journals Online

Journal of Climate 2013, e-View
doi: <https://doi.org/10.1175/JCLI-D-12-00703.1>

A diagnostic evaluation of precipitation in CORDEX models over southern Africa

Evangelia-Anna Kalognomou,¹ Christopher Lennard,¹ Mxolisi Shongwe,² Izidine Pinto,³ Alice Favre,^{4,5} Michael Kent,¹ Bruce Hewitson,¹ Alessandro Dosio,⁶ Grigory Nikulin,² Hans-Jürgen Panitz,⁶ and Matthias Büchner²

¹ University of Cape Town, South Africa
² South African Weather Service, Pretoria, South Africa
³ Centre de Recherches de Climatologie, UMR 6282, Biogéosciences CNRS, Université de Bourgogne, France
⁴ European Commission Joint Research Centre, Institute for Environment and Sustainability, Italy
⁵ Rossby Centre, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden

AMERICAN METEOROLOGICAL SOCIETY
AMS Journals Online

Journal of Climate 2013, e-View
doi: <https://doi.org/10.1175/JCLI-D-12-00703.1>

Assessment of the Performance of CORDEX Regional Climate Models in Simulating Eastern Africa Rainfall

Hussen Seid Endris,¹ Philip Omondi,² Susan Jalo,² Christopher Lennard,¹ Bruce Hewitson,¹ Ladislaus Chang'a,³ J. L. Awango,⁴ Alessandro Dosio,⁵ Patrick Kotien,⁶ Grigory Nikulin,² Hans-Jürgen Panitz,² Matthias Büchner,¹⁰ Frede Stordal,¹¹ and Lukya Tazalika¹²

¹ University of Cape Town, Cape Town, South Africa
² IGAD Climate Prediction and Applications Centre (ICPAC), Nairobi, Kenya
³ University of Zambia, Lusaka, Zambia
⁴ Tanzania Meteorological Agency, Tanzania
⁵ Western Australian Centre for Geoscientific and the Institute for Geoscience Research Curtin University, Perth

AMERICAN METEOROLOGICAL SOCIETY
AMS Journals Online

Theoretical and Applied Climatology
January 2016, Volume 123, Issue 1, pp 369-386

First online: 10 January 2015

Daily characteristics of West African summer monsoon precipitation in CORDEX simulations

Nana Ama Browne Klutse, Mouhamadou Bamba Sylla, Ismaila Diallo, Abdoulaye Sarr, Alessandro Dosio, Arona Diedhiou, Andre Kamga, Benjamin Lamptey, Abdou Ali, Emiola O. Gbobiyanji, Kwadwo Owusu, Christopher Lennard, Bruce Hewitson, Grigory Nikulin, Hans-Jürgen Panitz, Matthias Büchner Show less

INTERNATIONAL JOURNAL OF CLIMATOLOGY

Research Article

Climatology, annual cycle and interannual variability of precipitation and temperature in CORDEX simulations over West Africa

Emiola Gbobiyanji^{1,2}, Abdoulaye Sarr^{3,*}, Mouhamadou Bamba Sylla⁴, Ismaila Diallo⁵, Chris Lennard⁶, Alessandro Dosio⁷, Arona Dhiédiou⁸, Andre Kamga⁹, Nana Ama Browne Klutse¹⁰, Bruce Hewitson⁶, Grigory Nikulin¹, Benjamin Lamptey¹¹

Article first published online: 19 OCT 2013
DOI: 10.1002/joc.3834
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Additional Information (Show All)
How to Cite | Author Information | Publication History

Climate Dynamics

March 2016, Volume 46, Issue 5, pp 1799-1818

First online: 06 June 2015

Spatial distribution of precipitation annual cycles over South Africa in 10 CORDEX regional climate model present-day simulations

Alice Favre, Nathalie Philippou, Benjamin Pohl, Evangelia-Anna Kalognomou, Christopher Lennard, Bruce Hewitson, Grigory Nikulin, Alessandro Dosio, Hans-Jürgen Panitz and 1 more

Article Metrics
Social Mentions

ATMOSPHERIC SCIENCE LETTERS
A JOURNAL OF THE ROYAL METEOROLOGICAL SOCIETY

Research Article

An evaluation of CORDEX regional climate models in simulating precipitation over Southern Africa

Mxolisi E. Shongwe^{1,2*}, Chris Lennard¹, Brant Liebmann⁴, Evangelia-Anna Kalognomou⁵, Lucky Nsangwani³ and Izidine Pinto²

Article first published online: 9 OCT 2014
DOI: 10.1002/asl2.538
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Climate Dynamics
April 2014

Simulating the link between ENSO and summer drought in Southern Africa using regional climate models

Arlindo Meque, Babatunde J. Abiodun

Purchase on Springer.com
\$39.95 / €34.95 / £29.95*

Abstract
This study evaluates the capability of regional climate models (RCMs) in simulating the link between El Niño Southern Oscillation (ENSO) and Southern African droughts. It uses the Standardized Precipitation-Evapotranspiration Index (SPEI), computed using rainfall and temperature data to identify 3-month drought over Southern Africa, and compares the observed and simulated correlation between ENSO and SPEI. The observation data are from the Climate Research Unit, while the simulation data are from ten RCMs (ARPEGE, CCLM, HIRHAM, RACMO, REMO, PRECIS, RegCM3, RCA, WRF, and CRCM) that participated in the regional climate downscaling experiment (CORDEX) project. The study analysed the rainy season (December–February) data for 19 years (1989–2006). The results show a strong link between ENSO and droughts (SPEI) over Southern Africa. The link is owing to the influence of ENSO on both rainfall and temperature fields, but the correlation between ENSO and temperature is stronger than the correlation between ENSO and

Climate Dynamics

First online: 08 July 2015

Teleconnection responses in multi-GCM driven CORDEX RCMs over Eastern Africa

Hussen Seid Endris, Christopher Lennard, Bruce Hewitson, Alessandro Dosio, Grigory Nikulin, Hans-Jürgen Panitz

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IJG> Vol.4 No.4, June 2013

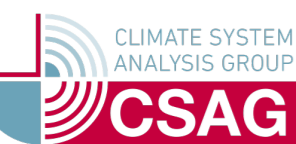
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Simulation of the Rainfall Regime over Ghana from CORDEX

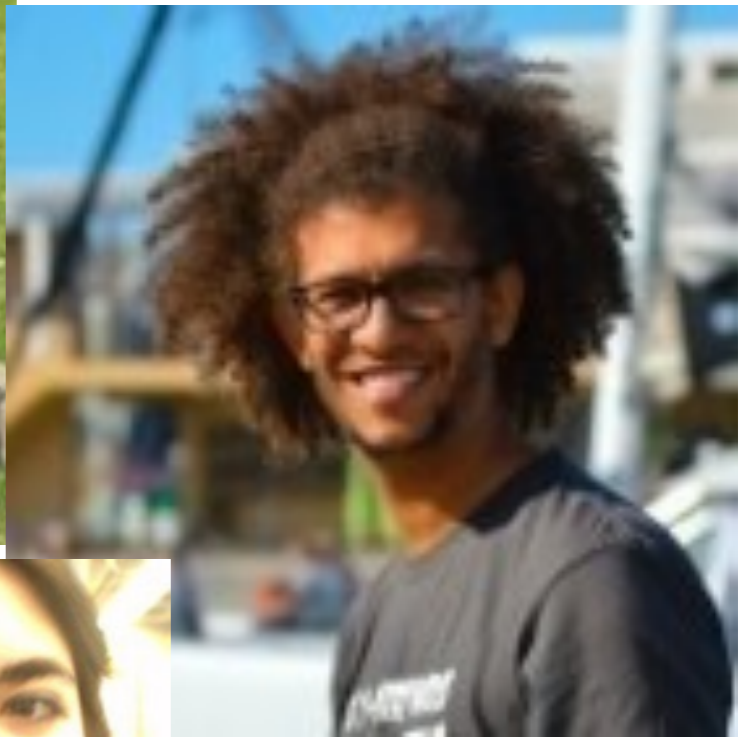
Download as PDF (Size: 1220KB) | Full-Text HTML | PP. 785-791 | DOI: 10.4236/ijg.2013.44072

Author(s) Leave a comment
Kwadwo Owusu, Nana Ama Browne Klutse

ABSTRACT
This paper investigates how well the rainfall regime on which many lives depend in Ghana is well represented by the Coordinated Regional Climate Downscaling Experiment (CORDEX). The objective of the study is to demonstrate how well the ten CORDEX models are able to capture the spatial and temporal rainfall seasonality over the southern and northern sub-sections of Ghana. The choice of the sub-sections is based on the fact that south of 8°N experiences a bi-modal rainfall regime while the north has a unimodal regime. The results indicate that the rainfall over Ghana is associated with high levels of variability at the inter-annual time scale. Particularly over the southern part of Ghana, all the models follow the same trend as over Ghana with similar rainfall values as the observation. Over the northern part of Ghana, relatively low rainfall agreeing with the observation. However, most of the models overestimate



Cordex Africa teams



Cordex Africa Phase 2: 2015-2018

<https://www.csag.uct.ac.za/cordex-africa/cordex-africa-analysis-phase-2/>

Workshop 1 - Identify key regional research questions and develop/adopt methodologies

Workshop 2 - Initial analysis of CORDEX-Africa data based on the questions elucidated in the first workshop

Workshop 3 - Build on the research questions developed at the 2nd analysis workshop, refine the proposed paper ideas and come up with proposals for the CORDEX Flagship Pilot Studies



Swedish Ministry of the
Environment and Energy

Cordex Africa Phase 2: 2015-2018

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Workshop 4 - **Decided instead to develop and write papers that could be considered in the IPCC special report on 1.5 degrees of global warming (IPCC SR1.5)**



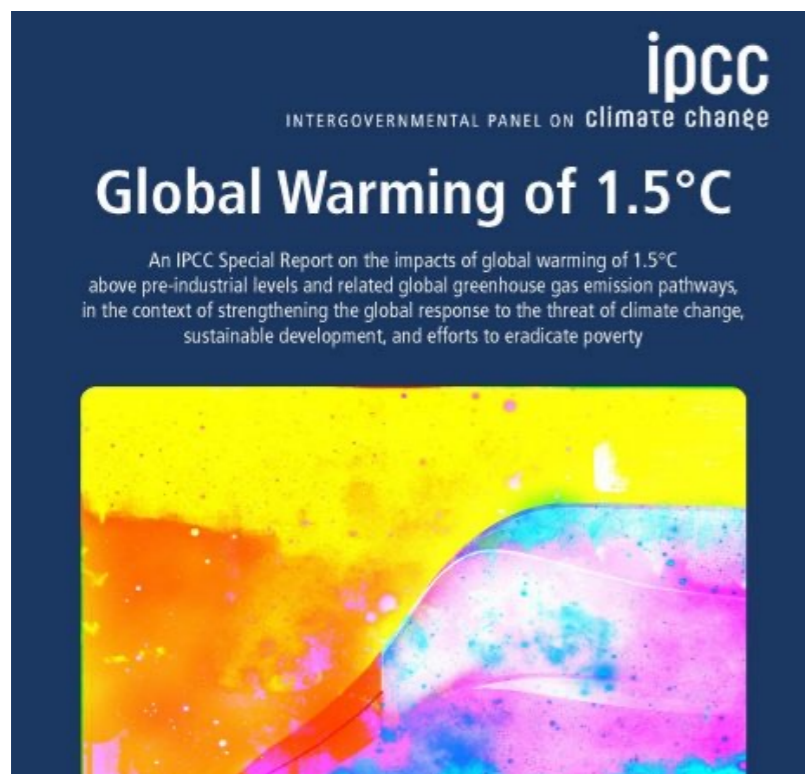
Cordex Africa Phase 2: 2015-2018

<https://www.csag.uct.ac.za/cordex-africa/cordex-africa-analysis-phase-2/>

Workshop 4 - Decided instead to develop and write papers that could be considered in the IPCC special report on 1.5 degrees of global warming (IPCC SR1.5)

Workshop 6 - Refine and crystallise research question for each planned paper and set of analysis products that could be used in the final paper writing workshop

Workshop 7 - writing workshop (a “writeshop”) where key team members spent five days together to (a) finalise the corrections to the 1.5-degree papers submitted in October 2017 and resubmit them



Box 3.1: Sub-Saharan Africa: Changes in Temperature and Precipitation Extremes

Cordex Africa Phase 2: 2015-2018

<https://www.csag.uct.ac.za/cordex-africa/cordex-africa-analysis-phase-2/>

1. Lennard C, Nikulin G, Dosio A and Moufouma-Okia W (2018) **On the need for regional climate information over Africa under varying levels of global warming**, Environ. Res. Lett., doi:10.1088/1748-9326/aab37b2.
2. Nikulin G, Lennard C, Dosio A, Kjellström E, Chen Y, Hänsler A, Kupiainen M, Laprise R, Mariotti L, Fox Maule C, van Meijgaard E, Panitz H-J, Scinocca J F and Somot S (2018) **The effects of 1.5 and 2 degrees of global warming on Africa in the CORDEX ensemble**, Environ. Res. Lett., doi:10.1088/1748-9326/aab2b43.
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Cordex Africa Phase 2: 2015-2018

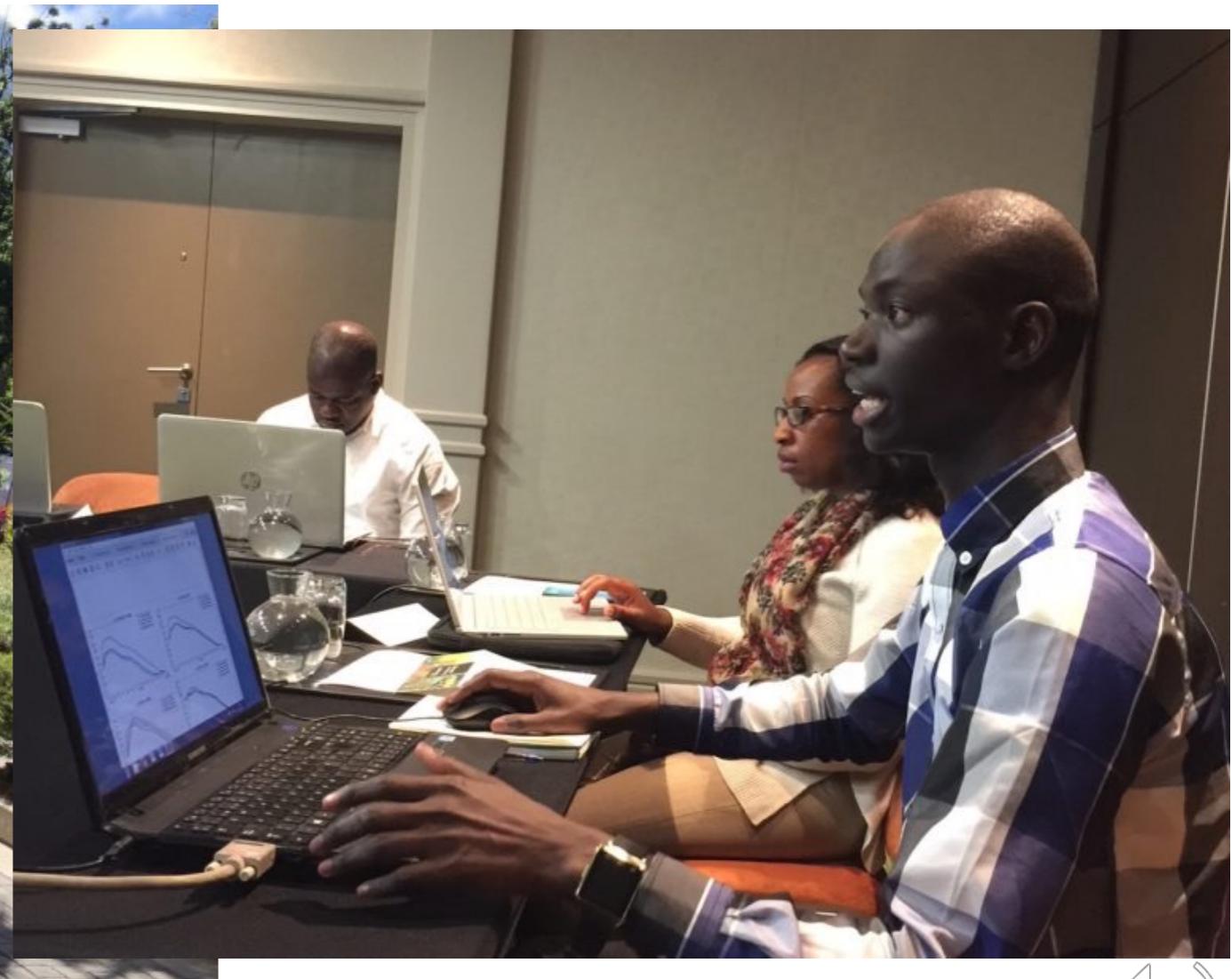
<https://www.csag.uct.ac.za/cordex-africa/cordex-africa-analysis-phase-2/>

VIA group

Workshop 5 – Specific engagement with the VIA group in CORDEX-Africa.

Workshop 6 - VIA teams worked to set up their papers, decide on what analysis each team wanted to do (health, hydrology, agriculture, ecology)

Workshop 8 - This workshop served as the second VIA workshop for CORDEX-Africa; finalised paper ideas



Cordex Africa Phase 2: 2015-2018

<https://www.csag.uct.ac.za/cordex-africa/cordex-africa-analysis-phase-2/>

Original Article | Published: 08 October 2019

Assessing climate change impacts on water resources in the Benue River Basin, Northern Cameroon

Rodric M. Nonki, André Lenouo, Christopher J. Lennard & Clément Tchawoua

Environmental Earth Sciences 78, Article number: 606 (2019) | [Cite this article](#)

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A [Correction](#) to this article was published on 27

This article has been [updated](#)

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Comparison between dynamic and static sensitivity analysis approaches for impact assessment of different potential evapotranspiration methods on hydrological models performance

Rodric MÉRIMÉ Nonki¹, André Lenouo², Christopher J. Lennard³, Raphael M. Tshimanga⁴, and Clément Tchawoua⁵

¹Laboratory for Environmental Modeling and Atmospheric Physics (LEMAP), Department of Physics, Faculty of Sciences, University of Yaounde 1, Yaounde, Cameroon | ²Department of Physics, Faculty of Sciences, University of Douala, Douala, Cameroon | ³

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Action	Manuscript Number	Title	Initial Date Submitted	Status Date	Current Status	Date Final Disposition	Final Disposition
View Submission Author Response View Decision Letter View Attachments	TAAC-D-20-01019	Impact of future climate change on malaria in West Africa	30 Dec 2020	01 Oct 2021	Accept		

Page: 1 of 1 (1 total completed submissions)

Impact of Future Climate Change on Malaria in West Africa
I. Diouf, Adelo, A., Abiodun G., and Lennard C.



Cordex Africa stakeholder engagement

Mixing climate and VIA communities

Burkina Faso: Climate change and health

Cordex Africa stakeholder engagement

Mixing climate and VIA communities

Burkina Faso: Climate change and health

- Health, media and climate specialists
- Many lessons learned by all delegates
- We speak different languages!
- How do we communicate uncertainty.....
- Communication of our message is critical - how, to whom, use an expert!
- Organizers learned many lessons



Cordex Africa stakeholder engagement

Mixing climate and VIA communities

Dar Es Salaam:

Climate information for decision making in peri-urban areas

Cordex Africa stakeholder engagement

Mixing climate and VIA communities

Dar Es Salaam: Climate information for decision making in peri-urban areas

- DRM, water, ecology, energy, infrastr, climate
- Place-based not sector-based -> co-discovery
- Climate and non-climate stressors
- The nature of climate information - how should it be used
- Even **more** lessons learned by organizers



Cordex Africa

Some of the lessons we have learned...

1. We can downscale anything AND sell the result authoritatively...
responsibility
2. Continually **assess your assumptions** about what you think you know: scientific capacity, cross sectoral collaboration, your knowledge base...
3. Bring in **stakeholder needs and priorities** early on. This requires early engagement with a representative spectrum of regional stakeholders
4. 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 prioritisation
5. Articulate questions in the appropriate **time and space scales**
6. **Understand concepts** before you attack the data....making pretty graphs for no reason is a waste of time
7. Need to set timelines and **articulate milestones**
8. Design the process with **long term continuity** in mind

Cordex Africa

Some of the lessons we have learned...

1. Data access – shipping discs around Africa.
2. Observed data – climate and application data is difficult to get.
3. Finding **funding** to run the workshops that facilitate this knowledge creation – persevere!

Number One Lesson.....

It's not just the work ...

It's not just the work ...

Developing long-lasting relationships is critical!!



It's not just the work ...

Developing long-lasting relationships is critical!!



Thank you...

<http://www.cordex.org>

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

