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

EMCR Perspective on Climate in the Next Decade: Expectations and Opportunities

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On behalf of the WCRP OSC EMCR Symposium attendees

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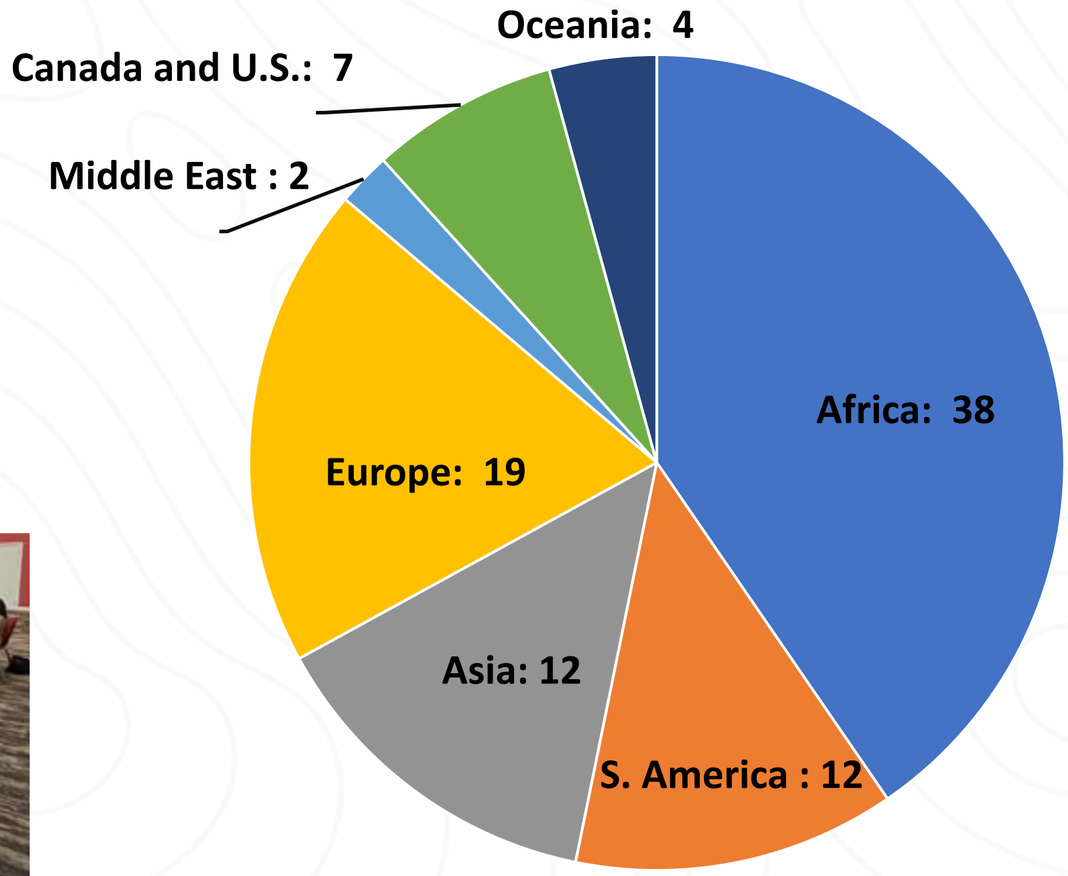
WCRP OSC EMCR Symposium 2023

Some Statistics..

The Early and Mid-Career Researchers Symposium

Over 800 applications received for approximately 94 places

- Selected based on the abstract review scores
- Availability of regional funding
- 62 out of 94 are funded. The rest are self-funded.



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Key Discussion Questions

1. **What are the key challenges for creating robust, usable and used climate information at local scales from a climate science perspective?**

2. **What are key climate research and knowledge gaps in the global South, and how can we advance climate science in and for the global South?**

3. **How can we contribute to supporting policy making with climate science and knowledge, during the upcoming decade, also called the "decade of decisions?**

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I. What are the key challenges for creating robust, usable and used climate information at local scales from a climate science perspective?

Km-scale modeling, opportunities and challenges

- Physical and human-driven processes that need **model improvements shall be informed by societal needs** (e.g. precipitation, cities, coasts).

- **AI (incl. ML)** **Opportunities:**

  - Resources reduction for running climate models
  - Efficient data analysis
  - Multivariable downscaling information for science and management

Challenges:

- Only as good as the training data (e.g. climate models / obs.)
- Not applicable for all Earth processes (e.g. carbon cycles)
- Still no/limited human factors included

Understanding systems from local to trans-local to regional

- **What do we mean with "local"** ? E.g. communities, local scientists, climatology, sectors, or area.
- **What happens at local scales, is driven by trans-local processes** (e.g. flood in informal settlement, driven by hydro-processes at regional & global scale).
- **New modeling methods and structures & thinking are needed.**

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I. What are the key challenges for creating robust, usable and used climate information at local scales from a climate science perspective?

Understanding local needs and participatory approaches

- **Co-production is central to connect climate information to user needs**.

  - local and indigenous knowledge.

  - **Concrete Concepts**: how does climate influence your mobility, nutrition patterns, etc.?

  - Need to understand structures at local levels, **hierarchy, governance, privileges and exclusions**.

- **How can we see risk through the lens of the other**? How is risk understood by different communities, and their privileges/roles in society?

Methods for co-creating used information

- Using **collective memory** of people and integrating it into the climate information products. Ground-truthing the data including local stakeholders (e.g. farmers), gamification. E.g. was this storm really extreme/impactful in a game context?
- **Combine multiple lines of climate evidence meaningfully** and then **combine this information with local data** relevant for decision making (e.g. sectoral data, socio-economic data, etc.).

II. What are key climate research and knowledge gaps in the global South, and how can we advance climate science in and for the global South?

Research and capacity development priorities

- Strengthen the initiatives that **make international data accessible** (e.g., WCRP/WWRP S2S Pilot Project)
- Invest in filling gaps in **observational network**, maintenance and quality control of the observations.
- Need for **regional reanalysis/observations that are fit for purpose.**
- Complementary approaches **blending different techniques** (AI + traditional climate modeling).
- **Multiple single-point failures exist, e.g. limited trained staff which often migrates for better opportunities.**
- **Accessibility** (visas and costs; conferences, collaborative visitations, networking)

Policy support

- **Synergies** between local government, policy makers, funding bodies, research organizations, society and researchers need to be strengthened to advance the understanding on **how to implement climate actions and solutions**.
- **Equitable partnerships,** strict policies **discouraging "helicopter/parachute" science**.
- Conscious efforts from the WCRP to **promote leadership of Global South scientists** in its program, include specific programs based on Global South needs.

II. What are key climate research and knowledge gaps in the global South, and how can we advance climate science in and for the global South?

The role of education

- **Address Climate Change Literacy Gap**: climate change education in schools to bridge the current lack of expertise and limited higher education opportunities in the field
- Established **Climate Training Hub in Global South regions**: help to deliver climate-specific training, enabling researchers to receive comprehensive education locally, reducing the need for overseas training and fostering more impactful climate research.

Improving the Global South participation in international research endeavors

- **Global South should prioritize its own research agenda** for its challenges, because solutions proposed by the Global North do not necessarily fit for the Global South.
- Foster **scientific collaborations** at national/regional/Global South level.

"Cooperation and equity is the key for sustainable future"

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III. How can we contribute to supporting policy making with climate science and knowledge, during the upcoming decade, also called the "decade of decisions?

Priority areas that bridge climate science to policy

- **Contribute to the WCRP LHA Research on Climate Intervention** to understand the regional and local effects.
- Climate knowledge on adaptation options that **prioritize the nexus** of climate with areas such as health & agriculture.
- **Impact modelling** is crucial, esp. at regional and local scales.
- **Explore the role of AI** in climate services, education, and governance.

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III. How can we contribute to supporting policy making with climate science and knowledge, during the upcoming decade, also called the "decade of decisions?

Need for strong engagement at global, regional and national levels

- Create **policy experiences for climate researchers** → such as internships/fellowships/stays with government institutions that support the connections with policy makers in different sectors.
- More national and international fundings for EMCRs to focus on **policy relevance in research**.
- **Citizen science** can help bridge the gap between science and policy → EMCRs have lots of creative ideas and solutions and these shall be welcomed.
- Ensuring the **presence of EMCRs in major climate and policy negotiation** meetings.
- **Create and support regional science-policy hubs** to support regional level decision making.

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Final key messages

The climate situation is urgent:
Actionable climate science and science-based solutions are the key challenge for WCRP

→ Need improvements of climate observation networks, modelling capacities, and coordinated modelling efforts to support climate action on regional-to-local scales (esp. coastal, urban, mountains).

→ Need climate science that supports the assessment of the current and future effectiveness of adaptation and mitigation action and understanding the interactions of climate actions with the physical climate system, supporting sustainable development for all.

"As we confront pressing environmental challenges, the vigor and innovation of the next generation of academics are pivotal in shaping the trajectory of scientific knowledge and its application for a more sustainable future."

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WCRP and EMCRs

- Strengthening engagement of EMCRs in WCRP community since 2015.
- WCRP increasingly supported EMCRs throughout their activities.
- **WCRP Core Projects and LHAs** actively appointing **EMCRs in their panels** and working groups.
- **Young Earth System Scientists (YESS)** community as one of the key ECRs networks (officially endorsed in 2017 by WCRP), other networks (YHS, APECS, PAGES ECN, ECR NoN,...).
- YESS, a bottom-up ECR community, is actively fostering the next generation of interdisciplinary Earth system scientist at the global scale (>2400 members from >120 countries), a vital resource to the WCRP community for long-term science advancements.

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Thank you!

WCRP World Climate Research Programme

WORLD METEOROLOGICAL ORGANIZATION

unesco Intergovernmental Oceanographic Commission

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REMA

AIMS African Institute for Mathematical Sciences RWANDA