



# **The NCAR Colloquium on African Weather and Climate: Fulfilling Peter Lamb's Mission**

**Arlene Laing**

CIRES/U of Colorado-Boulder

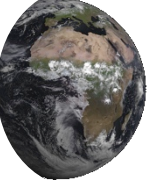
**Kerry Cook**

University of Texas-Austin

# NCAR SUMMER COLLOQUIUM ON AFRICAN WEATHER AND CLIMATE: Unique Challenges and Application of New Knowledge

<https://ral.ucar.edu/csap/events/ISP/>

- 25 July – 5 Aug 2011
- Sponsored by NCAR Integrated Science Program (ISP)
- Conceived at 3<sup>rd</sup> AMMA conference as **forum for students studying African weather and climate to interact with each other. Attract more students to research on Africa.**
- **23 graduate students** (half were African, representing 9 regionally diverse countries; remainder from US and one from Nepal), **26 lecturers**



# 2011 NCAR Colloquium Goals

- i. **Synthesizing knowledge** of African weather and climate,
- ii. Applying **modern tools** (remote sensing, numerical simulation and prediction, statistical data analysis, and visualization) to understand variability on synoptic, sub-seasonal, inter-annual, and climate timescales, making and interpreting prediction, and optimizing societal benefit in Africa

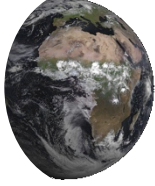
# Week 1: Weather and Sub-seasonal Scales



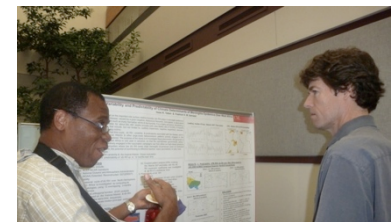
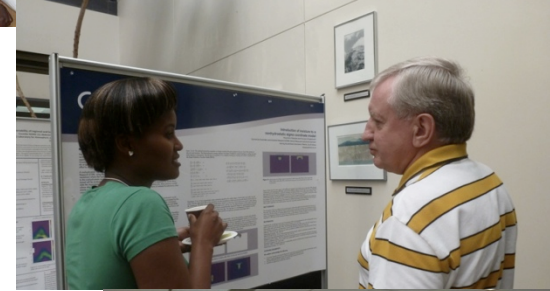
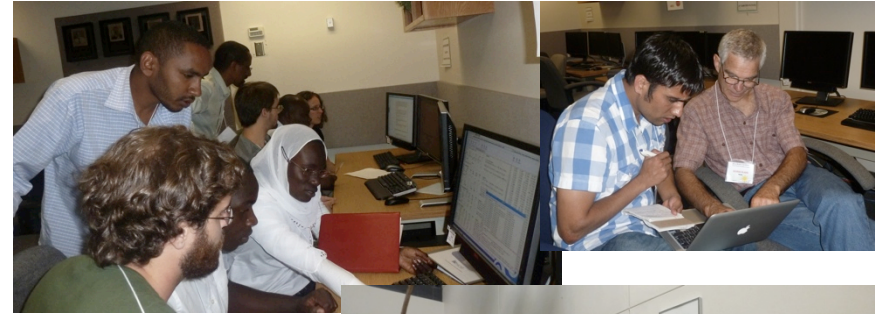
# Week 2: Climate, Earth System, Impacts



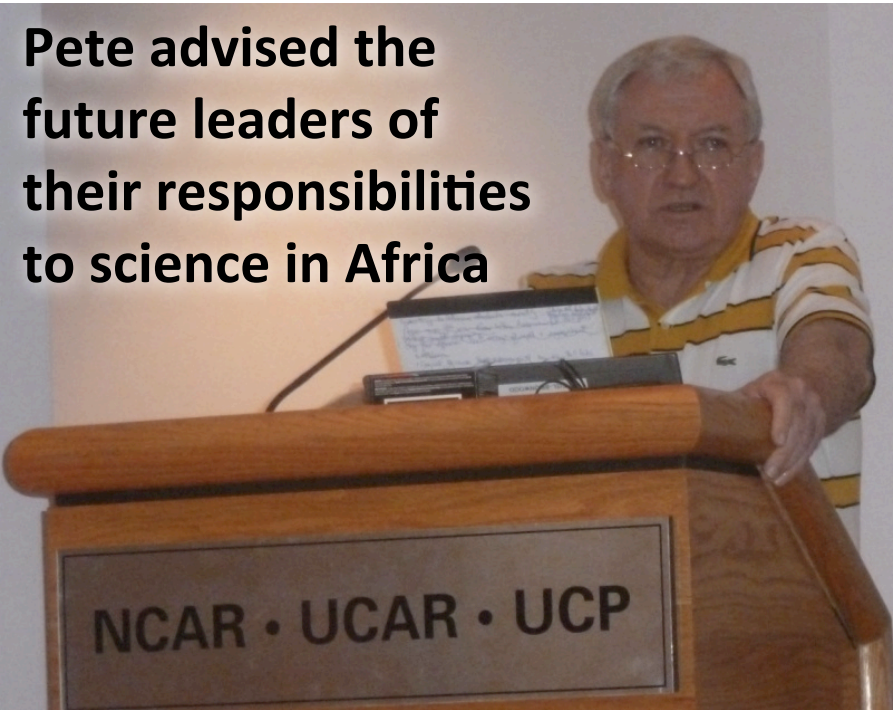
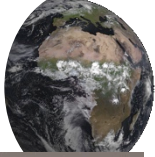
# Colloquium Format



- Lectures
- Hands-on, group exercises
- Student Poster sessions
- Panel discussions
- Group projects
- Field trip to observe burn area and instruments with experts on land surface processes, fires, and floods
- One-on-one consultations
- Fun trip to Rocky Mountain National Park



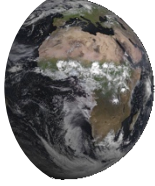
# Lessons from past success. Ideas for the future



Wassila shared NCEP's success via collaborations



# Students' Priorities for the Future



**Group 1:**  
Improving Observational Network  
in Africa for Sustainable Socio-  
Economic Development



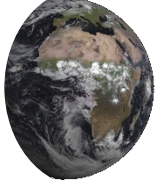
**Group 2:**  
Improving Observations: A  
challenge facing weather and  
climate research over Africa



**Group 3:**  
Food Security and Climate  
Variability



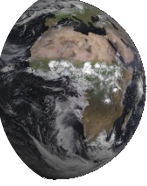
# Survey of Colloquium Graduates



- Role of the colloquium in their career or academic life
- How the work and words of Peter Lamb may have influenced (or may still influence) them

*At the colloquium, Peter Lamb spoke of the importance of encouraging independence, forging personal relationships, and helping Africans to help themselves. He reminded students, the future leaders of science, of the responsibility to use science to benefit Africa and its development.*

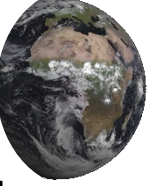
Students cited his panel presentation as “outstanding” in survey immediately after the colloquium



# Survey: 4 years after colloquium

- What is your employment or academic status? Please list status, area/field/sector, and position title.
- Was your employment opportunity due to relationships formed through the colloquium? For example, were you recruited by a colloquium participant or lecturer or alerted to opportunity by a colloquium participant? If so, please describe.
- How has the knowledge and skills gained from the colloquium assisted you or your organization in fulfilling your goals?
- Describe any current, past, or planned collaboration with other colloquium participants (student or lecturers).
- Can you tell us about any success stories in your career that you believe were made possible because of your experience at the colloquium?

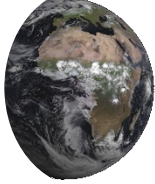
# Survey: 4 years after colloquium



At the colloquium, Dr. Peter Lamb reminded students, the future leaders of science, of the responsibility to use science to benefit Africa and its development, to help Africans to help themselves. With that in mind, please respond to the following questions.

- What inspires you to pursue the type of work/academic track that you are in?
- Are you involved in formal or informal activities that benefit Africa?
- In what ways is your work helping with scientific advancement, capacity building, or other societal benefit in Africa?
- What support would you find helpful to make your work more relevant to scientific and social development in Africa?
  - Match with mentor with experience working in Africa,
  - Funds for collaborative visits,
  - Other \_\_\_\_\_
- List research activity/publications/products created since the colloquium

# Survey Results

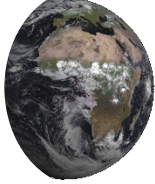


## 14 respondents (60% of graduates)

- 9 Africa, 5 US
- 3 University Faculty (1 senior lecturer)
- 4 Post-doctoral researchers (Canada, Spain, US, UK)
- 1 Forecaster, Government Weather Service
- 1 Research scientist, University aircraft operations manager
- 1 Faculty specialist and technical advisor to Commissioner, Uganda Dept. of Relief and Disaster preparedness and Management
- 1 UCAR Visiting Scientist at Naval Research Lab
- 1 Climate science researcher, Agricultural research institute
- 2 PhD students

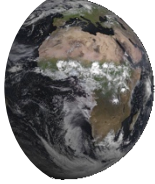
***Two positions due to connections made at colloquium***

# How has knowledge and skills gained from colloquium assisted you or your organization in fulfilling your goals?

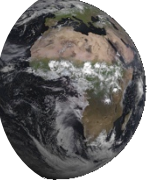


- **Presentation on atmospheric modeling gave me ideas on how to progress with my PhD.** The lecturer advised me to implement at least two microphysics schemes in the model I was working with, and I did that. I wrote two papers and my PhD thesis discussing the implementation and comparison of the two microphysics schemes.
- **1. Skills acquired on the use of R statistical software were very used in and assisted me in completing my PhD course in time.** The course had stalled due to unavailability of appropriate software. 2. ...direct impact ... our current research ... by individual presenters: William Bua, A.K. Githeko, Arlene Laing, **Peter J. Lamb:- Provided inspiration for Africa to look for solutions by understanding the continent's climatic circumstances. Posed the question “Do you believe in rainfall ?”**, Fredrick Semazzi, Wassila Thiaw, Kerry Cook, Christine Wiedinmyer

# How has knowledge and skills gained from colloquium assisted you or your organization in fulfilling your goals?

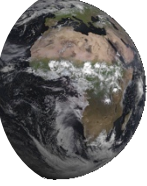


- ... opened up my research to dive deeper into looking at **understanding the physical characteristics of drought**. Prior to it I'd hoped to assess drought purely by vegetation conditions but I broadened it to look in to meteorological droughts.
- ...most useful ... was being **able to talk and bounce ideas off of graduate students doing similar work**.
- ...most important thing ... was to **increase my awareness on the importance of the work that has been done on African climate/ Weather** and overall the remaining issues. **That pushes me as an African to work hard.**



# How has knowledge and skills gained from colloquium assisted you or your organization in fulfilling your goals?

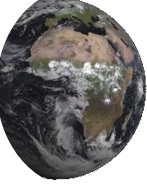
- ... **training gained during the colloquium developed my research capacity and also some of my PhD analyses.** The skills learnt have also been **cascaded to the students whose research I supervise.**
- ... **training given on Climate science, e.g., Model verification, Ensemble forecast and the introductory skill of GIS** help me to perform different activities



# How has knowledge and skills gained from colloquium assisted you or your organization in fulfilling your goals?

- What I learned at the colloquium has **shaped my current research interests in vegetation in areas that are vulnerable to climate change**
- ... **able to monitor the data bank in order to ensure good input of Nigeria data and also fill in the gap of observation network** to some extent ...

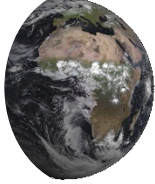




# Collaboration with colloquium participants

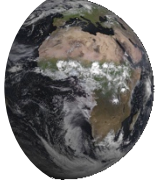
- Continued to collaborate with Dr. Mary-Jane Bopape in various areas of Meteorology including co-supervision of research for Masters Students at the University of Venda.
- Co-supervising Masters student with Hector Chikoore. We are also planning to write a paper together in 2016 when I go back to South Africa.
- With : 1. Catherine Nakalembe - A planned workshop in China on drought mitigation. 2. Dr. Gizau- An invitation to participate in a conference in Addis Ababa.

# Success stories possible because of experience at the colloquium



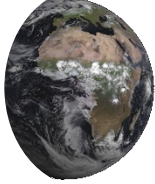
- My PhD thesis ... on the impact of the MJO on West African monsoon system. Before my participation to that colloquium I had never heard about that phenomenon and it has affected later my research interests.
- We obtained appropriate data and software. ... The training received at NCAR enabled me complete my PhD research in November 2014. ... We are developing a model for estimating mean monthly rainfall for the period up to 2020 which can be used for planning
- Through my poster presentation at the colloquium, I was able to **develop a research theme for my students, out of which they participated in an international conference**, based on their research findings.
- The colloquium assisted me in **reaching out to the other participants when in need of any inquiry internationally.**

# Success stories possible because of experience at the colloquium



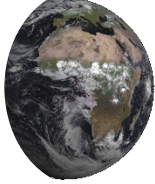
- The fact that I can advise the Commissioner [Uganda] is definitely a big, big success.
- The colloquium did lead indirectly toward being a visiting graduate student at NCAR. The work done as a visiting graduate student became a major part of my PhD thesis.
- Stronger links with Hector Chikoore. More awareness on satellite/radar products available at the South African Weather Service from Estelle de Coning's presentation. ... we will collaborate more from 2016.
- My research interests are well aligned with the UMD Department of Geographical Sciences, so I consider coming to this department a successful move for my career. A move which was due, in part, to connections I made at the colloquium.

# What inspires you to pursue your type of work/academic track?



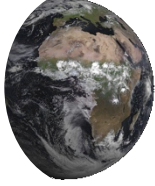
- **Dr. Lamb's talk have inspired me a lot** on directing my focus on the study of West African monsoon variability and the mechanisms which are involved.
- Current research was **inspired by the observation that the gains so far achieved through research in support of agriculture in our country had been severely reduced by the changing climatic patterns making climate science higher up in the order of prerequisites for agricultural production.** Our country's economy is supported mainly be agriculture.
- **Demystifying Meteorology** - making more African students take up what was once regarded as a difficult field of science

# What inspires you to pursue your type of work/academic track?



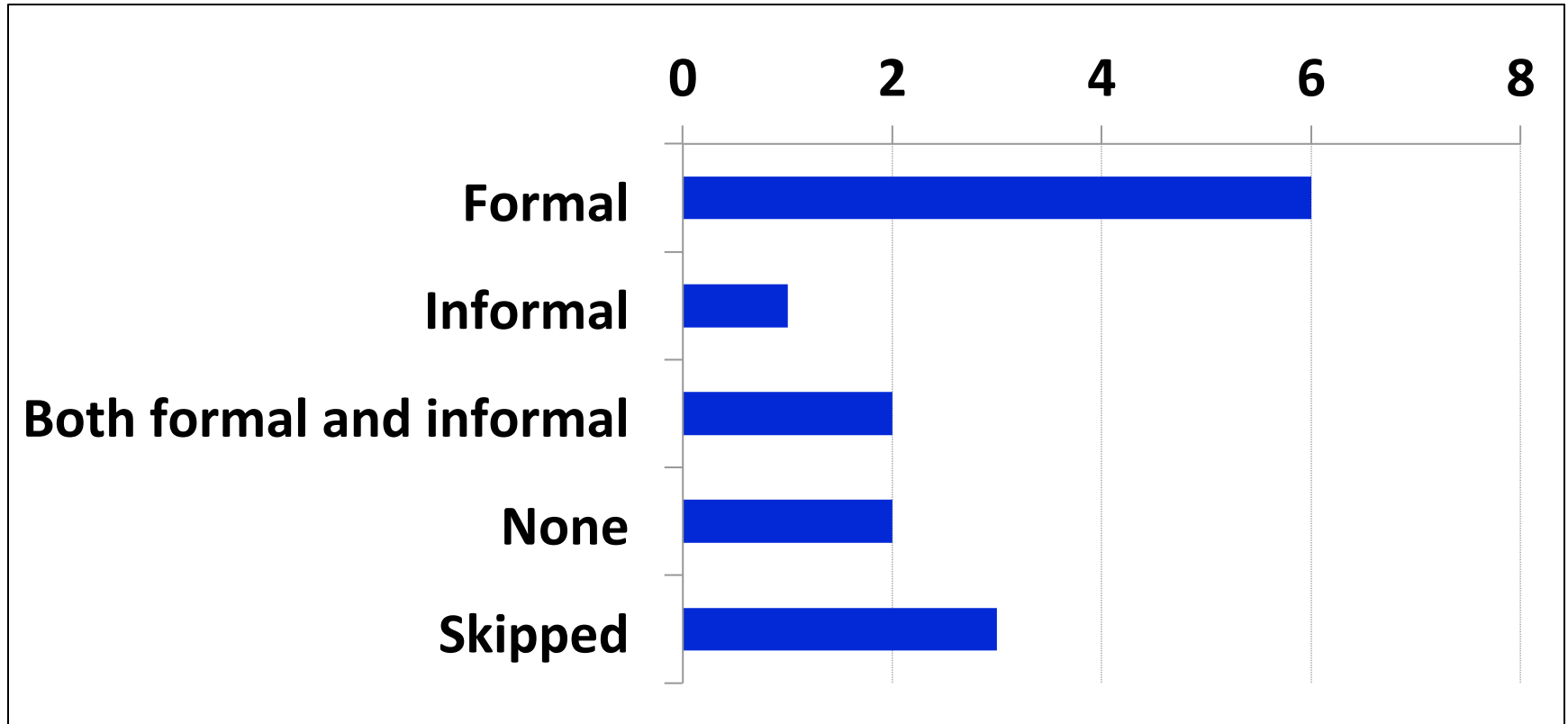
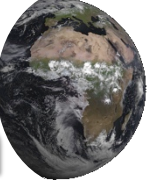
- **Making a contribution to the development of my country. Getting the right and very high quality Information decision maker in time. ...** Reports of death every year due to the lack of information and access to it...
- I think as an African that scientific knowledge is not an "immediate" truth. Yet, as a scientist I really believe that we cannot use another way than science to solve our problems. So, in my daily work, I am **guided by the seek of knowledge, real knowledge that can definitely chase all doubts in our mind and convince Africans that science is our way to come over our problems.** This is really critical, especially for weather and climate sciences where uncertainties are quite a lot.
- I like solving problems and I also like the fact **that my work helps people, even if only indirectly.**

# What inspires you to pursue your type of work/academic track?

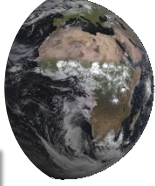


- When I started getting interested in atmospheric modelling, I realised that **people in my home country were generally using models as black boxes**. We only worried about the input data, the compilers required and then getting output data without a real understanding of how models work. **I am working on model development now because I think as Africans we need to have a better understanding of how numerical models work.**
- I am **inspired to understand how the vegetation that supports human activity (either food or natural resources) could be impacted by changing climatic conditions**, and by extension to understand how to allocate resources and alter human behavior to protect life on the planet

# Involvement in activities that benefit Africa



# Ways your work is helping with scientific advancement/capacity building/other societal benefit in Africa

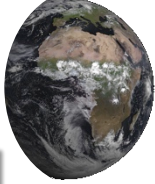


## South Africa

- I am coming to the end of my Postdoc in the UK where I work ... to develop boundary layer schemes.... I will return to South Africa in February to rejoin the Council for Scientific and Industrial Research and lead efforts to improve cloud and boundary layer schemes in a model that is being developed in South Africa, with Australian and Japanese collaborators. I will also continue to work on climate change research and impacts over Africa, and start being an active advisor for students.



# Ways your work is helping with scientific advancement/capacity building/other societal benefit in Africa



## South Africa

- I work with university students, building capacity through teaching and research.

I also work with communities doing research with communities targeting those questions that matter most to users of weather and climate information.

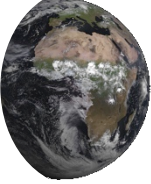
# Ways your work is helping with scientific advancement/capacity building/other societal benefit in Africa



## Uganda and Tanzania

- Working with the Office of the Prime Minister in Uganda and the Ministry of Agriculture of Tanzania Department of Food Security. Developing methods for real time crop conditions monitoring and drought monitoring. I do trainings on data collection, packaging and reporting. I advise and implement programs for monitoring.

# Aims to fulfill her colloquium group's goal



## Improving Observations: A challenge facing weather and climate research over Africa

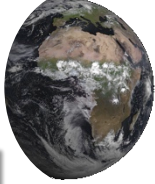
**Dec 2015**

- “... met with the Data manager in the Uganda meteorological department ... spoke to him about the lack of climate stations in my study area ... **we've decided to work on a proposal ... to develop a government run, and managed network in my study area.** ... I believe, for sustenance and quality, **capacity has to be transferred to the local institution which I believe was one of the core goals of the colloquium.**”

**Jan 2016**

- **Arlene put her in contact with UCAR scientists prototyping affordable 3D-printed weather stations for Africa**

# Ways your work is helping with scientific advancement/capacity building/other societal benefit in Africa



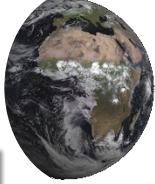
## East Africa - Lake Victoria Region

- Working with the GEWEX HyVic RHP & FCFA HyCRISTAL project to study variability of rainfall and wind in Eastern Africa and how that effects wind & hydroelectric power generation

## Kenya

- By getting involved in developing software such as current SMS12.12 to be used locally to respond challenges in climate variability, we hope to build local capacity and accumulate enough climate knowledge base for the future

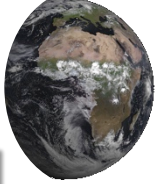
# Ways your work is helping with scientific advancement/capacity building/other societal benefit in Africa



## West Africa

- My research work will have a clear impact over West Africa by providing .... a better understanding of the relationship between MJO and moisture associated to the WAM at intraseasonal timescale. ... it will give also a potential use of the MJO events to predict moisture flux anomalies associated to the WAM however pointing to a potential benefits skilful extended range forecast in advance of regional-scale rainfall spells over West Africa. This potential prediction are of vital importance for water resources and agriculture, which is mainly rain-fed and, therefore, highly dependent on rainfall.

# Ways your work is helping with scientific advancement/capacity building/other societal benefit in Africa

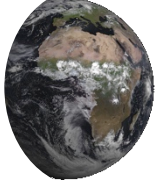


## Sahel

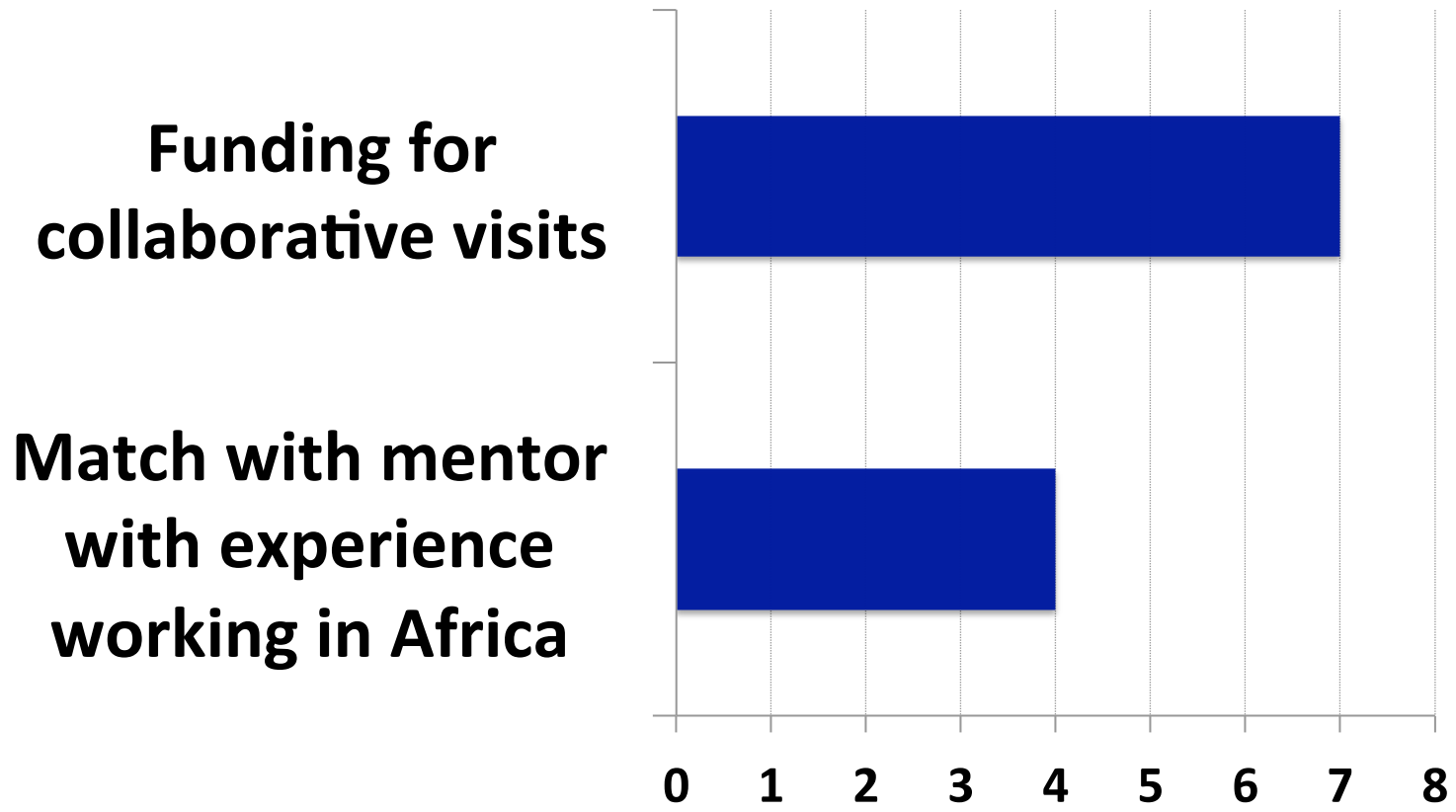
- My postdoctoral project is held in a framework of climate change adaptation and mitigation project over the Sahel. We work with health and agricultural scientists to develop climate regional information for Sahelian communities.

## Ghana

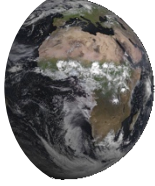
- Train undergraduate and graduate students in the field of Climate Science. The students' research focus on regional climate variability of African continent.



# What support would you find helpful to make your work more relevant to scientific and social development in Africa?



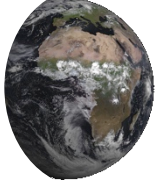
# What support would you find helpful to make your work more relevant to scientific and social development in Africa?



- I would like to begin organize trainings and invite international experts on agriculture monitoring, meteorology, and remote sensing....
- More meetings ... between climate scientists and users of climate information ... in order for climate scientists to better understand how climate information is currently used, what information is needed for social development, and how much uncertainty is acceptable for those making the decisions....
- I would like to be able to visit more often African Weather or Climate and Universities to share my research, spend some time with students or personal to understand their concerns and help as much as possible. Truly, young talents cannot grow without proximity with junior/senior scientist and this is lacking....

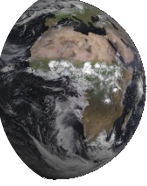


# Research activity/publications/products related to Africa



## 11 responses

- 31 Journal Articles
  - 5 respondents had 4 to 5 articles
- 8 Ph.D. Dissertations
- 1 Masters thesis
- 15 conference presentations
- 2 weather model development projects
- 1 statistical climate model development project
- Several applied climate projects



# Summary

- The colloquium has been important to the participants' career development and academic life and created new collaborations
- Responsible for specific success stories
- Participants are fulfilling some of their goals expressed in the colloquium
- The words and work of Peter Lamb has continued to influence them to “Help Africa to help itself”

# Organizing Committee

## 2011 NCAR ISP Colloquium on African Weather and Climate: Unique Challenges and Application of New Knowledge



**Chris  
Thorncroft**



**Raj  
Pandya**



**Fred  
Semazzi**

**Chidong  
Zhang**

**Kerry Cook  
(University  
Co-chair)**

**Wassila  
Thiaw**

**Arlene  
Laing (UCAR  
Co-chair)**

**Pete Lamb**

Left – right: Chris Thorncroft, Fred Semazzi, Chidong Zhang, Kerry Cook (University Co-chair), Wassila Thiaw, Arlene Laing (UCAR Co-chair), Peter Lamb, Raj Pandya

# Thanks to Sponsors and Local Organizers

NCAR | National Center for  
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<https://www2.ucar.edu/atmosnews/in-brief/5280/ncar-colloquium-looks-african-weather-and-climate>