

## Report to CLIVAR SSG-19

### Panel or Working Group: Asian-Australian Monsoon Panel (AAMP)

#### 1. Contributions to developing CLIVAR science and fit, where appropriate, to the CLIVAR imperatives

- a) The Asian-Australian Monsoon Panel has established an ad hoc Monsoon Metrics Team (In-sik Kang, Akio Kitoh, Ken Sperber, Andy Turner, Bin Wang, and Tianjun Zhou, with contributions from monsoon experts H. Annamalai and A. Moise) to promote the systematic evaluation of climate models. The goal is to (1) ascertain the fidelity with which the mean monsoon and its' variability is represented, (2) understand sources of model bias that affect the simulation of the monsoon, and (3) investigate the robustness of the impact of climate change on the monsoon. Two papers, one on the boreal summer Asian Monsoon, and the other on the Austral Winter monsoon, are being drafted for journal submission by the IPCC AR5 deadline. These works will intercompare the CMIP5 and CMIP3 models to evaluate the AAM in terms of (1) the mean state, (2) the interannual variability of the East Asian monsoon (a) the ENSO-monsoon teleconnection and (b) the East Asian Monsoon, (3) the timing of climatological monsoon onset, peak and decay, and the duration of the monsoon, and (4) the fidelity of the simulation of monsoon intraseasonal variability. (Imperative I)
- b) AAMP has sponsored the monsoon intraseasonal variability prediction intercomparison and has contributed to the development and continuing analysis of the numerical hindcast and forecast experiments of intraseasonal variability.
- c) The AAMP supports and contributes to the development of metrics and diagnostics of the MJO and monsoon intraseasonal variability (especially targeting the northward and eastward ISO propagation during the boreal summer monsoon) through interactions with the WWRP-THORPEX/WCRP Year of Tropical Convection MJO Task Force. (Imperative III)

#### 2. Briefly list any specific areas of your panel's activities that you think would contribute to the WCRP Grand Challenges as identified by the JSC at its most recent meeting<sup>1</sup>

- a) Evaluation of decadal prediction and predictability of the AAM is seen as a new effort by AAMP. This is being facilitated by a September 2012 workshop "International Workshop on Interdecadal Variability of Global Monsoons" that AAMP is sponsoring in Nanjing, just prior to AAMP-12. AAMP has obtained \$15K from NSF to support the participation of early career scientists at this workshop.

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1. Provision of skillful future climate information on regional scales (includes decadal and polar predictability)
2. Regional sea-level rise
3. Cryosphere response to climate change (including ice sheets, water resources, permafrost and carbon)
4. Improved understanding of the interactions of clouds, aerosols, precipitation, and radiation and their contributions to climate sensitivity
5. Past and future changes in water availability (with connections to water security and hydrological cycle)
6. Science underpinning the prediction and attribution of extreme events

- b) The evaluation of monsoon intraseasonal variability and predictability in present-day and climate change simulations in CMIP5 and operational forecast models may yield insight into potential changes to the frequency and intensity of active and break cycles that are associated with short-term extremes of regional drought and flood and provide insight into model shortcomings that are acting to limit monsoon intraseasonal predictions.

**3. Key science questions that you anticipate your community would want to tackle in the next 5-10 years within the context of a more ocean-atmosphere orientated CLIVAR (1-3 suggestions)**

**Comment: Why the emphasis on ocean-atmosphere when the “new” CLIVAR is trying to move away from the artificial barriers of the past?**

- a) An improved understanding of the role of the Indian Ocean in modulating and limiting predictability of the Asian-Australian monsoon on subseasonal to interdecadal time scales
- b) An improved understanding of the role of land surface processes in modulating and providing predictability of the Asian-Australian monsoon on subseasonal to interannual time scales (see item 6c, below)
- c) A comprehensive understanding, model treatment and evaluation of the role of aerosols for monsoon variability and change.
- d) Understanding the role of the oceans for driving monsoon decadal variability especially related to ENSO and its teleconnection to the monsoon

**4. Cooperation with other WCRP projects, outside bodies (e.g., IGBP) and links to applications**

- a) AAMP supported the CINDY2011/DYNAMO observational campaign through the procurement of high-resolution forecasts and analyses from available forecast centers. AAMP and YOTC are also promoting coordinated numerical experimentation for CINDY-DYNAMO, making use of the full range of modeling abilities (AGCMs, OGCMs, CGCMs, tropical channel, coupled regional mesoscale, regional, cloud resolving, SCM, ocean mixed layer models).
- b) AAMP is iterating with K. Takano (Coordinator, RAII Sub Group on Climate Application and Services of the Working Group on Climate Services, Adaptation and Agrometeorology [RAII WGCAA-CAS]) and G. Flato (WGNE/WGSIP) on how to improve climate services, especially as they relate to Regional Climate Outlook Products. The primary issue to be addressed is the development of a more systematic approach to making and verifying the seasonal forecasts made through the RCOFs. We recommend (1) that established protocols for making and verifying forecasts should be followed (e.g., Kirtman and Pirani, 2009, BAMS) (2) that training and development should be promoted through the WWRP/WGNE, and (3) that formal sessions on verification should be convened at key meetings, such as an upcoming verification workshop to be held in Melbourne, and the 2013 Fifth International Workshop on Monsoons (IWM-V).
- c) Interactions with the WWRP Monsoon Panel are fostered through the Expert

Panel on Climate Impact on Monsoon Weather by B. Wang (co-chair) and H. Hendon and I.-S. Kang (members). B. Wang was one of the editors of the book entitled "The Global Monsoon System: Research and Forecast" which contains the proceedings of the Fourth WMO International Workshop on Monsoons that was held in Beijing, China in 2008. As in 2008, AAMP will contribute to setting the agenda for the IWM-V workshop (see item 4b, above).

- d) AAMP representatives K. Sperber and A. Turner met with representatives of PAGES to discuss differences in approaches toward developing research foci, and discussion of potential common interests. AAMP have sought to engage the PAGES community in the International Workshop on Interdecadal Variability of the Monsoon as mentioned in item 2a above. On intraseasonal time scales, Kim Cobb discussed PAGES work that was indicative of MJO/ISO activity from speleothem observations. Additionally, to foster future interaction it is suggested that she and/or another PAGES representative with monsoon interests be invited to AAMP-12 to give a presentation on prospective PAGES/CLIVAR interactions.
- e) K. Sperber (and until recently H. Hendon) serves as a member of the WWRP-THORPEX/WCRP Year of Tropical Convection MJO Task Force. Contributions have been made in (1) the development of metrics for assessing MJO skill in models, (2) the development of process-oriented MJO diagnostics, (3) improving the method of making forecasts of boreal summer intraseasonal variability, and (4) establishment of a case study diabatic heating experiment to evaluate convective processes and the MJO in climate and NWP models.
- f) A. Kitoh and T. Zhou are lead authors, and B. Wang is a contributing author of Chapter 14 of the IPCC AR5. K. Sperber is a contributing author to Chapter 9 of the IPCC AR5.

## **5. Workshops/meetings held**

- a) During the WCRP OSC available members of the AAMP met to discuss (1) progress on the diagnostic analysis of the CMIP3 and CMIP5 simulations, and (2) the scope and logistics of our impending workshop entitled "International Workshop on Interdecadal Variability of Global Monsoons."
- b) Progress on the development of the AAM diagnostics and metrics (see item 1) has been reported in numerous invited and contributed presentations, including the 4<sup>th</sup> and 5<sup>th</sup> International Workshops on Global Climate Change Projection, the 2011 IUGG Conference, the WCRP Open Science Conference the 2011 Fall AGU Meeting, and the CMIP5 Workshop.

## **6. New activities being planned, including timeline**

- a) The CLIVAR Asian-Australian Monsoon Panel seeks to promote/implement during 2012/2013 the:
  - Application of standard diagnostics and metrics for evaluation/validation to CMIP5 and CMIP3 numerical experiments for the Asian and Australian components of the monsoon (separate papers)
  - Analysis of the ENSO monsoon teleconnection and its interdecadal variability, including the possible impact of anthropogenic climate change on this relationship

- Finalizing analysis of MJO/MISO hindcast experiments and release of the hindcast archive to the public
  - Assessment of MJO real-time forecast skill (in conjunction with YOTC MJOTF)
  - Promote a better understanding to the role that land surface processes play in monsoon variability. This may be fostered through a joint meeting of AAMP and AMY in Nanjing, China in September 2012.
- b) The CLIVAR Asian-Australian Monsoon Panel and the YOTC MJO Task Force seek to promote/implement during 2012/2013 the:
- Development of process oriented diagnostics for improved understanding of MJO/MISO processes
  - Ongoing evaluation of real-time MJO forecasts, including impacts (tropical cyclones and higher latitude effects)
  - Development of diagnostics and metrics for boreal summer MISO, including forecast approaches that best capture the northward propagating component of the MISO
  - In combination with YOTC, GEWEX GASS, AAMP, and the MJOTF, complete numerical case-study simulations and begin analysis of MJO Diabatic Heating experiment
- c) During 2012-2014 the CLIVAR Asian-Australian Monsoon Panel and AMY may propose a) a coordinated analysis of future change of AAM using CMIP5 outputs, and b) improved understanding of the role of land surface processes in modulating monsoon variability (see item 7b, below)
- d) Improved coordination/cooperation of AAMP with WWRP Monsoon Panel (items 4b and 4c, above) may be achieved if cross-membership (at least one person) between AAMP and the WWRP Monsoon Panel Executive Committee was established.

## **7. Workshops / meetings planned**

- a) International Workshop on Interdecadal Variability of the Global Monsoons will be held in Nanjing, China on 10-12 September 2012 (organized by AAMP), just prior to AAMP-12. AAMP has obtained \$15K from NSF to support the participation of early career scientists at this workshop. Similar funding is also being sought from Indian and Chinese agencies for funding their own early career scientists.
- b) AAMP-12 will be held in Nanjing, China on 12-14 September 2012. We may meet with AMY representatives to discuss cooperative research on the role of land surface processes in modulating the monsoon.
- c) AAMP should be involved in the planning of the WMO Fifth International Workshop on Monsoons to be held in 2013 since H. Hendon, I.-S. Kang, and B. Wang are members of the "Expert Team on Climate Impacts on Monsoon Weather" of the WWRP Monsoon Panel (see item 6d for the suggestion of further improving AAMP/WWRP Monsoon Panel interactions through cross-membership).

## **8. Issues for the SSG**

- a) Improvement in meeting coordination is needed. In advance of calendaring meetings/workshops/conferences, the SSG should circulate the list of proposed meetings/workshops/conferences soon after the panels make their pro forma requests. This would facilitate the possibility of combining similarly themed

meetings and thus strengthen cross-connections within the program. As an example of a missed opportunity, only after the logistics for the AAMP sponsored “International Workshop on Interdecadal Variability of the Global Monsoons” were confirmed, did we find out about the “CLIVAR/WCRP Workshop on Decadal and Multi-decadal Variability in the Pacific and Indian Oceans.” Furthermore, these workshops are being held in successive weeks in September 2012, which is perhaps causing colleagues to choose between one or the other workshop, and minimizing attendance and interaction at each.

## Annex A

### Proforma for CLIVAR Panel and Working Group requests for SSG approval for meetings

Requests should be made through D/ICPO ([Catherine.beswick@noc.ac.uk](mailto:Catherine.beswick@noc.ac.uk)), against the following headings:

1. **Panel or Working Group:** CLIVAR Asian-Australian Monsoon Panel
2. **Title of meeting or workshop:** 13th Session of the AAMP immediately after the Fifth International Workshop on Monsoons (IWM-V).
3. **Proposed venue:** TBD
4. **Proposed dates:** ~October 2013
5. **Proposed attendees, including likely number:** AAMP panel members and invited experts participating in the Fifth International Workshop on Monsoons (IWM-V). Panel members: ~10-12 people, and special guests: 6-8.
6. **Rationale, motivation and justification, including: relevance to CLIVAR themes & JSC cross cutting topics and any cross-panel/working group links and interactions involved:**
7. **Specific objectives and key agenda items:** (1) Review the status of the actions and recommendations approved at AAMP-12, (2) Assess the results of the Fifth International Workshop on Monsoons (IWM-V) and propose actions accordingly, (3) Assess the interaction of AAMP with other CLIVAR/WCRP panels and WGs, the WWRP Monsoon Panel and AMY, including other field program developments for the region, and progress in RCOF forecast synthesis and verification
8. **Anticipated outcomes (deliverables):** Ensure cross-panel and cross-programmatic interactions continue to make progress as related to (1) analysis of monsoon climate change in CMIP5, (2) role of land-surface interactions in monsoon variability, (3) adoption of improved forecast and verification techniques by the RCOFs, (4) understanding processes/forecasting/hindcasting of monsoon intraseasonal variability, and (5) the usefulness (including potential applications) of further investigation of decadal/interdecadal predictability of monsoon variability
9. **Format:** Targeted presentations and discussion sessions

10. **Science Organising Committee (if relevant):** AAMP co-chairs and representatives of other monsoon panels (e.g., WWRP Monsoon Panel)
  
11. **Local Organising Committee (if relevant):** TBD depending on host/location of meeting
  
12. **Proposed funding sources and anticipated funding requested from WCRP:** US CLIVAR, NSF, and an estimated amount of USD10K from WCRP