



*43rd Session of the WCRP Joint Scientific Committee (JSC43)*

## **Regional information for Society (Rifs)**

Silvina Solman, Bruce Hewitson, Sara C. Pryor



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# WCRP Core Project: RfS

## Outline

**May 2019**, following JSC 41: Task Team on Regional Activities (TTRA)

**Dec 2020**, JSC-41b, TTRA recommends establishing “**RfS**”

**Early 2021**, Interim Coordinating Group (ICG), and appointment of three RfS co-chairs

## **Key objective of the ICG: establish RfS as a full-fledged core project**

- 1. Key developments of the RfS Interim Coordinating Group (ICG)**
- 2. Proposals and requests to the JSC**
- 3. GEP report**
- 4. CORDEX report**

*NOTE: The ICG work is now complete, the last meeting has been held, and members thanked.*

*NOTE: RfS currently operates as the three co-chairs with the support of Nico (who is greatly appreciated) from the WCRP secretariat*



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# WCRP Core Project: RfS

## ICG actions 2021/2022

### **Develop the documents to establish RfS (all now unanimously approved by the ICG):**

*These are intended as living documents and serve as an entry point for the new SSG*

1. The Vision and Mission document: this is the equivalent of what is on the web sites for the other core projects ... “this is what RfS is about”
2. The RfS governance document: lays out the structure of RfS
  - A structure that follows the vision and mission of RfS.
  - Identifies core elements of RfS, their composition, relationships, and reporting.
  - CORDEX retains its full identity but has its home in RfS.
  - GEP finding its home in RfS

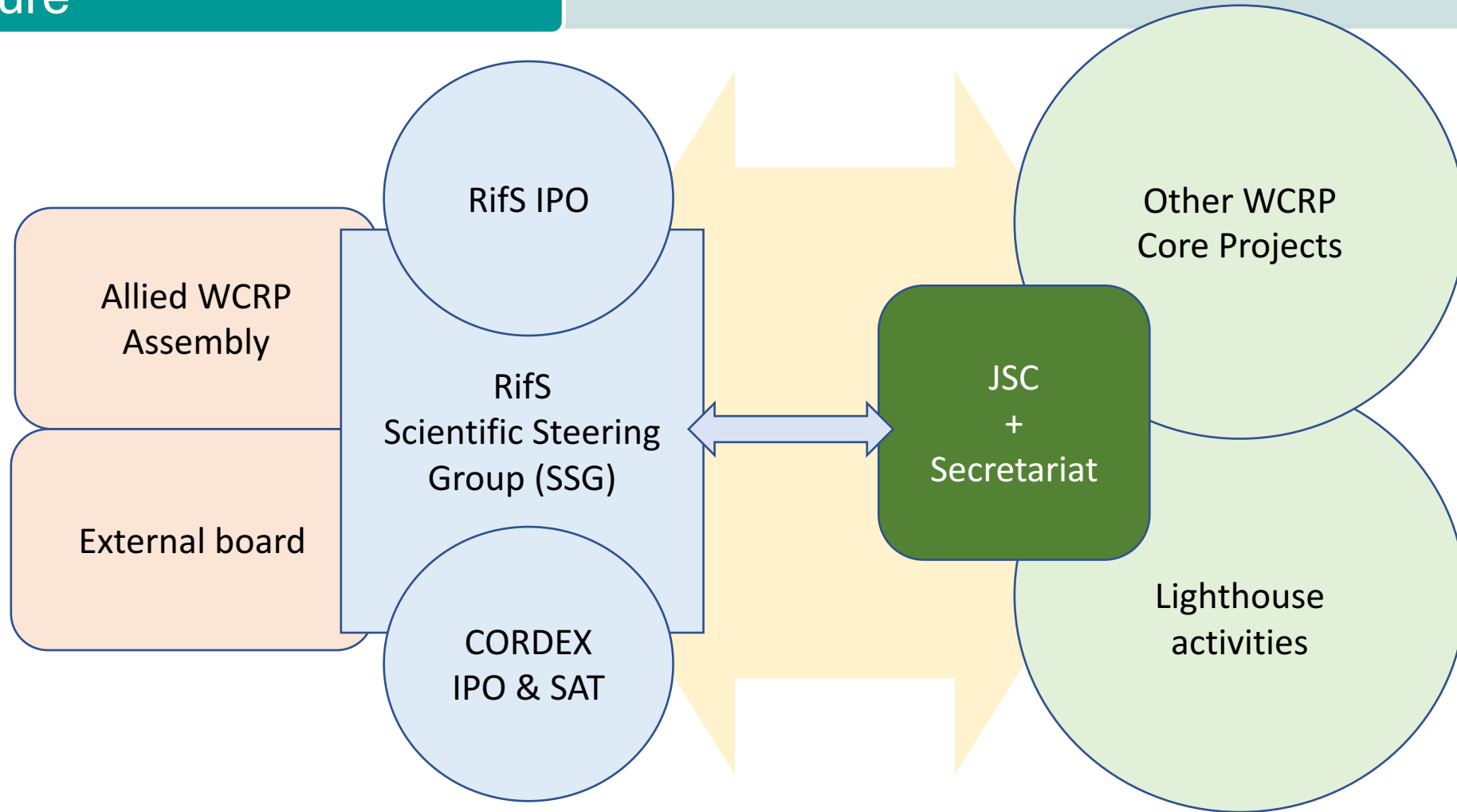


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# WCRP Core Project: RifS

## Structure



# WCRP Core Project: RfS

## CORDEX

### Key messages about CORDEX within RfS

- CORDEX retains its own Scientific Advisory Team (SAT), IPO, and co-chairs
- One of the CORDEX co-chairs will serve double duty as a RfS co-chair
- RfS SSG have responsibility for approval of the CORDEX co-chairs and SAT.
- CORDEX budget: will keep its allocation (at the same level as previous years) in addition to the full RfS allocation.
- Reporting from CORDEX to the JSC will be a standalone element of the RfS report

RfS is currently developing its relationship with the GEP



# WCRP Core Project: RifS

## SCIENCE PLAN

A living document

### Three overarching CHALLENGES focused on the regional / decision scale

1. How to optimally identify, understand, and model the relevant climate processes and their interactions which are most critical to manage the socio-ecological risks at the decision scales within regions.
2. How to optimally integrate multiple lines of evidence from observations, understanding of physical climate processes, and data from dynamical and statistical regional and global models to inform society's climate information needs.
3. How to best undertake engagement between stakeholders and the science community in different regional contexts to maximize the information benefit for the stakeholder and ensure that the user context is integrated into the design and execution of relevant climate research.



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# WCRP Core Project: RifS

## SCIENCE PLAN

A living document

**Four CLUSTERS of research questions that are inter-related, co-dependent, overlapping**

1. Regional climate understanding for climate projections (multi-decadal)
2. Regional climate understanding for climate predictions (seasonal to decadal)
3. Weather and climate extremes
4. Communication and Societal Engagement

Clusters 1 and 2 include a set of questions common to both cluster's interests



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# WCRP Core Project: RifS

## SCIENCE PLAN

A living document

**Twelve OBJECTIVES that necessarily need input from all clusters**

*Examples:*

- Improved understanding of the fundamental mechanisms and drivers of regional climate change and regional climate variability.
- Construction of regional climate information relevant to the decision context and impacts
- Quantification of the temporal and spatial scales of skillful climate prediction and projection and the associated added value



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# WCRP Core Project: RifS

## SCIENCE PLAN

A living document

**Many QUESTIONS specific to a cluster's foci, each with multiple associated actions**

*Examples:*

- What model complexity is required to usefully represent regional climates and change?
- How to reconcile and integrate multiple lines of evidence in providing regional climate information?
- How can we best develop methods to attribute change in probability of observed extreme events?
- How can we enable improved understanding of, and advance the dialogue with stakeholders?



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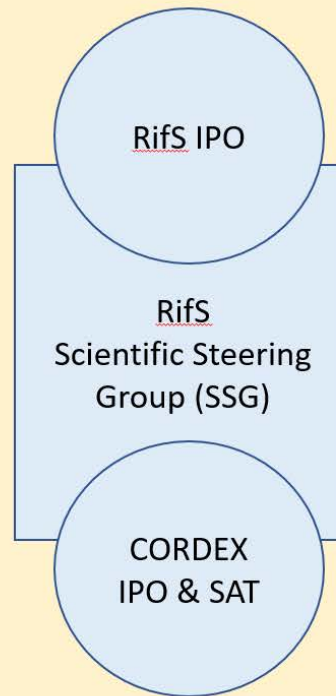


# WCRP Core Project: RifS

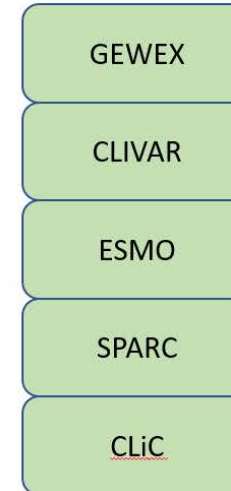
## SCIENCE PLAN

RifS has a key role in intra-WCRP communication

### Lighthouse regional activities



### WCRP Core Projects



# WCRP Core Project: RfS

## (some) 2022 Initiatives

| Event  | Purpose   |
|--|---|
| <b>AGU</b> – <i>committed</i>  | A RfS sponsored session proposed and accepted ... Session title is “Pathways to Provision of more Robust Regional Information for Society”  |
| <b>Conversations within WCRP</b> – <i>ongoing</i>                            | RfS co-chairs have been making presentations to, initiating conversations with, and participating in meetings with different parts of WCRP, e.g GEWEX and MCR                             |
| <b>RfS IPO</b> – <i>imminent</i>   | An essential resource for RfS that we hope will be rapidly established  |
| <b>Election of RfS SSG</b> – <i>pending</i> JSC approval of RfS science plan | Develop capacity for designing and implementing initial RfS pilot projects and collaborations, subject to consultations with other core projects, LHAs, and identified external agencies. |
| <b>Webinar series</b> – <i>pending</i> SSG appointment                       | A webinar discussion series on priority topics from the science plan.   |
| <b>Workshop(s)</b> – <i>mixed</i>  | Interactions with two workshops aligned with RfS (“Global north-south dynamics”, “Building an African Alliance”). Waiting on SSG to discuss a RfS-specific workshop                       |



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# WCRP Core Project: RfS

## Proposals for JSC approval

1. The JSC **accept the RfS Science plan** and related RfS documents – this is the trigger for further actions. The science plan has been unanimously adopted by the ICG, and been reviewed by four JSC members (Jens Christensen, Roberto Rodríguez, Ken Takahashi, Maria Ivanova).
2. Following the science plan acceptance, a call will be made for nominations for the RfS SSG. We request that JSC undertake to approve the selected SSG nominations by email well before the next JSC meeting, as we need to establish the SSG as soon as possible to sustain momentum and initiate new actions.
3. RfS requests approval to elect now two members of the ICG onto the new SSG. We need the capacity to sustain momentum, and especially to help screen the SSG nominations which we anticipate will be many. The RfS co-chairs nominate ICG members Izuru Takaybau (Japan) and Lincoln Muniz (Brazil) for approval.



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# GEP



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# WCRP Core Project: RfS

## GEP Status

1. GEP to be included under RfS was proposed at WCRP leadership meeting
2. This was discussed with RfS ICG leadership and accepted
3. GEP staffing will comprise a GEP-SU Director, part-time (minimum three months per year); One Coordination Officer (full time); One IT Officer (full-time); Two Data Analysis Officer (part-time, minimum six months per year each); Two Science Officers (part-time, minimum six months per year each)

**An agreement between WMO and NUIST for the GEP Support Unit has now been approved by WMO and should be signed by the Director of the Science and Innovation Department very soon (of which WCRP belongs to), and then sent for the NUIST signature.**



# WCRP Core Project: RifS

## GEP Implementation plans

GEP needs and welcomes inputs

- 1. Annual GEP assessment:** a) Develop web content, b) Update annual assessment of extremes to support UNFCCC COP's and global stock take, the assessment shall include factual description about extremes of the past year (e.g. WMO's annual statement of climate) and most recent research development on the subject. Need to think about timing of the assessment (i.e., how to reconcile the occurrence of COPs in Nov with other timeline).
- 2. Indices development and research:** a) Global dataset development, b) Regional and global analysis to provide input in-time for GEP annual assessment and IPCC AR7, c) Work closely with the relevant WMO expert team (that Lisa is a chair) to support capacity building for indices related training
- 3. Event attribution:** Focus on methodological development and critical review, similar to what IDAG used to do for d/a but for event attribution. This will be different from BAMS annual special issues which publishes small analyses.
- 4. Compound events:** Focus on methodological development and critical review, where we can push for new development
- 5. A steering group** to provide oversight and internal/external coordination



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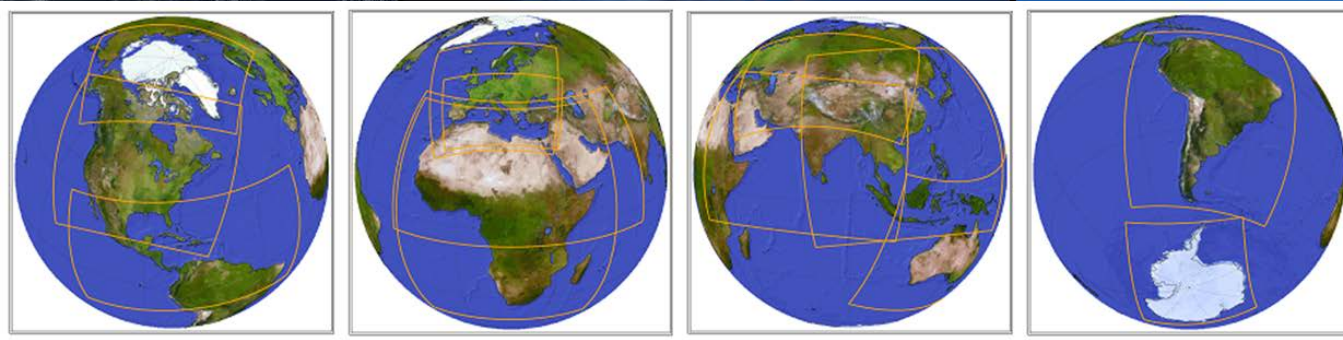
# CORDEX



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- Arctic CORDEX
- North America CORDEX
- Central America CORDEX

- EURO-CORDEX
- MED-CORDEX
- CORDEX Africa
- MENA-CORDEX

- Central Asia CORDEX
- South Asia CORDEX
- East Asia CORDEX
- South East Asia CORDEX
- Australasia CORDEX

- South America CORDEX
- CORDEX Antarctica

# Coordinated Regional Downscaling Experiment (CORDEX)

43rd Session of the WCRP Joint  
Scientific Committee

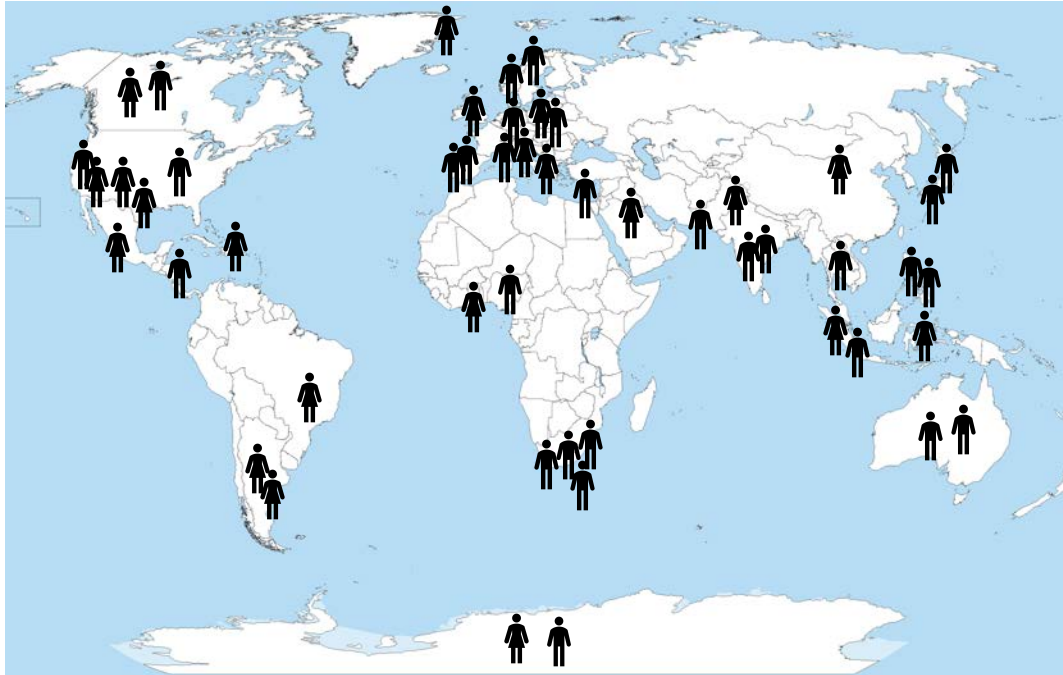
*Silvina Solman/Daniela Jacob/Iréne Lake*

*June/July 2022*

*Online*



## CORDEX SAT members & POCs

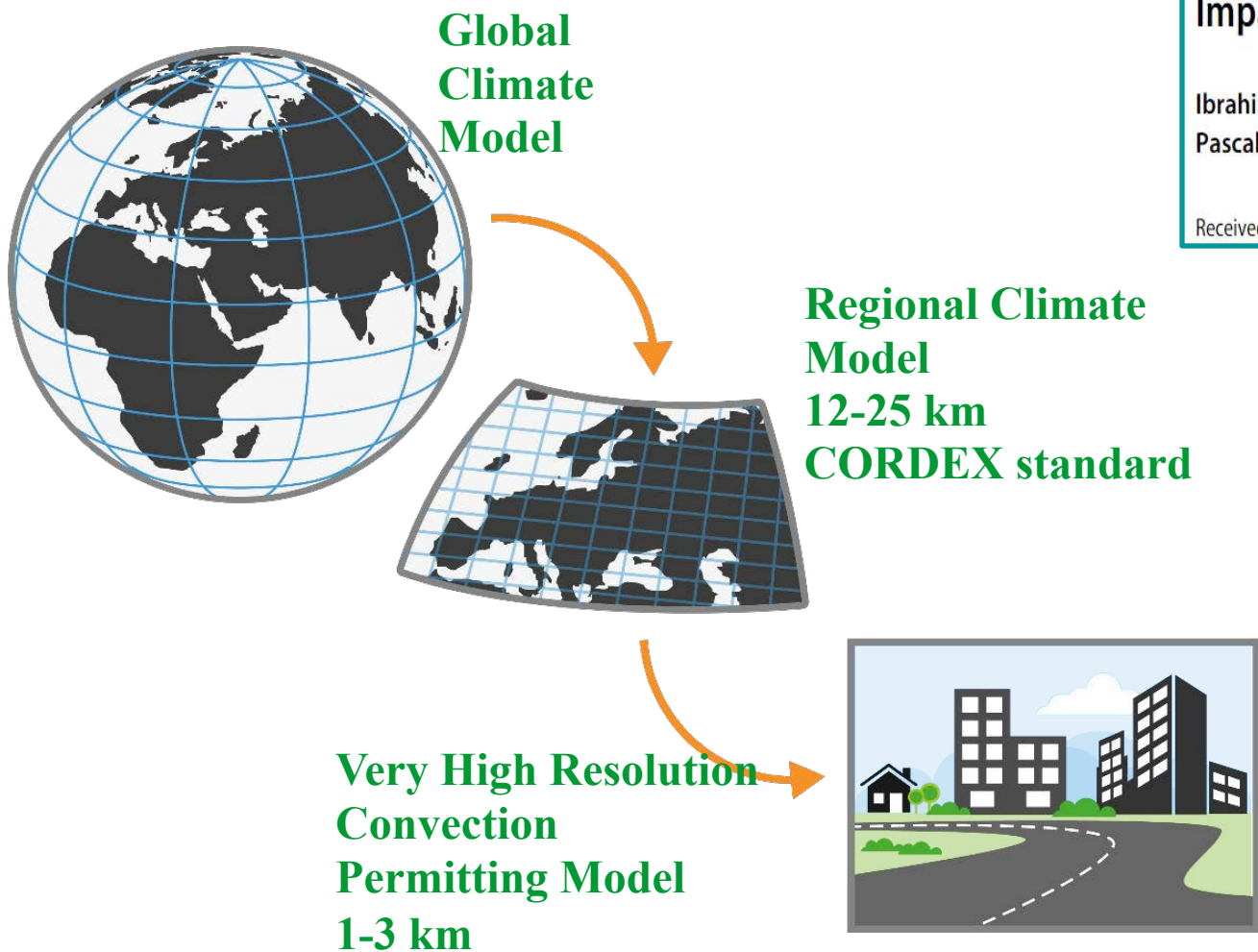


- **Global collaboration**
- **Regional/local climate phenomena and variability**
- **Coordinated, easy to use, climate information for regions**
- **Understanding/knowledge transfer/capacity development**
- **Informed decisions**

**Platform/facilitator for coordination and cooperation**

# The chain from global to local

- from data to knowledge to societal benefit -



## Impact of future climate change on malaria in West Africa

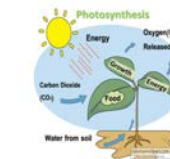
Ibrahima Diouf<sup>1,2</sup> · Abiodun M. Adeola<sup>3,4,5</sup> · Gbenga J. Abiodun<sup>6</sup> · Christopher Lennard<sup>7</sup> · Joyce M. Shirinde<sup>8,9</sup> · Pascal Yaka<sup>10</sup> · Jacques-André Ndione<sup>11</sup> · Emiola O. Gbobaniyi<sup>12</sup>

Received: 30 December 2020 / Accepted: 1 October 2021 / Published online: 20 October 2021



## Investigating the potential impact of 1.5, 2 and 3 °C global warming levels on crop suitability and planting season over West Africa

Temitope Samuel Egbebiyi<sup>1</sup>, Olivier Crespo<sup>1</sup>, Christopher Lennard<sup>1</sup>, Modathir Zaroug<sup>1,5,6</sup>, Grigory Nikulin<sup>2</sup>, Ian Harris<sup>3</sup>, Jeff Price<sup>4</sup>, Nicole Forstenhäusler<sup>4</sup> and Rachel Warren<sup>4</sup>



- Longer Monsoon > wetter, warmer
- Respiratory illnesses
- Waterborne diseases – cholera etc
- Mosquitos > dengue fever
- Depression and anxiety

# Progress and achievements

- **White paper: The future scientific challenges for CORDEX (2021)**  
Silvina Solman, Daniela Jacob, Anne Frigon, C. Teichmann, M. Rixen, W. Gutowski, Iréne Lake
- **CORDEX experiment design for dynamical downscaling of CMIP6 (2022)**
- **CORDEX-CMIP6 Atmosphere Variable List (2022)**

CORDEX-CMIP6 Data Request: CORE Atmosphere variables

ag - aggregation for subdaily output. i: instantaneous. a: averaged over output interval.

| output variable | units                              | ag | long name   | standard name                             | Output frequency |     |     |     |
|-----------------|------------------------------------|----|---|---|------------------|-----|-----|-----|
|                 |                                    |    |   |   | mon              | day | 6hr | 3hr |
| tas             | K                                  | i  | Near-Surface Air Temperature                        | air_temperature                           | x                | x   |     |     |
| tasmax          | K                                  | i  | Daily Maximum Near-Surface Air Temperature          | air_temperature                           | x                | x   |     |     |
| tasmin          | K                                  | i  | Daily Minimum Near-Surface Air Temperature          | air_temperature                           | x                | x   |     |     |
| pr              | kg m <sup>-2</sup> s <sup>-1</sup> | a  | Precipitation                                       | precipitation_flux                        | x                | x   |     |     |
| evspsbl         | kg m <sup>-2</sup> s <sup>-1</sup> | a  | Evaporation Including Sublimation and Transpiration | water_evapotranspiration_flux             | x                | x   |     |     |
| huss            | 1                                  | i  | Near-Surface Specific Humidity                      | specific_humidity                         | x                | x   |     |     |
| hurs            | %                                  | i  | Near-Surface Relative Humidity                      | relative_humidity                         | x                | x   |     |     |
| ps              | Pa                                 | i  | Surface Air Pressure                                | surface_air_pressure                      | x                | x   |     |     |
| psl             | Pa                                 | i  | Sea Level Pressure                                  | air_pressure_at_mean_sea_level            | x                | x   |     |     |
| sfcWind         | m s <sup>-1</sup>                  | i  | Near-Surface Wind Speed                             | wind_speed                                | x                | x   |     |     |
| uas             | m s <sup>-1</sup>                  | i  | Eastward Near-Surface Wind                          | eastward_wind                             | x                | x   |     |     |
| vas             | m s <sup>-1</sup>                  | i  | Northward Near-Surface Wind                         | northward_wind                            | x                | x   |     |     |
| clt             | %                                  | a  | Total Cloud Cover Percentage                        | cloud_area_fraction                       | x                | x   |     |     |
| rsds            | W m <sup>-2</sup>                  | a  | Surface Downwelling Shortwave Radiation             | surface_downwelling_shortwave_flux_in_air | x                | x   |     |     |
| rls             | W m <sup>-2</sup>                  | a  | Surface Downwelling Longwave Radiation              | surface_downwelling_longwave_flux_in_air  | x                | x   |     |     |
| orog            | m                                  |    | Surface Altitude                                    | surface_altitude                          |                  |     |     | fx  |
| stfl            | %                                  |    | Percentage of the Grid Cell Occupied by Land        | land_area_fraction                        |                  |     |     | fx  |

- **Outcomes from FPSs:**
  - Coordinated Convection permitting modelling
  - ESRCMs
  - Storyline approach for climate hazards
  - Role of Aerosols in regional CC
  - Urban modeling
  - Land-use change

# Progress and achievements

## ➤ The Future scientific challenges for CORDEX: Empirical Statistical Downscaling (ESD)

Jose Manuel Gutiérrez, T. Cabazos, J. Evans, G. Nikulin, S. Somot, D. Maraun, R. Benestad, B. Hewiston, M. L. Bettolli

## ➤ CORDEX Science Plan

Priority focus areas to achieve the CORDEX goals include:

- *Added value of downscaling: from process understanding to the provision of valuable information*
- *Benefits and costs of increasing model's complexity*
- *Benefits and costs of convection-permitting models*
- *Assessing the role of human activity on the regional climate change signals.*
- *Characterize the uncertainty of regional scale climate change signal through downscaled scenarios for multiple regions with multiple downscaling approaches*

Ready to be  
published on the  
CORDEX website

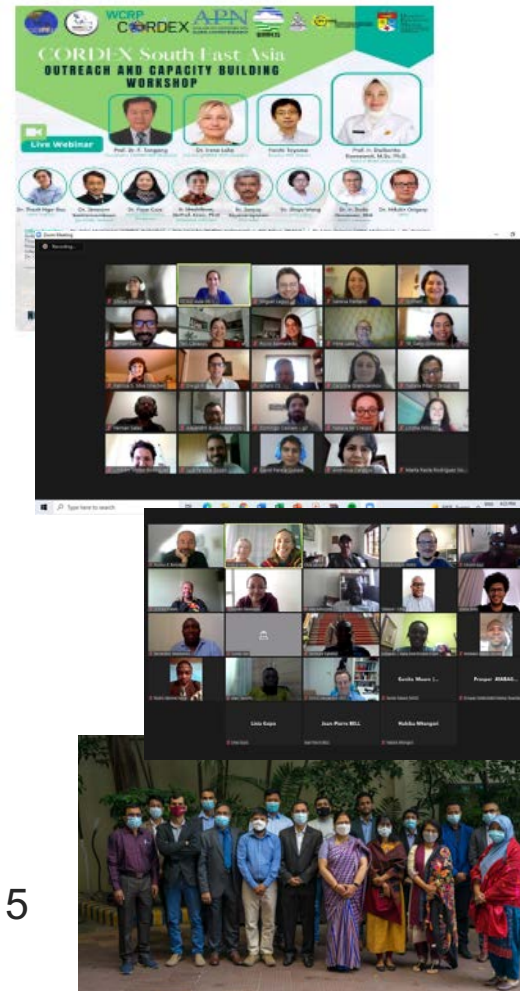
# Progress and achievements

## ➤ Online workshops:

- EURO-CORDEX workshops + general assembly
- CORDEX Africa podcast
- CAM/SAM paper-writing workshop 3 & 5 May, 5 & 6 Oct 2021
- CORDEX SEA workshop 15-17 Nov 2021 with 335 zoom participants and over 1000 following on YouTube
- CORDEX Africa –extended collaboration 8 & 9 Dec 2021, 13 African countries represented
- CORDEX-MAIRS-Future Earth networking 6,7 & 9 Dec 2021
- Storyline workshop CORDEX North America 25-27 April 2022

## ➤ IRL/Hybrid Workshops

- Spatial and temporal climate change analysis South Asia 13-15 Dec 2021 + 7-11 March + 21-24 June
- CORDEX Africa future plans 20-22 April 2022



❖ **CORDEX** contribution to the WCRP presentation on the UNFCCC Research Dialogue - 9 June 2022

❖ **CORDEX** contribution to the IPCC WGI AR6

# Progress and achievements/Future Plans

## CORDEX simulations status

CORDEX simulation status

[View on GitHub](#)

## CORDEX simulations status

These are different views of the CORDEX-CMIP6 simulations status:

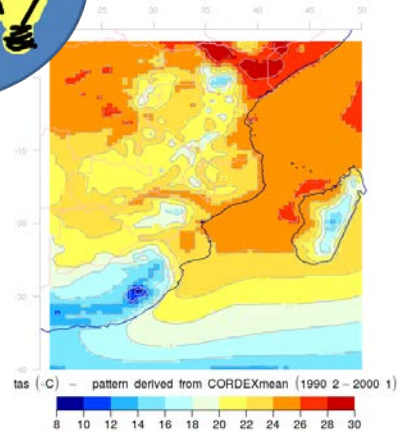
- Full list of simulations
- Summary by domain
- Summary by scenario
- Summary by experiment

They are generated from `CMIP6_downscaling_plans.csv`, which collects the plans from the different groups as gathered in this document.

Check out also the CORDEX-CMIP5 simulations available on ESGF, either as GCM-RCM matrices by scenario or an interactive list.

# Future plans

- Synthesis of major outcomes from FPSs: The way forward
- Coordination of convection permitting simulations on smaller domains
- Integrating dynamical and statistical methods → **Hybrid workshop in October 2022 in Oslo.**
- Further develop capacity exchange workshops/training on methods, tools, accessibility, applications etc
- Assess CORDEX data/information use – policy, impact, adaptation



CORDEX > WMO/GCF [climateinformation.org](http://climateinformation.org)



|   |   |   |
|---|---|---|
| <p><b>Site-specific report</b></p> <p>Get an instant climate change overview for any location world-wide.</p> | <p><b>Data Access Platform</b></p> <p>Download pre-calculated climate indicators and explore interactive maps and graphs.</p> | <p><b>Climpact</b></p> <p>Calculate climate indicators using your own weather and climate data.</p> |
|---|---|---|

Which climate information and Which tool should I use?





# Future plans



WCRP  
CORDEX  
Coordinated Regional Climate Downscaling Experiment

25-29 SEPTEMBER 2023 TRIESTE, ITALY  
**ICRC-CORDEX 2023**  
International Conference On Regional Climate

Home About Program Registration Guidelines Practical information Call for abstracts FAQ



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

The next International Conference on Regional Climate (ICRC) CORDEX conference will focus on discussions and ideas for the way forward and CORDEX contributions to the WCRP Open Science Conference in October 2023. The conference will also focus on specific regional challenges and solutions, such as needs for National Adaptation Plans and climate financing.

CORDEX connects climate science with solutions! Knowledge needs to be shared and be a bridge to action!

- Inputs for the WCRP OSC 2023
- Added value of ESD + km-scale resolution RCMs to inform society



WCRP  
CORDEX  
25-29 SEPTEMBER 2023 TRIESTE, ITALY  
**ICRC-CORDEX 2023**  
International Conference On Regional Climate



### Themes of the conference

- Coordination of strategies and methods
- Modelling across scales
- The relevance of CORDEX to society - connecting climate science with solutions

In-person and online attendance, 25-29 September 2023.

### Main venue

The Abdus Salam International Centre for Theoretical Physics  
ICTP in Trieste, Italy. Call for regional hubs.

The way forward, CORDEX contributions to the WCRP Open Science Conference in October, specific regional challenges and so-lutions, needs for National Adaptation Plans and climate financing.

**Knowledge needs to be shared > bridge to action!**

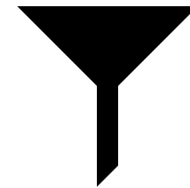
Details will be announced soon on

[Cordex webpage](#)



# Emerging issues (White Papers/Science Plan)

- ❑ Small regions, regional/local scales/phenomena > risks/VIA
- ❑ Identify drivers, assess impacts
- ❑ Multiple downscaling approaches
- ❑ Added value of Downscaling
- ❑ Distillation – merge, choose, understand
- ❑ Regional Earth System Models (human dimension), SSPs
- ❑ Capacity building/exchange
- ❑ Scientific challenges and Societal needs
- ❑ Bridge to society



- Timing for the CORDEX simulations delivery to the IPCC AR cycle
- Dialogue and collaboration with other WCRP activities (My Climate Risk, ESMO and others)
- CORDEX visibility within the new WCRP structure