AMMA Working Group 1: West African Monsoon and Global Climate

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19 August 2005

The two-way interactions between the West African Monsoon (WAM) and the rest of the globe are important for determining the variability of the WAM and its global impacts. The aim if this working group is to better understand and predict the multi-scale variability of the aspects of global climate linked to the WAM. This WG will be particularly concerned with addressing the sciences issues raised at the global scale (***see Section 3.2.1 of ISP***) including *Variability and Predictability of the WAM* and *Impacts of the WAM on global climate*.

General Objective : Towards evaluating and improving climate predictions and impacts related to the WAM.

General Strategy :

- To bring the existing structure of the AMMA research project to the international community, and integrate researches developed in Europe, Africa and US at least, to build an international coordination ;
- To entrain not yet involved scientists in AMMA issues where man power is lacking to benefit from international coordination ;
- Do not try to cover all the topics of this very wide-open working group activity field, but focus of some identified weaknesses in the on-going activities of AMMA ;
- To coordinate with VACS activities.

Proposed Gaps and Opportunities :

A lot of scientific activities are presently happening in AMMA at national and continental levels. The question is how WG1 can build on this and improve it. So we propose to address some weakly supported issues in AMMA and to analyze each of them by taking into account the multi-scale variability and scale interactions. These issues are presented with a decreasing priority. Depending on how the WG1 will function, we will focus on the most priority issues or address also the other issues.

<u>Modeling activities :</u>

- Need more work on modeling activities at different scales and especially at mesoscale with regional models to improve model processes
- This activity is not well developed in VACS whereas this is a CLIVAR objective
- Evaluation of AGCM at different scales; to ensure that AMMA observations will be used to help us understand the problems with models and contribute to improve them
- Evaluation of existing simulations with ocean-atmosphere coupled models; problem of the systematic warm bias in the eastern tropical Atlantic
- Identify modeling activities in groups like C20C-WGSIP and ENSEMBLES, and contact them for any collaboration around WAM

<u>WAM-aerosols interactions :</u>

- The role of the aerosols inWAM climate as well as the impact of WAM on the aerosols transport (over the Atlantic and Mediterranea) are very important but presently not well-known.

- Identify scientists in this field not yet involved in AMMA and entrain them into WAM activities

Intra-seasonal-to-decadal WAM predictability :

- On the other hand, WAM is embedded in modes of variability which are common to the whole Tropics : modes in intra-seasonal variability more or less controlled by convectively-coupled equatorial waves, modes in interannual variability like El Niño, modes in decadal variability linked to the Indian Ocean, links between the Indian monsoon activity and WAM,…Work on WAM predictability must be encouraged, and in particular, we must consider that a part of WAM convective activity may be predicted by activity (or may predict activity) in other monsoon areas. Discussion with WG4 must be developed in relation to intra-seasonal variability especially and variability of weather systems. Contact with CLIVAR-WGSIP and ENSEMBLES has to be made in order to get model outputs from them (DEMETER type seasonal predictions and Global Change scenarios), and entrain them to consider the WAM area.

Central and East Africa :

- WAM is in fact more focused on the Western part of sub-Saharan Africa. Central part of Africa belongs to AMMA but it is not so well-investigated, whereas convection developing there can impact rainfall amounts in West Africa. Also, eastern Africa is not considered in AMMA but in connection with the western part. Moreover climate in these areas are less known that over West Africa. Efforts must be put on promoting researches on this area. Coordination with VACS activities must be discussed.

Global Change :

- In parallel to the evaluation of coupled models, put more efforts on the analysis of regional scenarios of climate change over West and Central Africa; this issue is not so well developed in CLIVAR, and the systematic bias of the coupled models need to use specific strategies. To focus also on the issue of the climate change detection with African historical data sets.

WAM and the other monsoon systems :

- On one hand, WAM possesses some characteristics that can be found in other monsoon systems, like the 15-day and “MJO” modes or the occurrence of some abrupt shifts in the northward excursion of the ITCZ that also exist in the Asian monsoon system par instance. Exchanges of expertise on the related physical mechanisms between scientists involved in the different monsoon fields could be fruitful. WG1 could push such monsoon inter-comparison activities (see the example of the 1st Pan-WCRP Workshop on the Monsoon Climate Systems organized by CLIVAR and GEWEX).

Proposed activities :

By its activities, AMMA is contributing to VACS. WG1 will keep VACS informed of its actions and progress. Then, WG1 activities, which are relevant to climate variability and predictability, will be communicated through VACS to CLIVAR and up to WCRP. VACS individual members who wish to contribute to WG1 will be invited to join this working group. WG1 proposes for the next 12 months :

- To begin coordinating activities described above ;

- To organize plenary, parallel and poster sessions of Dakar Conference in November 2005 ;
- To promote AMMA sessions or workshops dedicated to the specific issues identified above at an international level to entrain new people in AMMA : AMS meeting on air-sea interactions in January 2006 (?), AMS Hurricane and Tropical Meteorology in April 2006, EGU Conference in April 2006 ;
- To keep contact with the organizers of the Pan-WCRP workshops on monsoon climate systems (the first meeting held in June 2005). These workshops aim to promote closer interactions between GEWEX and CLIVAR by integrating the current understanding of the fundamental physical processes governing monsoon variability. In the near term (~ 1 year), a meeting is planned on the improvement of the diurnal cycle of precipitation in global models ;
- Dr Bill Lau and Yongkang Xue intend to organize a project under CEOP to conduct a study on "General Circulation Modeling for Monsoon Systems" with the African monsoon as an initial target. WG1 will contact them quickly to see how to participate.
- To promote proposals including African scientists (START, IRD supports for young African teams and individual African scientists,…).

Proposed membership :
WG1 need a core of 5-6 people to push the agenda and a wider group of around 15 key people. Its composition has to be discussed in the ISSC meeting in Paris. Here is a preliminary proposition :

- The 3 PIs of WG1 representing, Africa, Europe and US
- Link with VACS (A. Giannini ?, K. Cook ?)
- Link with CLIVAR-Atlantic (Sutton, Terray ?)
- Link with CLIVAR WGSIP (T. Stockdale ?)
- Link with WG4 (A. Kamga – ACMAD - ?)
- Somebody from Central Africa (F. Kamga – Cameroon - ?)
- Somebody from the aerosols community (Prospero ?)
- Somebody from the modeling community, especially RCM (Cook, Druyan, Giorgi ?)