

WORLD CLIMATE RESEARCH PROGRAMME

OPEN SCIENCE CONFERENCE

Day 1, 23 October 2023



1. Opening Session

- Climate change impacts are becoming increasingly severe and are being felt every day around the world, in the oceans and on the land, from the Arctic to the Antarctic, said conference co-chair Helen Cleugh. In the face of unprecedented challenges, dramatic climate action is needed to limit global warming, requiring unprecedented societal transformations to sustain the future of life on Earth.
- Society must cope with ongoing changes and their impacts: the emergence of complex risks, including drought, heavy rain and flooding, heatwaves, extreme fire weather, other weather and climate extremes often occurring at the same time.
- The reasons for this year's unprecedented spikes in temperature increases in the atmosphere and the ocean are still being investigated. But they illustrate the complexity and connectivity of the climate system, and the urgent need for find sustainable solutions based on understanding of the entire Earth system. A giant leap is required by societies embarking on a new path to a sustainable world. It requires that we fundamentally reconfigure our economies, energy, food and health systems so that they work for both people and the planet.
- Conference co-chair Detlef Stammer outlined five key climate challenges: a) Climate system Understanding; b) Transforming society; c) Learning how to live in a warmer world, d) Actionable regional climate information, e) Modelling and observing climate futures.
- It is significant that it is the first OSC to be held in Africa. The continent is experiencing higher temperatures, heatwaves, heavy rains, floods, tropical cyclones, prolonged droughts, desertification, and stronger cyclones. This has devastating impacts on communities, with serious health and economic implications involving displacement, migration, water shortages and food crises. "Climate change is a fact. It is not a hoax. In Rwanda we are victims of climate change. Last May we had floods that killed more than 130 people in one night. Our policy should be a science-based policy, informed by research," said Environment Minister Jeanne d'Arc Mujawamariya.
- African and least-developed countries are priorities for the global Early Warnings for All initiative, which seeks to ensure that everyone on Earth is protected by life-saving early warnings by the end of 2027, said WMO Secretary-General Petteri Taalas. The initial investment of US\$ 3.1 billion

will yield massive benefits. Early warnings are part of coordinated climate change adaptation policies.

- Africa is at the convergence of the triple planetary crisis of climate change, biodiversity, and environmental degradation. Climate action and achieving SDGs are linked “To address the SDGs and climate change, we need to address the issue of advancing climate science and research for a sustainable future,” said UN Deputy Secretary-General Amina Mohammed.
- Climate science plays a key role in empowering vulnerable nations and levelling the playing field, said Lina Yassin (International Institute for Environment and Development).

In Africa there is “... a deep sense of understanding that there can be no climate action in isolation from all of the other SDG goals. The need to work together and move beyond the framing of global north and south: “Maybe soon we can stop talking of the global north, and the global south because for climate, there is no north and south. There’s one world, one planetary system, and one fragile climate,” said Macharia Kamau of the International Science Council.

Evening Dome Plenary: The needs of and opportunities for the Global South

COP28 needs to inject new urgency into climate action; especially in the light of the current global stocktake and NDC assessment; and the imperative and urgency of climate financing. There is considerable interest from financial sector, energy, and security agencies. But decisions are typically made in corporate world without data and there is a need for “data impact models”: collaborative work between social, economic, and physical sciences.

Key Points:

1. Weather attribution: World weather attribution influences the global community’s view of the effects of climate change on weather events; this plays a role in informing loss and damage; there is potential for impact attribution, but this is much harder.
2. Global carbon dioxide emissions using remote sensing (e.g., the Orbiting Carbon Observatory, OCO): there is relevance to global stocktake (informing Nationally Determined Contributions (NDCs)). Fifty countries have not updated their NDCs, so OCO is important.
3. Climate litigation trends: 55% of litigation outcomes are related to climate change. This is relevant to:
 - Retrospective litigation, which needs robust attribution studies
 - Climate green washing, where there is a strong upward trend
 - An increased focus on biodiversity – the climate nexus
 - Ocean protection from further climate impacts due to extreme events
 - Short lived climate pollutants, where there is international litigation between states
4. Nature-based approaches for managing Africa’s grassy ecosystems: the issue is that grassy ecosystems store significant carbon and the majority of African landscapes are not forested. A rush to sequester carbon encourages large-scale planting of trees without distinguishing between reforestation and afforestation. There is a real risk that financial incentives have the potential to drive large land conversion, said Barend Erasmus (University of Pretoria).
5. Regional tipping points: There has been research and debates regarding global tipping points, but do we know if the same is true for regional tipping points? Do we have the science?
6. The southern Amazon is close to a tipping point because of the combined effects of land use and climate change on the Amazon. The current drought is the worst on record – not least because deforestation depletes moisture retention after the rainy season. The consequences of the destruction of the Amazon rain forest include loss of livelihoods, loss of biodiversity, changing

the regional climate and increasing greenhouse gas emissions. There will be global impacts if the Amazon is no longer a carbon sink but a carbon source, said Carlos Nobre (University of Sao Paulo). There is an alternative. There is a vision for a sustainable Amazon in the future.

Parallel Sessions

- **Advances in climate research** - Climate variability, predictability and prediction
There have been improvements in climate prediction and the development of early warning systems for climate extremes and hazards. There are opportunities for progress, for instance, in subseasonal to seasonal forecasts. However, we need more skillful, decision-relevant, and tailored predictions in response to user needs and feedback.
- **Global energy budget**
The Earth Energy Imbalance (EEI) estimate from the ocean heat inventory is progressing rapidly. A mean of effective radiative forcing trends, driven by greenhouse gas concentrations and government actions to reduce aerosols, are driving most of the increases.
- **Water cycle**
There is a lack of attention from the climate research community on the changing water cycle and its consequences for human water resources. More effort is needed to reduce uncertainties associated with projections of the impact of increasing greenhouse gases on precipitation and evaporation.
- **Impacts on human health and urban systems**
Climate and health. Research and evidence play a key part of the strategy to ensure that effective climate services for health are developed, implemented and evaluated in partnership. Urban climate modelling is essential to help plan cities, including to predict and manage risk to health and wellbeing, infrastructure, and communities.
- **Attribution of changes**
Rapid extreme attribution allows the communication of the role of climate change behind an extreme event at the time when people are actually interested in it. There is an urgent need for more representation of the global south in attribution research and applications both in terms of who is involved, what regions are studied, and what factors are considered.
- **Co-produced climate services and solutions**
Climate services are known to have positive effects on resilience and wellbeing. However, we must create standards to ensure that the service is robust. There is an increasing recognition of the urgency to bridge the gap from physical climate science to the needs of human and natural systems, especially on regional information for climate services.
- **Institutions and frameworks**
We need to rapidly enhance our ability to deal with climate information in a decision/policy context. An unprecedented amount of climate data is now available to users. Much more effort is required to support communities in extracting the relevant information and account for it in existing decision-making processes to enhance both national capability and capacities.



WCRP Open Science Conference (OSC) Opening Ceremony. Helen Cleugh giving the opening welcome address (Photo: Martin Visbeck).



WCRP OSC Opening Day. From left: Detlef Stammer (WCRP Chair), Macharia Kamau (Special Envoy of former President Uhuru Kenyatta on the EAC-led Peace Effort on Eastern DRC and Commissioner, Office of the Former President of the Republic of Kenya; International Science Council), Petteri Taalas (World Meteorological Organization Secretary-General), Jeanne d'Arc Mujawamariya (Minister for Environment, Rwanda), Helen Cleugh (Co-Chair of WCRP OSC Science Organizing Committee), Lina Yassin (Researcher), Juliet Kabera (Director General, Rwanda Environmental Management Authority). Photo: Clare Nullis.



WCRP Open Science Conference Venue, with stunning weather for the opening day. Photo: Martin Visbeck.

The World Climate Research Programme coordinates research around some of the most pressing scientific questions in relation to the compounded nature of the climate system, to find answers together with all nations, looking at it from multitude of disciplines. It is cosponsored by the World Meteorological Organization, the Intergovernmental Oceanographic Commission of UNESCO and the International Science Council.

<https://wcrp-osc2023.org>

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