The Africa Climate Conference 2013

(ACC-2013)

15-18 October 2013, Arusha, Tanzania

Call for Abstracts

The World Climate Research Programme (WCRP) collaborating with the United Nations Economic Commissions Africa Climate Policy Center (ACPC) will host the first ever Pan-Africa Climate Research Conference on 15-18 October, 2013 in Arusha (Tanzania), themed the "**Africa Climate Conference 2013: Advancing African Climate Science Research & Knowledge"**.

The Africa Climate Conference 2013 (ACC-2013) aims to address new frontiers of knowledge on the African Climate system, and narrow the communications gap currently existing between African decision-makers and climate scientists, in order to develop a coordinated collaborative research strategy to enhance climate science outputs so that they may better inform climate early warning responses and adaptation in Africa. Concrete Pan-African and multi-disciplinary climate research program proposals and a concerted climate research effort, hosted across African climate research hubs, are anticipated from this major climate Conference for Africa.

Bringing together scientists of African climate towards meeting African policy-makers' needs, the ACC 2013 Conference will offer a platform for decision-makers and climate researchers, scientists and practitioners from Africa and around the world, to jointly address a number of priority African climate research frontiers that have been identified through consultation with a broad spectrum of research, applications and user communities initiated at the second Climate Change for Development in Africa (CCDA-II) conference .

The Scientific and Technical Steering Committee of the ACC-2013 ~~is~~ invites abstracts for either oral or poster presentations for the conference sessions detailed in section 2 of this Call. PhD candidates and young scientists from African institutions conducting frontier research to improve predictability of the African climate system on subseasonal to seasonal, decadal and longer timescales are particularly encouraged to submit abstracts. Female researchers are strongly urged to apply.

All interested researchers and practitioners are invited to submit an abstract of at least 500 words and no longer than 1000 Words, by filling the abstract submission form available online at: **http://www.climdev-africa.org/acc2013.**

The deadline for abstract submission to the Africa Climate Conference (ACC-2013) is set to May 31, 2013.

Those selected for oral presentations will be **notified by July 1st,** and invited to produce extended abstracts to be included in the conference proceedings.

Effort is currently underway to secure funding for scientists and researchers to attend the ACC-2013, particularly young Africa-based researchers and female scientists. Preference will be accorded to those whose abstracts have been accepted as well as self-funded participants. Interested participants needing funding assistance to attend the ACC-2013, should specify such need on their abstract submission form.

1. Background

Africa is highly vulnerable to current climate variability and extremes and most likely to suffer adverse effects of climate change. Current limits to our collective understanding of the African climate system impede our collective ability to deliver adequate early warnings and climate

predictions, and restrict the use of climate information by African decision-makers and communities most vulnerable to current and future impacts of a changing climate.

Adaptation policies and actions will be most effective if informed by the best possible science on current and future climate. To achieve this, we must fill the large gaps in our collective understanding of the African climate system, through scientific and applications driven research, in order to ensure that climate research outputs are developed and communicated in a form that is salient and usable for decision-makers and vulnerable communities on the continent.

African climate variability is of fundamental importance to many global climate phenomena currently targeted by the international research community. Examples include at sub-seasonal timescales the Madden-Julian Oscillation (MJO) – important for intra-seasonal rainfall variability in Africa; at longer timescales, basin-scale sea surface temperature fluctuations – important drivers of African seasonal drought and flood, and at still longer timescales, decadal ocean variability - a potential driver of decadal oscillations in rainfall such as seen in the Sahel.

The World Climate Research Programme (WCRP), has defined global research frontiers and imperatives and, through its core projects, is delivering research and databases to advance, among other topics, climate model improvement, sub-seasonal to seasonal prediction, decadal prediction, climate change scenarios and understanding, climate extremes prediction and sea-level rise. For sub-seasonal timescales, collaborative projects with the World Weather Research Programme (WWRP) are addressing predictability and interactions between weather and climate timescales – notably the role of tropical convection. In these initiatives the challenge of making research results useful and easily accessible to end users such as adaptation planners and policy makers is explicitly recognized. Adequate observations of climate are essential to all the above activities and in this context the Global Climate Observing System (GCOS) programme is coordinating development of the observational resources needed for climate research, monitoring, prediction and national development. African scientists and some institutions are involved in such international programmes.

The year 2012 has seen the approval of the Implementation Plan of the Global Framework for Climate Services (GFCS) - a major international initiative developing under the United Nations (UN) system and led by the World Meteorological Organisation (WMO). Building on the activities and initiatives described above, as well as others, the GFCS aims to mainstream value-added climate information for decision makers through user-driven and science-based activities. The structure of the GFCS is based on 5 components or Framework 'pillars': observations and monitoring; research, modeling and prediction; a system for climate service provision; a user interface platform and capacity building.

There is thus a strong context of global infrastructure development, research and other initiatives with direct relevance to the African continent. The African Climate Conference 2013 will provide a forum to assemble and review these activities, and a means of channeling their relevance for Africa in a coordinated focus on African climate research and user-driven climate services.

2. Conference Themes

Africa Climate Conference 2013 (ACC-2013) abstracts and speakers will need to address one or more of the following 9 Conference themes, as follows. Conference themes are mapped onto 16 identified priority Research Frontiers of African Climate Research to address the critical information needs of African end-users, policy-developers and vulnerable communities, to adapt to a changing climate and manage risks, now to the mid-to-end 21st century.

Abstracts should demonstrate understanding of the state of knowledge of the relevant research frontier and state clearly the research objectives and progress/findings to be presented, as well as remaining gaps. All the good practice evidence from frontier research on each of these climate research frontiers will be compiled and circulated ahead of the Conference, to serve as a solid basis of evidence to guide discussion and agenda-setting during the ACC-2013.

1. **To support strategic planning ahead-of-season (1- month to 6-months outlook)**
    - Research frontier #1: Understanding and prediction of SST variability. Particularly attention will be given to frontier research on ocean basins less studied than the tropical Pacific ENSO region (e.g. Indian Ocean, Tropical Atlantic) that have comparable impacts on African rainfall.
    - Research frontier #2: Understanding and representation of teleconnections in models to enhance forecast performance and interpretation.

Potential benefits of advancing these research frontiers include more confident decision making in:

a) Implementing early responses to expected drought and flood (in extreme years) – including in declaring projected food security status;
b) Selecting crop types and cultivars for the growing season;
c) Agricultural water management, irrigation scheduling and reservoir operations
d) Allocation of competed water resources, including for hydropower;
e) Preparing mitigation strategies to minimize impacts on human and animal health.

An additional benefit with cross-cutting impact would be increased credibility, usability and uptake of seasonal and multi-annual forecasts – leading to accelerated interaction between climate science and users, driven by increased usability and demand for forecasts.

2. **To support Intra-seasonal risk monitoring and management to inform within-season operations (1-2 weeks to 40 days range)**

    - Research frontier #3: The Madden-Julian Oscillation (MJO) is the dominant mode of intra-seasonal variability in the tropics. Improved understanding and modelling of its impact on the temporal distribution of African seasonal rainfall, including rains onset and cessation, is a key research frontier.
    - Research frontier #4: Mesoscale rain-bearing processes are key for short range forcasting, however, these processes are not well understood in Africa. Correct representation of these processes and their links to the larger scale circulation is essential for realistic simulation of typical temporal variability in rainfall and thus to the capability to predict risks of prolonged dry spells or periods of heavy rain and other high impact events.

Potential benefits of advancing these research frontiers include more confident decision making in:

a) Refining strategies based on seasonal forecasts (e.g. planting times and crop types)
b) Choosing in-season operational strategies e.g. crop protection, water management (i.e. reservoir operation), irrigation scheduling, issuance of health advisories.
c) Protecting life and livelihoods against heavy rain or heatwave events
d) Enhance early warning activities

3. **To support Longer-term strategic planning/policy development (next 1-10 years)**
    - Research frontier #5: Understanding of the natural drivers of decadal climate variability over Africa and its interaction with the climate change signal is needed.
    - Research frontier #6: Comprehensive evaluation of decadal prediction systems dedicated to regional prediction and projection of near term climate change and geared towards providing early guidance on the likelihood of changes in seasonal rainfall patterns, hazardous weather and extreme climate events (such as recurrent

drought in the Sahel and the 2011; Greater Horn of Africa drought). Where available also, good practice of exploration of potential for tailored multi-annual to decadal

forecast products, trialed with users (adaptation policy developers and national planners).

Potential benefits of advancing these research frontiers include more confident decision making in:

a) Selection of food security strategies (based e.g. on drought frequency risk)
b) Infrastructure planning (dams and reservoirs, power plants, irrigation infrastructure, roads, flood protection works, housing, urban development)
c) Insurance sector planning and development, with development of more relevant products for African stakeholders
d) Improved science-based input into national adaptation planning and policy development.
e) Management of trans-boundary resources such as water resources, aquifer, forest
f) Climate change adaptation and mitigation policies and strategies

4. To support Climate change adaptation policy development/planning (next 50 years)

- Research frontier #7: Understanding of processes and feedbacks relating to the carbon cycle, water cycle, aerosols, vegetation and their representation in climate models is needed to improve the physical basis of climate scenarios for Africa. Results of Frontier research on the role of land-use changes over Africa in modulating climate change impacts are welcome under this theme.
- Research frontier #8: Best practice in developing robust climate change scenarios at geographical levels appropriate for end-user decision-making. CORDEX Africa researchers are strongly encouraged to submit their relevant findings under this theme.
- Research frontier #9: Attribution of recent extreme events in Africa. Research assessing and refining methodologies for near-real-time attribution of climate events, to provide timely analysis to governments/decision makers. Two important focus areas are: the Greater Horn of Africa region, where recent drying trends and drought episodes appear counter to the predicted longer-term change to wetter conditions, and, the recent greening of the Sahel as a long-term trend of decadal cyclical return of rains needs to be further probed into. Any research improving understanding of climatic changes in these two priority regions, and any other, are welcomed under this theme.

Potential benefits of advancing these research frontiers include more confident decision making in:

a) Regional and national planning to adapt to and mitigate the impacts of global climate change.
b) To understand and develop methodologies for new frontiers of negotiations such as loss and damage
c) National and regional policies
d) Develop Africa's negotiation positions

5. CROSS-CUTTING THEME #1: Assessing the current vulnerability due to recent climate events

- Research frontier #10: Good practice in observation, analyses and products from observations and database development- Enhancing the observations network for both biophysical and socio-economic climate variables through:
  - Database construction (including impact datasets (e.g. crop yields, health statistics)
  - Data rescue
  - Analysis of observations into useful products
  - Development of better-targeted applications models, across all climate-sensitive sectors.

Potential benefits of advancing these research frontiers include:

a) Developing a robust strategies for rescuing historical data, managing data, filling missing data and enhance data sharing
b) Better understanding of vulnerability to recent climate events, and improved impacts modeling. Regional and national planning to adapt to and mitigate the impacts of global climate change. The lack of adequate ground-based observational networks over much of the African continent is well documented. This seriously hinders abilities to assess the current state of the climate in terms of e.g. rainfall deficit/surfeit and thus the potential for flood/drought. Lack of 'ground truth' also hampers research and evaluation of climate modeling/prediction. There is as such an urgent need for development of both sustained

observational networks and also for temporary intensive observational campaigns (such as successfully achieved for West Africa by the AMMA programme) and emerging ClimDev-Africa Special Fund investment programme.

Equally urgent is a need to develop impact datasets, across all climate-sensitive sectors (e.g. crop yields, river flows, health/hospital admission statistics) to aid development and targeting of applications models.

6. CROSS-CUTTING THEME #2: Estimation of the impacts of climate variability and change

- Research frontier #11: Research on integration of climate predictions on all timescales (seamless forecasting) with application modelling to help optimise usefulness to users. Key areas include: agriculture and food security (regional crop yields; crop pests and diseases); health (movement and onset of diseases); water resources and energy (river flows, irrigation systems, hydro-electric systems, rural and urban water supply).

Selected benefits include further improvements to:

a) Selection of crop types and cultivars for growing season;
b) Allocation of competed water resources, including for hydropower and irrigation;
c) Preparation of mitigation strategies to minimize climate impacts on human and animal health.

7. CROSS-CUTTING THEME #3: Decision making at local scales

- Research frontier #12: Initiatives to develop an 'in house' capability for regional downscaling, including of seasonal forecasts, in African centres have been started but need consolidation and promulgation to all regions. Where benefits are demonstrated, these activities can be developed into operational services running in relevant regional African centres.

Potential benefits of advancing these research frontiers include:

a) Improved understanding of local decision-makers and communities' climate information needs, and improved capability of regional/national forecasting centers to address these needs, with value-addition relative to current forecasts.
b) Further capability to refine decisions on e.g.:

- Which regions are most at risk from dry/heavy rain spells
- Which river basins are most likely to be affected by surfeit or deficit;
- The risk and location of heatwaves.

Decision makers need climate information pertinent to the geographical scales for which decisions are made, e.g. river basins and agricultural regions, down to the farm level. Reliable output from current global operational prediction systems (on seasonal and longer timescales) is typically available only at much larger scale (e.g. regional or continental). Output from global systems can be 'downscaled' to provide greater geographical detail using Regional Climate Models, and both dynamical and statistical techniques. However, greater

understanding and improvement of the downscaling process is needed as well as detailed investigation of the potential benefits to decision making.

8. CROSS-CUTTING THEME #4: Building credibility and confidence in predictions, across timescales

- Research frontier #13: How to better characterize performance, credibility and confidence for predictions on all timescales, most notably intra-seasonal and longer-term climate forecasts, in consultation with end-users, to facilitate use of forecasts across timescales for early warning leading to early action

Potential benefits of advancing these research frontiers include:

a) Build user confidence in climate predictions, across timescales, and understanding of their uses and limitations for improved early warning to early action. Indeed, to make prudent use of a forecast, users need a full characterization of its performance in readily understandable measures. Such assessments are most developed for seasonal forecasts, but in general they remain frontier areas for predictions on most intra-seasonal and longer-term climate timescales.

9. CROSS-CUTTING THEME #5: Mainstreaming climate services for policy formulation and decision making

- Research frontier #14: How to improve communication of climate services and enhanced understanding between providers and users of climate information?
- Research frontier #15: capacity-building strategies at all levels, including ideas on how best to conduct and encourage education, training, courses, workshops, outreach etc. for effective science-based adaptation and risk management decisions
- Research frontier #16: Effective strategies to foster open partnership between practitioners/users of traditional systems of climate prediction and climate scientists, to bridge the cultural divide and improve the local relevance of scientific forecasts for local decision-making in Africa.

Potential benefits of advancing these research frontiers include:

a) Improved understanding of how to provide climate information in formats and through communication channels that are useful and readily understandable to end-users.
b) Strategies to achieve open partnership between practitioners/users of such traditional systems of climate prediction and climate scientists. Such strategies remain a frontier of research, yet are critically needed to bridge the cultural divide and improve the local relevance of scientific forecasts for local decision-making among climate-sensitive communities in Africa where there is a strong tradition of and reliance on traditional knowledge systems for climate prediction.

TABLE 1: Summary of Priority Climate Research Knowledge Frontiers in Africa, and Cross-cutting areas of research and development crucial to make climate science outputs useful to decision makers in Africa.

Priority	***Decision-making process and end-user information gap***	***Climate Research Frontier (CRF)***
1.	Process: Strategic ahead-of-season planning (1- month to 6-months lead range). Information gaps: • Onset, cessation timing • Likelihood of dry/very wet spells (risks)	*Theme: Seasonal prediction* *Key research frontier areas:* • *Remote drivers of variability, e.g. global sea-surface temperature and teleconnections* • *Local drivers of variability, e.g. land-*

	• Expected seasonal rainfall distribution	*atmosphere coupling*
2.	*Process: intra-seasonal risk monitoring and management / within-season operations (1-2 weeks to 40 days range)* *Information gaps:* • *More precise information on expected timing of onset/cessation* • *timing/duration/intensity of dry/very wet spells*	Theme: Sub-seasonal prediction Key frontiers areas: • *Improved understanding of sources of sub-seasonal predictability over Africa (including MJO)* • *Improved understanding of organized convection and upscale interactions (e.g. with African Easterly Waves)*
3.	*Process: Longer-term strategic planning/policy development (next 1-10 years)* *Information gap:* • *Forecasts of rainfall/temperature for next 1-2 years* • *Trends/frequencies for rainfall/temperature over next 5-10 years*	Theme: Decadal prediction Key frontiers: • Drivers of decadal and multi-decadal variability (AMO, PDO) • Role of aerosols
4.	*Process: climate change adaptation policy development/planning (next 50 years)* *Information needing improvement:* • *Robust climate change projections* • *Information of the role of climate change in observed events* • *Uncertainty analysis and adaptation strategy*	*Theme: Climate change scenarios* *Key frontiers:* • *Understanding of the carbon cycle, chemistry, aerosols, vegetation, water cycle* • Drivers of climate change • *Earth System Modelling* • *Attribution methodology*
CROSS-CUTTING THEMES		
CCT#1	*Process: Assessing the current vulnerability due to recent climate events* *Information gaps:* • *Lack of detailed information on e.g. recent rainfall deficits/surfeits* • *Lack of impact datasets, across all climate-sensitive sectors (e.g. crop yields, river flows, health/hospital admission statistics) to aid development and targeting of applications models*	*Theme: Observation system and database development* *Key frontier areas:* • *Enhancing the observations network for both biophysical and socio-economic climate variables* • *Database construction (including impact datasets (e.g. crop yields, health statistics)* • *Data rescue* • *Analysis of observations into useful products* • *Development of better targeted applications models*
CCT#2	*Process: Estimation of the impacts of climate variability and change*	Theme: Applications modelling Key frontiers: • Improved understanding/ modeling of climate impacts on hydrology, food security and crop yields, health
CCT#3	*Process: decision making at local scales* Information gaps: • Climate services not sufficiently geographically specific	*Theme: Downscaling* *Key frontier areas:* • understanding and improvement of the downscaling process • quantification of benefits to users

CCT#4	*Process: building credibility and confidence in predictions*	Theme: Forecast evaluation Key frontiers areas: • *evaluation of all forecasts for user-relevant variables, including impact variables* • *development of user-salient performance measures and indicators, characterizing forecast credibility and confidence, across timescales (seamless forecasting performance evaluation)* • *forecast model verification and limit of predictability*
CCT#5	*Process: Mainstreaming climate services for all timescales*	*Theme: Communication and climate service provider/user interactions* *Key frontier areas:* • *Improving availability/usability of services* • *strategies for bridging the gap between service providers and end users* • *capacity-building strategies at all levels, including ideas on how best to conduct and encourage education, training, courses, workshops, outreach etc. for effective science-based adaptation and risk management decisions* • *bridging the divide between science and indigenous knowledge systems, for improved salience of forecasts to local communities in Africa*

3. Contact

For further information on the abstracts submissions on other topics or general questions relating to the ACC-2013 conference, please email acc2013@climdev-africa.org.