



WORLD CLIMATE RESEARCH PROGRAMME

Regional Information for Society (RifS)

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Co-Chairs of Interim Coordinating Group



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WCRP Core Project: RfS

1. Vision & mission

VISION: *To understand, develop, and enhance the effective flow of relevant information among scientists, decision makers and society developing policy-relevant climate research*

MISSION:

- coordinate, facilitate, and implement research on regional climates
- partner with relevant internal and external research projects/organizations
- develop connections with stakeholder communities
- strategically inform new research foci

NOTE: RfS is NOT...
a replacement for existing regionally relevant activities within WCRP
an operational climate service to stakeholders for WCRP



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2. Science plan

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

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

**CORDEX is a core partner for achieving the RfS agenda (within cluster 1)
Extremes grand challenge has been embraced (cluster 3)**



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3. Structure

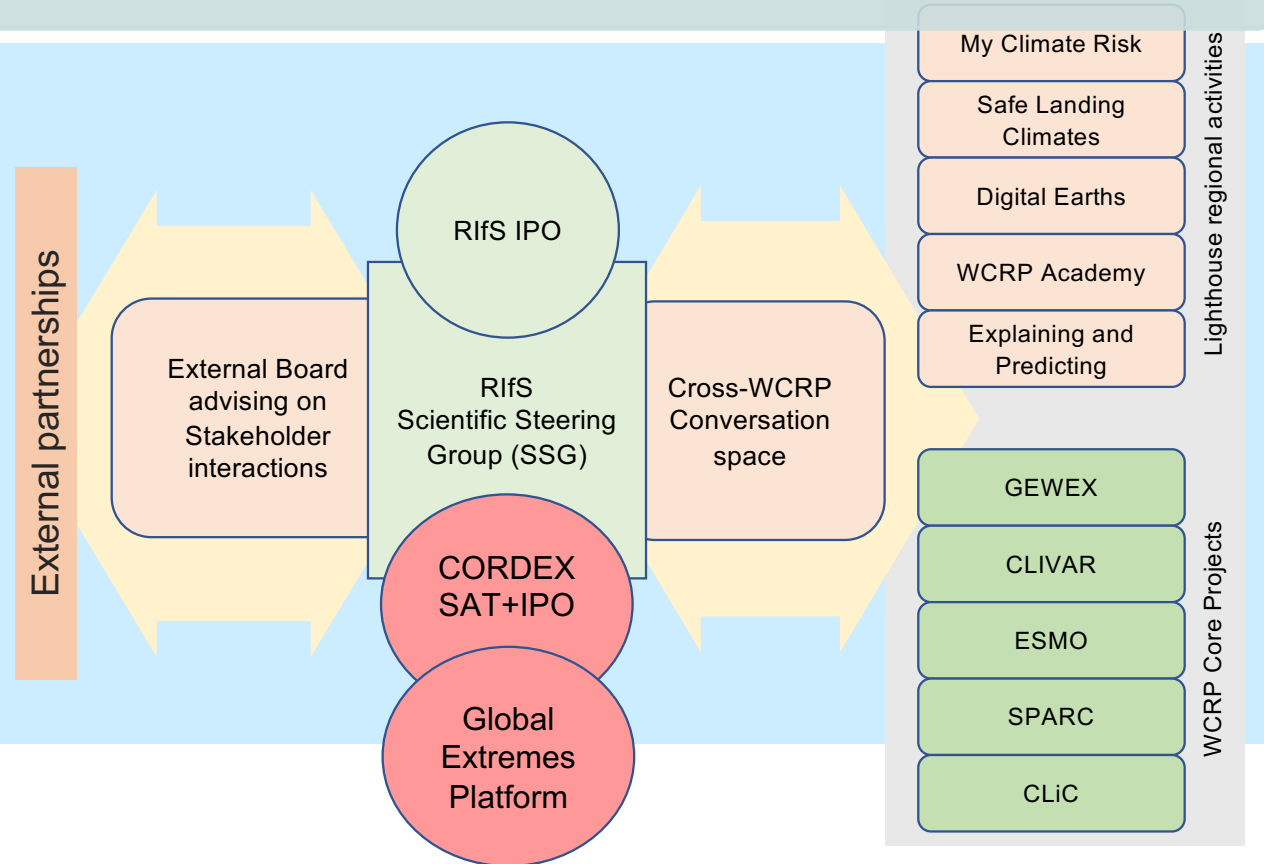
RfS is globally connected, regionally focused

A science plan for research that is about:

- Being contextually aware, societally engaged
- Generating scale appropriate data
- Translating to relevant information
- Communication to society

RfS is currently seeking partnerships to:

- Support regional actions
- Engage in informing RfS of context
- Collaborate in developing networks
- Contribute to capacity development



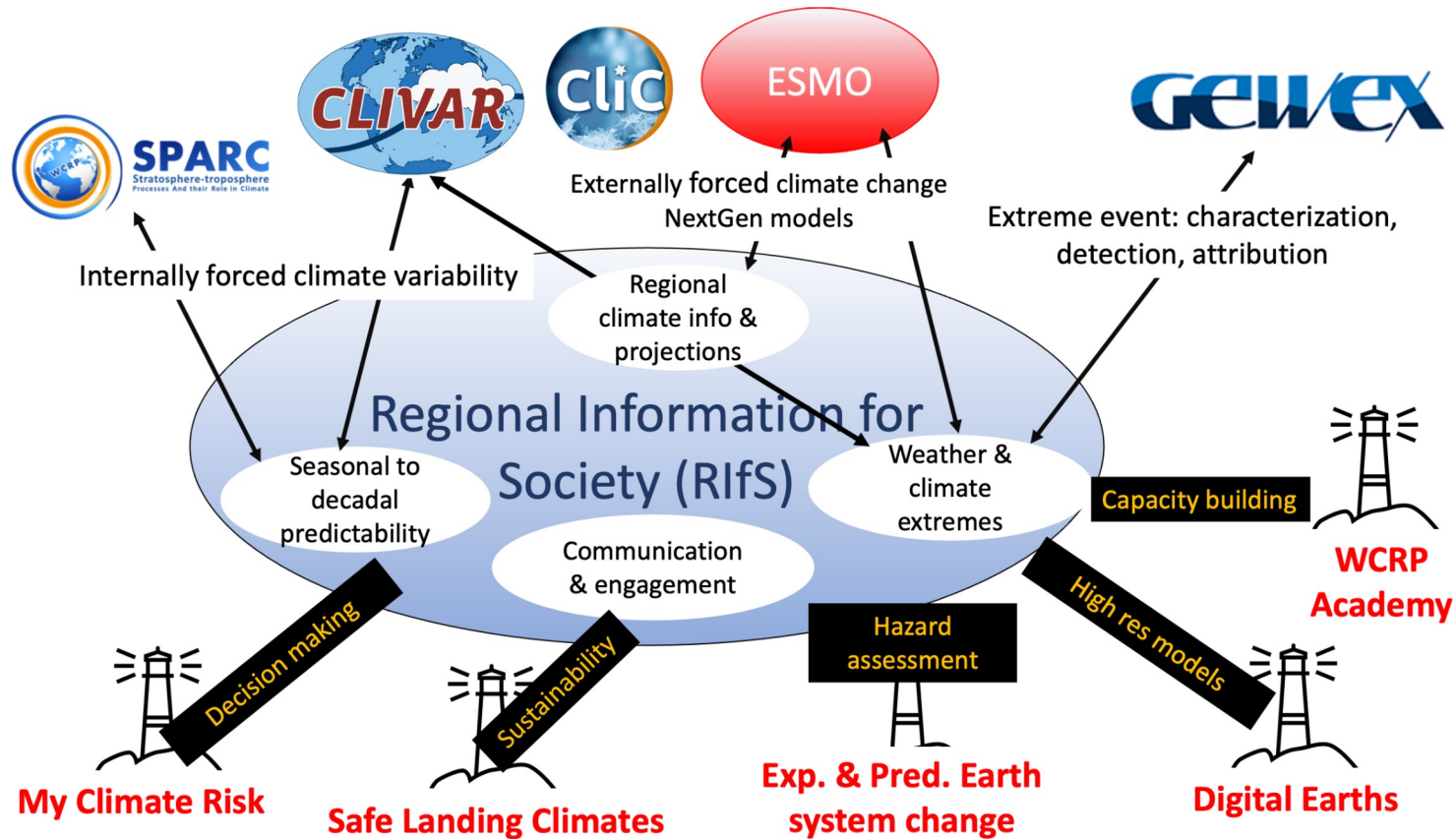
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4. Relationships

Within WCRP



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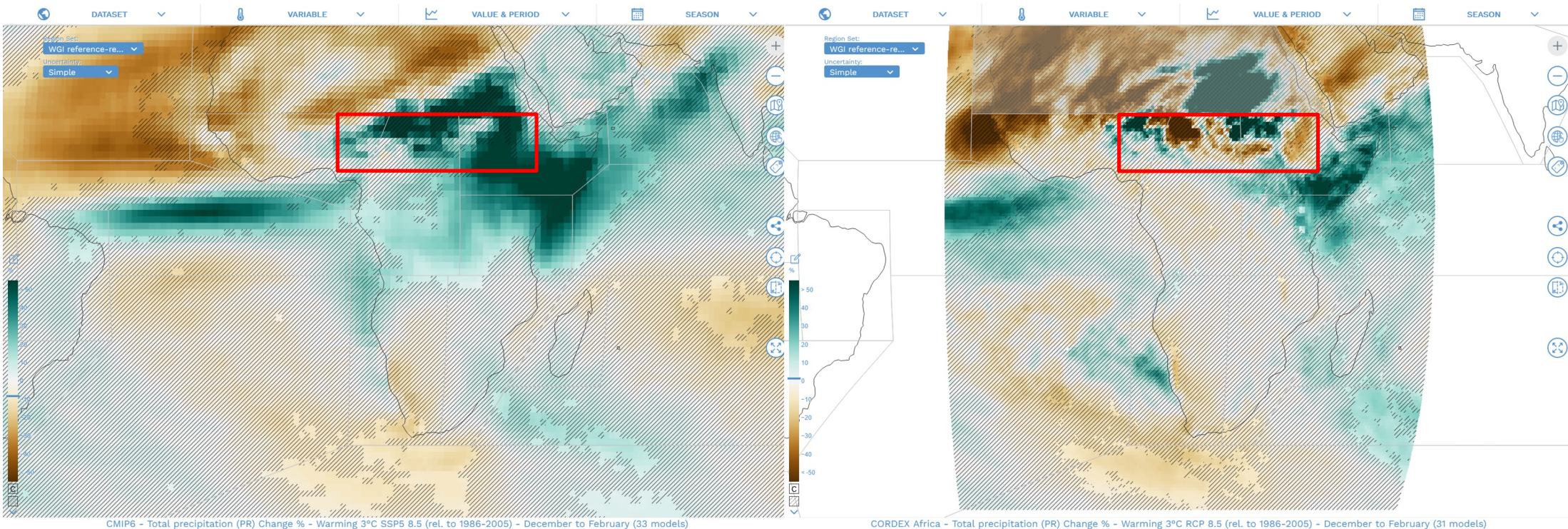


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A typical output from “Science to society”

This is a problem without effective peer-partnership with stakeholders!

Images from the AR6 WG1 Atlas (<https://interactive-atlas.ipcc.ch/>)



CMIP6 - Total precipitation (PR) Change % - Warming 3°C SSP5 8.5 (rel. to 1986-2005) - December to February (33 models)

CORDEX Africa - Total precipitation (PR) Change % - Warming 3°C RCP 8.5 (rel. to 1986-2005) - December to February (31 models)

CMIP6, 33 models, DJF, projected change in precip (%)

CORDEX, 31 models, DJF, projected change in precip (%)



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5a Challenges

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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5b Objectives

12 in total

Twelve OBJECTIVES that necessarily require collaboration from all clusters

Examples:

- Improved understanding of the fundamental mechanisms and drivers of regional climate change and regional climate variability.
- Construction of regional information relevant to the decision context and impacts
- Quantification of scales of skillful climate prediction and projection and the associated added value
- Better integration of connections across the pathways linking data production, information construction, knowledge development, and wisdom in adaptation



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5c Questions

Major QUESTIONS specific to each cluster's foci

Examples research questions:

- 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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5d Actions

Multiple proposed ACTIONS to address the cluster science questions

Example proposed actions:

- Assess/qualify the reliability and uncertainty of predictions/projections for derivative parameters relevant to stakeholders.
- Use the understanding of the regionally relevant multi-scale drivers of climate variability and change to reconcile the differences of data sources and so improve the signal-to-noise ratio
- Develop and apply new metrics for the detection and characterization of extreme events in the contemporary climate
- Understand how to assess user context and incorporate this into the design and communication of information



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RIfS Highlights from 2022-23

Event	Purpose
AGU Dec 2022	Poster session “Pathways to Provision of more Robust Regional Information for Society”
WRCP OSC	RIfS co-chairs and SSG members proposed multiple sessions
RIfS IPO	Ouranos, Montreal selected (https://www.ouranos.ca/en) Interviews for Director and staff positions ongoing.
RIfS SSG	Appointed and First meeting held.
GEP	Global Extremes Platform Support Unit (SU) established at Nanjing University of Information Science and Technology (NUIST) in China Data portal design & initial tenders Support staff selection ongoing.
CORDEX	→ CORDEX Presentation
Multiple Workshops	e.g. “Developing an Africa Alliance in Transdisciplinary Climate Research” (31th Oct - 2nd Nov 2022, Pretoria, South Africa). Developing an alliance of transdisciplinary collaboration based around a “web of actors” rather than “linear supply chain”
Building collaborations	e.g. Hewitson FOCUS-Africa, DELTAS CASCADES, and HEAT: exploring how RIfS framing of the science challenges complement work in these projects. Pryor International Energy Agency - needs for extreme precipitation data (damage vector for renewables).

Future Plans

Event	Purpose
Logistics	Once IPO established: Open communication - email list, website etc.
	Build a strategic procedure for the functioning of the SSG
	First Face-to-face RfS SSG meeting, likely around September, location yet to be decided.
	Listserve and web-site to act as a conduit for RfS information and dissemination and will link to and supplement GEP and CORDEX actions in these realms.
Scientific	Developing proposals for RfS webinars (potentially in partnership with other core projects and/or LHAs).
	Explore developing a review paper and/or white paper and/or position paper on RfS priorities in the science plan in relation to the state of science and current foci in regions.



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Linkages with Core Projects, Lighthouse Activities

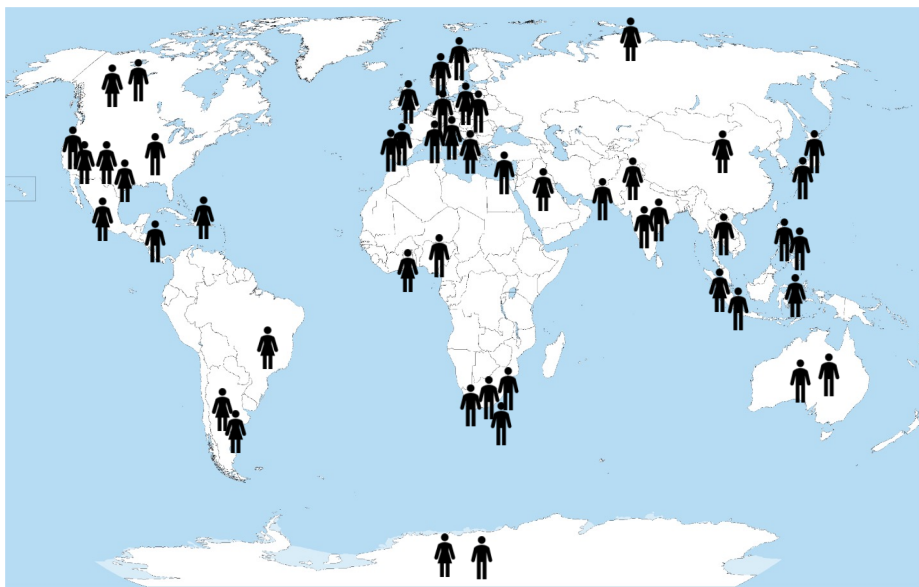
Event	Purpose
Conversations within WCRP – <i>ongoing</i>	RfS co-chairs are initiating conversations with, and participating in meetings to explore collaboration and mutual interests (GEWEX SSG-35, CLIVAR SSG-27, SPARC SSG-30)
	Strong planned collaboration with My Climate Risk LHA
	SSG RfS representatives to development of the Science Plan on WCRP Global Precipitation Experiment
	Linkages with ANDEX (GEWEX RHP)



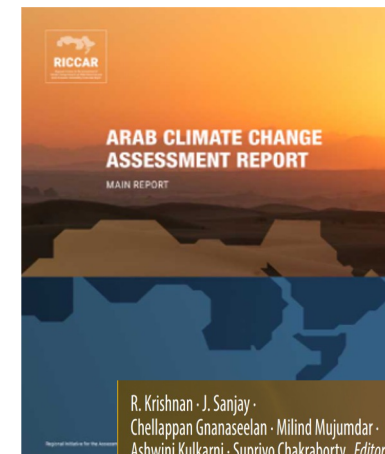
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CORDEX SAT members & POCs



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



R. Krishnan · J. Sanjay ·
Chellappan Gnanaseelan · Milind Mujumdar ·
Ashwini Kulkarni · Supriyo Chakraborty Editors

Assessment of Climate Change over the Indian Region

A Report of the
Ministry of Earth Sciences (MoES),
Government of India

Springer Open

**Platform/facilitator for coordination
and cooperation**

CORDEX for Vulnerability, Impact and Adaptation

The chain from global to local

- from data to knowledge to societal benefit -



Global Climate Model (GCM)



Regional Climate Model (RCM)
12-25 km, CORDEX standard

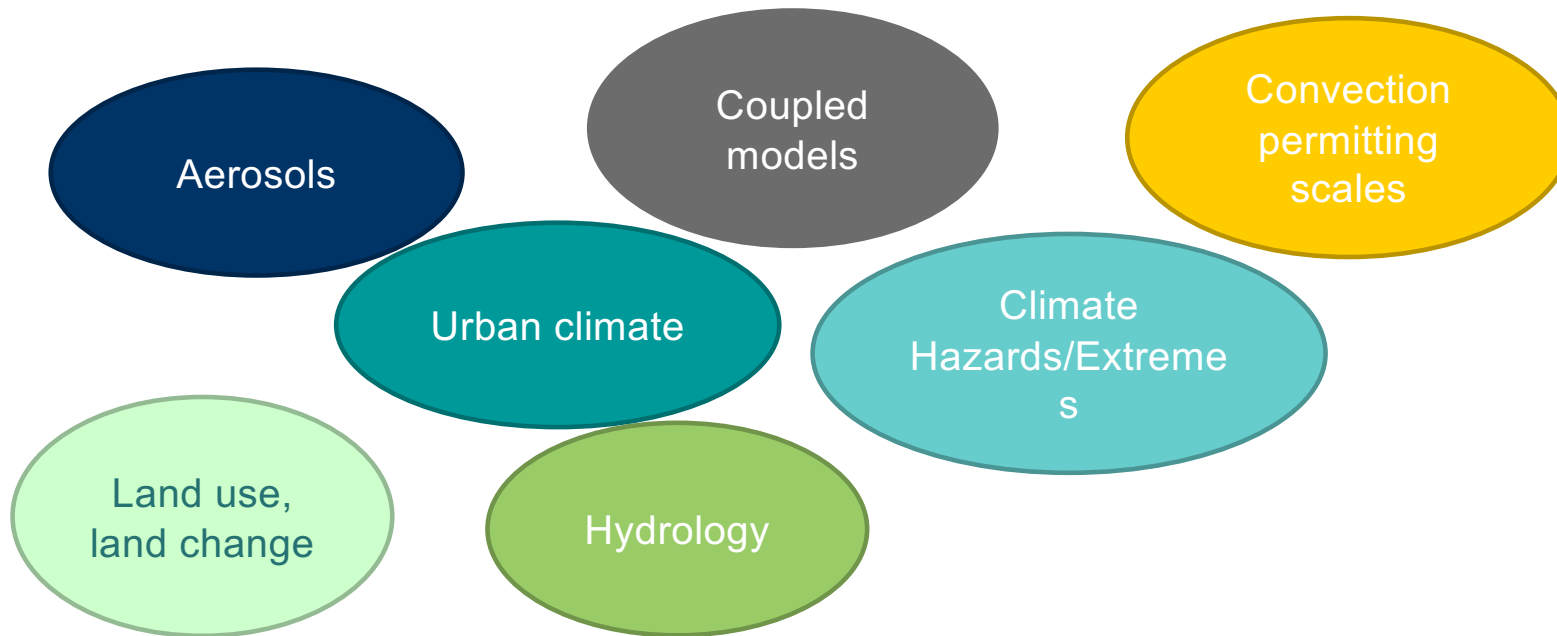
Empirical Statistical
Downscaling

Very High Resolution Convection
Permitting Model (CPRCM), 1-3 km



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Local/regional challenges with large socioeconomic impacts

➡ Actionable Climate Information

Progress and achievements over the last year

- **CORDEX CMIP6 simulation status available**

List of regional simulations/downscalings of CMIP planned for each domain

<https://wcrp-cordex.github.io/simulation-status//>

- **The Empirical Statistical Downscaling White Paper published**

Focuses on empirical statistical downscaling strategies and identify specific challenges within ESD.

<https://cordex.org/wp-content/uploads/2022/08/White-Paper-ESD.pdf>

- **Many published papers ([link to publications](#))**

CORDEX simulations status

CORDEX simulation status

[View on GitHub](#)



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

José M. Gutiérrez, Tereza Cavazos, Jason Evans, Grigory Nikulin, Samuel Somot, Douglas Maraun, Rasmus E. Benestad, Bruce Hewitson, Maria L. Bettolli

Draft version v1 (initial draft from SAT members): 25 November 2021.

v2 version – including comments from POCs until 11 February 2022.

v3 version – final version (21 June 2022)



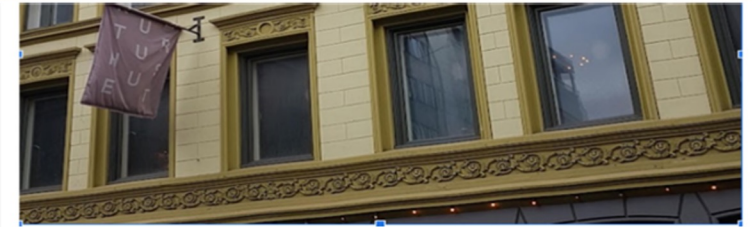
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Progress and achievements over the last year

Capacity building activities in the domains

- Workshop in Oslo on consolidating downscaling for the provision of **regional climate information to society** – CORDEX Consolidate, Oslo, 11-13 October
Youtube link: [ConCord Oslo 11-13 october 2022](#)
- CORDEX **South East Asia** workshop on Regional Climate Downscaling and Applications - Bangkok, Thailand, 8-9 November.
- Training on spatial and temporal climate change analysis using CORDEX regional climate models Bhutan, **South Asia** - Kathmandu, Nepal, 19-23 December
- **Polar CORDEX** Annual Meeting



Workshop on Consolidating downscaling for the provision of regional climate information to society - Cordex Consolidate (ConCord)



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Progress and achievements over the last year

Capacity building activities in the domains

- **North America** domain: Storylines from regional simulations Boulder, 25-27 April.
- Joint **Africa** workshop CORDEX domain and the South-East Africa Flagship Pilot Study. Workshop with funding from Sida, Maputo, 9-11 May -- > Africa workshops on **how CORDEX data is needed for users**
- **EURO-CORDEX** Annual Meeting
- Conference on Regional Climate Modeling and Extreme Events over **South America**: results from the CORDEX-FPS & Parallel CORDEX CAM/SAM lab-training activity , Buenos Aires, September 4-6



Conference on Regional Climate Modeling and Extreme Events over South America: results from the CORDEX-Flagship Pilot Study

4-6 September 2022 - Buenos Aires, Argentina

&

Parallel CORDEX CAM/SAM lab-training activity*

4-6 September 2022 - Buenos Aires, Argentina

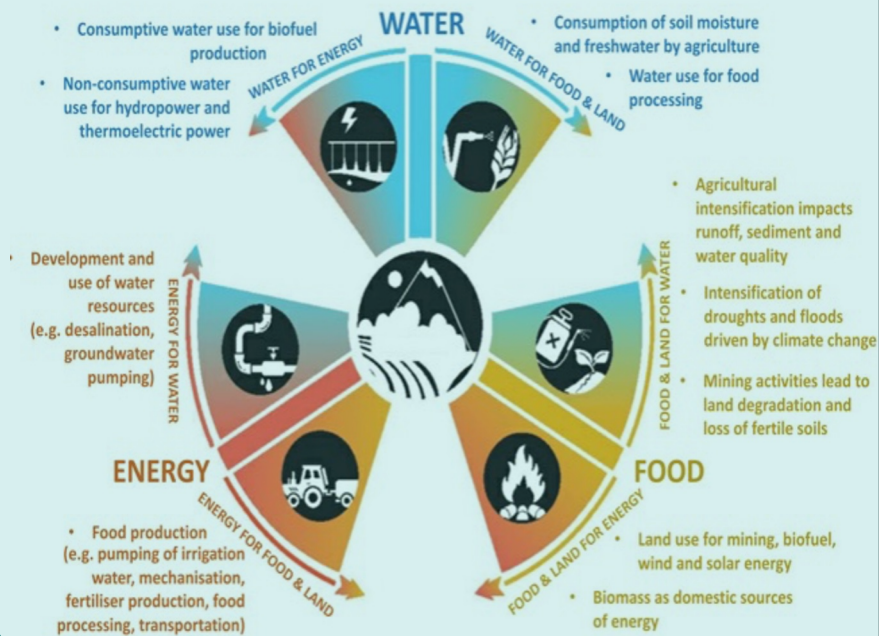


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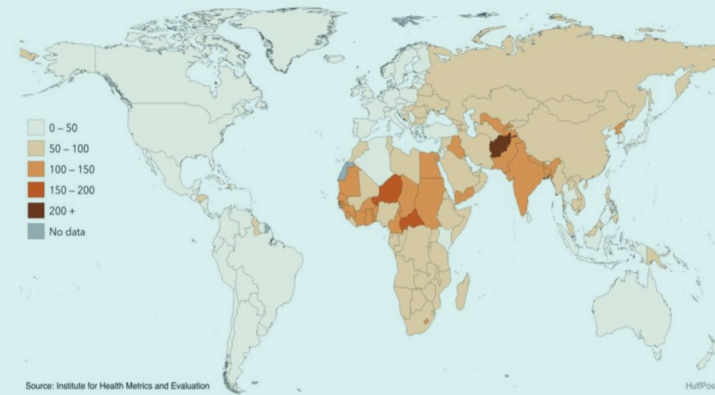
How CORDEX data has been used for impact assessment?

WEF Nexus in Mekong River Basin, Central Asia Dryland: Water supply, hydropower and use planning



Air-climate-health in Asia - Policy air quality, limitation of climate changes, health

Air pollution death rates around the world
Deaths per 100,000 people from ambient air pollution in 2016



Impact of future climate change on malaria in West Africa

Ibrahima Diouf^{1,2} · Abiodun M. Adeola^{3,4,5} · Gbenga J. Abiodun⁶ · Christopher Lennard⁷ · Joyce M. Shirinde^{8,9} · Pascal Yaka¹⁰ · Jacques-André Ndione¹¹ · Emiola O. Gbobaniyi¹²

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

Health

Longer Monsoon > wetter, warmer

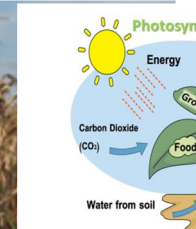
- ❓ Respiratory illnesses
- ❓ Waterborne diseases – cholera etc
- ❓ Mosquitos > dengue fever
- ❓ Depression and anxiety



Crops

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 Egbebiyi¹, Olivier Crespo¹, Christopher Lennard¹, Modathir Zaroug^{1,5,6}, Grigory Nikulin², Ian Harris³, Jeff Price⁴, Nicole Forstehäusler⁴ and Rachel Warren⁴



Water

Impact of climate change on hydropower potential of the Lagdo dam, Benue River Basin, Northern Cameroon

Rodric M. Nonki¹, André Lenouo², Clément Tchawoua³, Christopher J. Lennard⁴, and Ernest Amoussou⁵

¹Laboratory for Environmental Modeling and Atmospheric Physics, Department of Physics, Faculty of Sciences, University of Yaounde, P.O. Box 812, Yaounde, Cameroon

²Department of Physics, Faculty of Science, University of Douala, Douala, Cameroon

³Laboratory of Mechanics, Department of Physics, Faculty of Sciences, University of Yaounde, Yaounde, Cameroon

⁴Climate System Analysis Group, University of Cape Town, Cape Town, South Africa

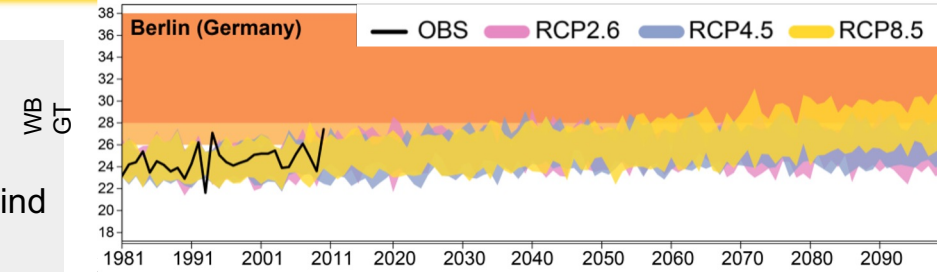
⁵Laboratoire Pierre Pagny: Climat, Eau, Ecosystème et Développement (LACEEDE), University of Parakou, Parakou, Benin



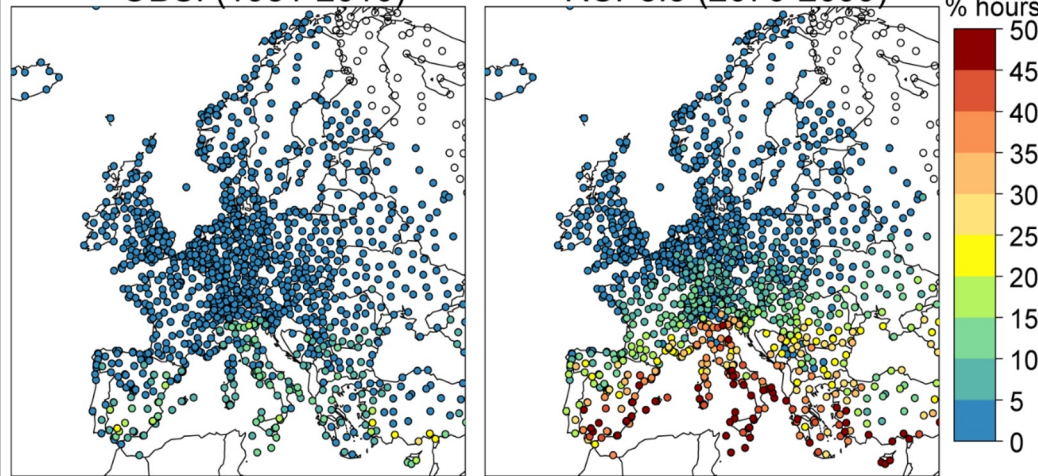
Lagdo Dam

Climate change projections of heat stress in Europe and its impacts

- **84 GCM-RCMs EURO-CORDEX** simulations, 3 RCPs
- ~1800 European stations
- Bias-corrected **transient projections of heat stress**
- Wet bulb globe temperature (WBGT: air and dew point temperatures, wind speed, solar radiation)



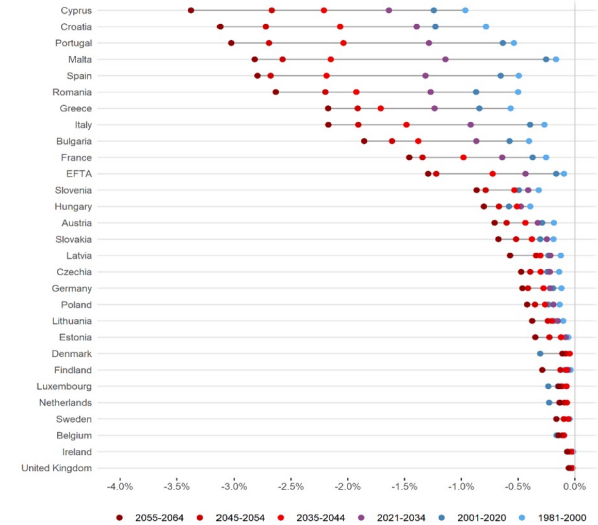
Productivity losses (% hours lost) due to heat stress in summer
OBS. (1981-2010) RCP8.5 (2070-2099)



Casanueva et al. 2020, Reg. Environ. Change



Economic impact (GDP losses) of heat stress by country



García-León et al. 2021, Nat. Comms.



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Progress and achievements over the last year



Climate Information for Decision Making

Bringing society into the science

RiFS and CORDEX represented

November 2022
Sharm El Sheikh, Egypt



Future plans

CORDEX simulations

- Publish CORDEX-CMIP6 archiving specifications
- CMIP6 standard downscalings available hopefully for all domains

Scientific plans (CORDEX White papers – Topics to be discussed during the ICRC2023)

- Synthesize outcomes of FPSs
- Dialogue with the community to coordinate and ‘standardize’ high resolution (convection permitting) simulations for smaller domains, including FPSs.
- Dialogue with the community for increasing interest on RESMs and very high-res, small area simulations, including event-based simulations for a better understanding of involved processes and to enlarge participating modeling groups.
- Discussions with the community on how to combine statistical and dynamical downscaling products
- Continued work with trainings and capacity building in the domains – increasing number of activities > larger requests for at least *seed funding*



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Future plans

- **The Bridge to Society – White Paper and implementation**
Scientific challenges and Societal need
CORDEX > WMO/GCF climateinformation.org

The screenshot shows the top navigation bar with the 'CLIMATE INFORMATION' logo and 'Tools' and 'Guidance' dropdown menus. Below this is a green banner with the text 'Providing climate science basis for climate adaptation and mitigation activities' and a 'View a short intro film' button. The main content area features three cards: 'Site-specific report' (with a smartphone image), 'Data Access Platform' (with a laptop image showing a red sun), and 'Climpact' (with a laptop image showing hands typing). A footer bar asks 'Which climate information and Which tool should I use?'.



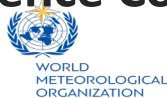
Future plans

Connections with the user community

- Enhance the connections with users to shape models (urban/lake/valleys)
- Leverage the information from the workshops about the user needs to get a better understanding on the need of high-resolution /more complex models and for what purpose
- Enhance the dialogue with the Climate Service community
- Climate service data delivery and connections with other activities with non WCRP communities (e.g. COP27)

CORDEX Events

- International Conference on Regional Climate CORDEX in Trieste, Italy and Pune, India 25-29 September 2023
 - Outcomes from CORDEX to the OSC2023
- Side events at the WCRP Open Science Conference in October 2023



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CORDEX events 2023, CORDEX-Conference

Home About Program Registration Guidelines Practical information Call for abstracts FAQ



Latest News about ICRC-CORDEX 2023

ICRC-CORDEX 2023 registration is now open!

More information about registration: ICRC-CORDEX2023 - Coordinated Regional Climate Downscaling E...

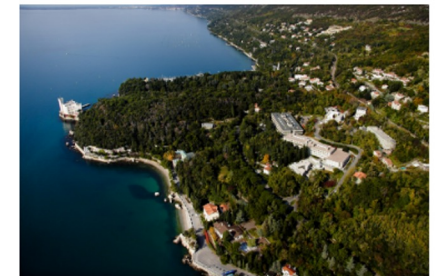
[Read More...](#)

[Take a look at the draft programme overview](#)

CONFERENCE ORGANISERS



Main venue - Trieste



Venue - hub in India



Focus on CORDEX interaction with society

Scientific development seminar sessions, discussion/panel sessions, ESC-event, side meetings and workshop/world café-sessions, workshop oriented sessions

- How can we answer faster to societal issues?
- Assessing climate impact and risk for agriculture, energy, health, infrastructure
- How to use regional climate change science to guide adaptation policies
- From climate models to socio-economic impacts
- Decision Support Systems? (climate portals, adaptation games etc)

CORDEX events 2023, side-event with WCRPs OSC



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**WORLD CLIMATE
RESEARCH PROGRAMME**
**OPEN SCIENCE
CONFERENCE**
23 - 27 OCT. 2023 | RWANDA

LL04: CMIP AND CORDEX ANALYSIS AND EVALUATION TOOLS

TH07: CORDEX AFRICA

CM01: FROM MODELS TO IMPACT – THE CLIMATE INFORMATION
CASCADE

WCRP Open Science Conference 2023
**ADVANCING CLIMATE SCIENCE
FOR A SUSTAINABLE FUTURE**



● DOME PLENARY

● SESSIONS

● POSTER CLUSTERS

● EARLY TO MID-CAREER RESEARCHER CORNER

Meet with us in "Remarkable Rwanda"

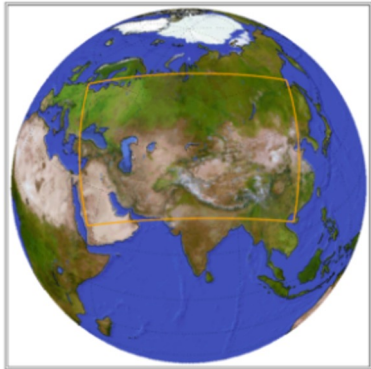
[>> Second Circular](#)



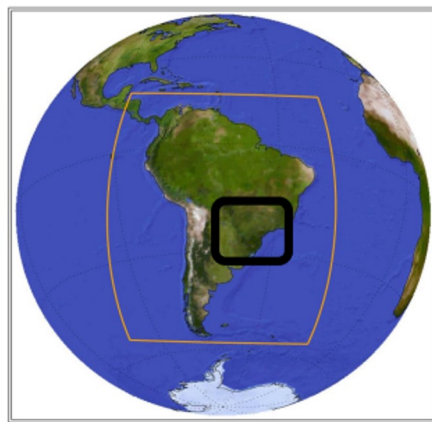
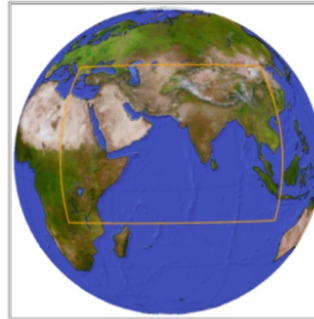
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CORDEX events 2023, regional workshops

Region 8: Central Asia



Region 6: South Asia



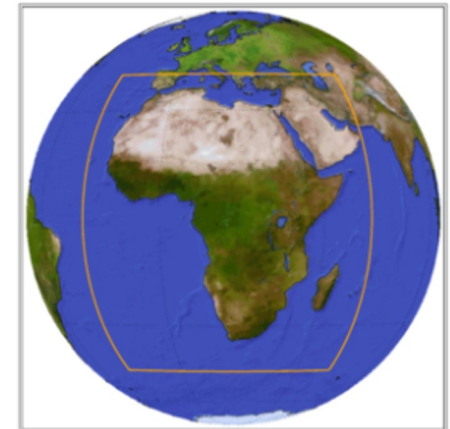
SOUTHEASTERN SOUTH AMERICA (SESA)

ARRCC Met Office ICIMOD WCRP CORDEX SMHI UKaid

TRAINING ON
Spatial and temporal analysis of climate change variables and indices using CORDEX datasets over Bhutan
19-22 December 2022 | Kathmandu, Nepal

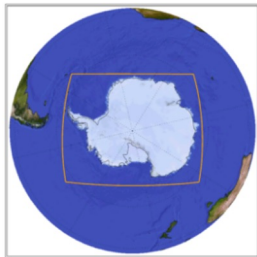
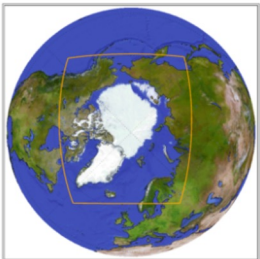


Region 5: Africa



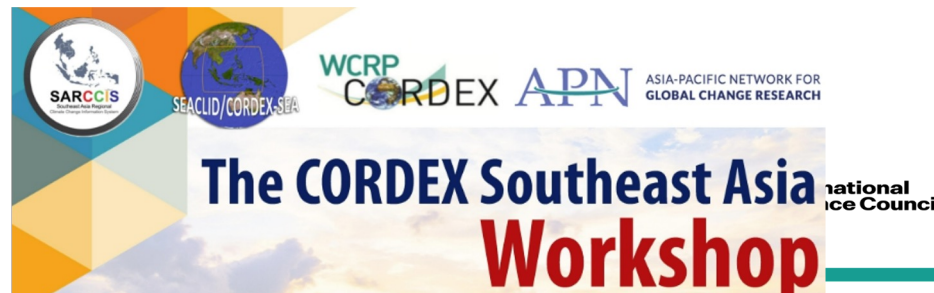
Region 11: Arctic

Region 10: Antarctica



SARCCIS SEA/CLID/CORDEX-SEA WCRP CORDEX APN ASIA-PACIFIC NETWORK FOR GLOBAL CHANGE RESEARCH

The CORDEX Southeast Asia Workshop
National Ice Council



Linkages with Core Projects, Lighthouse Activities etc.

- Strong linkages with ESMO, CMIP, WGCM, WGSIP, WGNE, GEWEX, CLIVAR, Digital Earth, MCR
- Discussions with CORDEX-Africa for potential engagement in a subsequent phase.
- Joint side events with CMIP at the WCRP OSC
- Polar CORDEX tightly connected with CliC
- CORDEX member co-chair in WCRP Academy
- Regular IPO-meetings
- Discussions on coop with GEWEX
- Links with ANDEX RHP (GEWEX)



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Collaboration with entities outside of WCRP

Three African SMHI/CORDEX workshops with many African stakeholders/users and experts during May-June 2023: **Gap analysis – regional/local climate information needs including new regional scenarios for Africa, indicators, dissemination platforms, planning of ITP-type trainings and Training of Trainers etc. Funder Sida.**

- **Workshop 1, Southern and East Africa:**

9-11 May, Maputo. Local partners; Eduardo Mondlane University (Atanasio Manhique) and National Institute of Meteorology (Bernardino Nhantumbo)

- **Workshop 2, West Africa:**

23-25 May, Niamey. Local partner; AGRHYMET (Abdou Ali and Bernard Minoungou)

- **Workshop 3, Central Africa:**

13-15 June, Douala. Local partners; University of Yaounde (Wilfried Pokam) and WMO (Wilfran Moufouma-Okia)



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Partnerships with entities outside of WCRP

- Workshops etc with MAIRS-Future Earth, incl session at the Sustainability, Research and Innovation Congress 2022
- Collaboration with WMO-GCF, for instance a session with CMIP, CORDEX and FAO at the Global Forum on Climate Science in September 2022
- GCOS - Contributions to World Café sessions at GCOS 2nd Climate Observation Conference in October 2022
- ESA - panel +chairing sessions at the Living Planet Symposium in April 2022, ESA sponsor of ICRC-CORDEX 2023
- APN - joint workshops and they also fund some activities
- ANSO - joint workshops and they also fund some activities



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