SECOND ANNUAL CONFERENCE ON CLIMATE CHANGE AND DEVELOPMENT IN AFRICA

Theme
Advancing Knowledge, Policy and Practice in Climate Change and Development

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SUB-THEME I : CLIMATE SERVICE DELIVERY FOR DEVELOPMENT

SESSION 3: FRONTIERS OF RESEARCH AND DEVELOPMENT FOR CLIMATE SCIENCE, SERVICES AND POLICY

RESEARCH STRATEGIES FOR WEST AFRICA

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PRESENTATION OUTLINE

I. AMMA PROGRAMME LESSONS

II. EXISTING FRAMEWORKS AND ONGOING INITIATIVES IN WEST AFRICA

III. CONCLUSION
I. AMMA PROGRAMME LESSONS

**Objective 1**
To improve our understanding of the West African Monsoon (WAM) variability

**Objective 2**
- a. To provide the underpinning science to link WAM variability to related societal issues and
- b. To define & implement relevant monitoring & prediction strategies

**Objective 3**
To ensure that the AMMA research is integrated with prediction & decision making activities (Forecast / EWS)
A multidisciplinary approach

Geophysical Sphere

Human Dimension

Tools & Methods

Decision making

Environmental monitoring

Socio-economic early warning systems

The human dimension

Seasonal to climatic forecasting

Remote sensing

Modelling

In-situ observations

The geophysical sphere

Human processes and food security

WP3.2

Health impact

Land productivity
A multiscale approach

Global SST
Teleconnections
Monsoon System
Easterly waves
GG SST Variability
Mesoscale Convective Systems
Convective Cells
Catchments
Vegetation
Pools
Scale Interactions
Water vapor transport
Trace gaz, Aerosols, etc

Global SST Variability

Major River Basins

Mesoscale

Local

Global

Regional

10^4 km

10^3 km

10^2 km

10^1 km

Year
Season
Day
Hour

SOP
EOP
LOP

MODELING/FORECASTS

SATELLITES

OBSERVATIONS
International Field Program: a strong component of AMMA

- Long term Observation Period
  - Based on existing networks (Catch, Idaf, Aeronet Impetus, Pirata, ...)
  - Enhanced & coordinated

Strategy based on space & time scale nesting

- Supra-regional (WA + Ocean)
- Regional (WA)
- Mesoscale
- Local

SPACE (km)

TIME (Years)

2002 2005 2006 2007 2008

WET DRY

Enhanced Observing Period

Based on existing networks (Catch, Idaf, Aeronet Impetus, Pirata, ...)
Enhanced & coordinated
An Ocean-Atmosphere-Land Regional Campaigns of Observations over West Africa
EOP/SOP Atmospheric Soundings (major effort)

EOP: also soundings of Ozone, Wind profiler, GPS stations (vapor), Radar, …
3 mesoscale networks to monitor for different climate regimes the water, vegetation, aerosol, gaz cycles

+ Intensive measurements on super-sites
Restoring the West African radiosonde network necessary to make forecasts & to monitor climate

- Greatest density of atmospheric soundings ever launched with 21 active stations
- 200 radiosonde operators and technicians working on the network + students and researchers from Africa, the Americas and Europe
The AMMA database

**Metadata**
Information about all the datasets → "catalogue base"

**Satellite products**
60 operational and research products
- NetCDF files
- Regular lat/lon grids

**User interface**
- Catalogue
- Questionnaire data
- Model outputs
  - Outputs from 15 research + 10 operational models
  - NetCDF files
  - Regular lat/lon grids

**In situ data**
About 250 datasets
- EOP / SOP / LOP data
- Historical data
- Operational data
- Research observing network data

**Questionnaire data**
1344 outputs of a socio-economics survey

**Two synchronized systems**
http://amma-international.org/database and http://amma.agrhymet.ne/amma-data
Phase 2 of AMMA: Scientific priorities

AMMA’s 2nd phase hinges on 3 key interacting research themes:

1. Continued effort to enrich our knowledge of the monsoon system.

2. Study of predictability and improvement of meteorological, seasonal and climate forecasting.

3. Interactions between society, environment and climate
Improving dynamical models for weather and climate prediction requires continued improvements and refinements in our knowledge and understanding of WAM variability and predictability.

This second phase will focus on the essential feedback loops at three key scales: weather, intra-seasonal and multi-annual.
(2) Weather, seasonal and climate predictability and forecasting

The AMMA program will work towards improving our ability to make weather and climate forecasts, and increasing our confidence in climate change projections. In order to do this, the knowledge acquired from phase 1 must be “pulled-through” to improve dynamical models used for weather and climate prediction. The research activity will be organized around 4 four major themes:

(i) Evaluation and improvement of models;
(ii) Utilization of current models (by way of new tools, ensemble prediction systems for example);
(iii) Improvement of use of available observations (satellite observations, for example);
(iv) Recommendation and implementation of permanent observing systems to improve monitoring capabilities and forecasts.

These themes will be promoted equally for weather (e.g. mesoscale convective storms, easterly waves and Kelvin waves, tropical cyclogenesis) and climate (intra-seasonal, seasonal and inter-annual to decadal) forecasting, as well as for climate change scenarios. One of the essential aspects of integrating the knowledge acquired into improvement of forecasting models is the reinforcement of links between the AMMA scientists and operational centers, represented by people working on model improvement and data assimilation.
(3) Society, Environment and Climate Interactions

This research theme will be organized around seven broad themes of scientific study:
(i) Water resources;
(ii) Land use, land cover and productivity;
(iii) Agriculture and food security;
(iv) Health;
(v) Energy;
(vi) Ecosystems;
(vii) Urban zones and African megacities.

This third scientific theme is the contribution of the African Community (AMMA-NET) to this second phase of AMMA.
II. EXISTING FRAMEWORKS AND ONGOING INITIATIVES IN WEST AFRICA
EXISTING FRAMEWORKS

1. AU / NEPAD action plan, 2005
2. PAN AFRICAN UNIVERSITY, December 2011
3. ECOWAS SCIENTIFIC RESEARCH POLICY (ECORP), June 2012
ONGOING INITIATIVES OF INTEREST IN (WEST) AFRICA

EU/ACP EDF Projects: GCCA, ACP/UE ST, AMESD/MESA

CCAFS

WASCAL (West African Science Service Center on Climate Change and Adapted Land Use)
ONGOING INITIATIVES OF INTEREST IN (WEST) AFRICA (suite)

GEF/LDCF/UNDP INITIATIVE

In May 2012, The GEF approved a set of 12 projects executed by UNDP and called “Climate Information and Early Warning Systems for Climate Resilient Development Programme” are receiving funding through the Least Developed Country Fund (LDCF) and are currently in the project design phase for the 11 countries currently receiving support (Liberia, Sierra Leone, Benin, Burkina Faso, Sao Tome and Principe, Gambia, Uganda, Ethiopia, Tanzania, Zambia and Malawi). Additional Projects may be also developed in Togo, Guinea and Mali.

All these projects include:
1. Procurement and installation or rehabilitation (in case of existing) of approximately 10+ hydrological monitoring stations with telemetry, archiving and data processing facilities.
2. Procurement and installation or rehabilitation of 20+ meteorological monitoring stations with telemetry, archiving and data processing facilities.
3. Procurement and installation or rehabilitation of radar for monitoring severe weather.
ONGOING INITIATIVES OF INTEREST IN (WEST) AFRICA (suite)

4. Procurement and installation or rehabilitation of upper air monitoring stations.
5. Procurement and installation or rehabilitation of satellite monitoring equipment to receive real time climate and environmental information.
6. Training of at least 3-5 officers to maintain and repair equipment, computer infrastructure and telecommunications, including cost-effective technologies to interface with existing equipment/software.
7. NHMS capacity to make and use climate forecasts (on daily to seasonal, as well as medium- to long-term timescales) is strengthened by training at least 4 forecasters.
8. Tailored sector-specific early warning products that link climate, environmental and socio-economic information on a range of timescales are developed, based on identified user needs.
9. National capacity for assimilating forecasts and monitoring into existing development planning, PRSPs and disaster management systems is built, including coordination with systems and warnings developed by other initiatives.
In Niger within the framework of PPCR, the Project of Development of the Information and the Climatic Prospective component is planning the enhancement of the capacities to generate climate data by improving the infrastructure:

- Synoptic Stations from 18 to 34 in 2015
- 617 to 796 rain gauges in 2015
- 39 pluviograph
- 39 agro-meteorological stations
III. CONCLUSION

THE ISSUE OF DATA ACCESS AND SHARING IS STILL A CROSS CUTTING ISSUE TO BE TACKLED AT THE BEGINNING THROUGH POLICY MEASURES TO ALLOW AN EFFICIENT IMPLEMENTATION OF THE PROJECTS/PROGRAMMES.

WE HOPE CLIMDEV AFRICA PROGRAM COULD FILL THAT GAP WITH AN ADEQUATE ADVOCACY AND RELEVANT INVESTMENTS TO ENHANCE THE OBSERVATIONS NETWORK
THANK YOU FOR YOUR ATTENTION