WCRP REPORT
World Climate Research Programme

Project Report

Report of the 10th Session of the Asian-Australian Monsoon Panel

Busan, Republic of Korea
18-19 June 2010

May 2011

ICPO Published Series No. 158
WCRP Informal Report No: 14/2011

CLIVAR is a component of the World Climate Research Programme (WCRP). WCRP is sponsored by the World Meterorological Organisation, the International Council for Science and the Intergovernmental Oceanographic Commission of UNESCO. The scientific planning and development of CLIVAR is under the guidance of the JSC Scientific Steering Group for CLIVAR assisted by the CLIVAR International Project Office. The Joint Scientific Committee (JSC) is the main body of WMO-ICSU-IOC formulating overall WCRP scientific concepts.

Bibliographic Citation
INTERNATIONAL CLIVAR PROJECT OFFICE, 2007:
Asian Australian Monsoon Panel. International CLIVAR
Publication Series No. (not peer reviewed).

Table of contents

1 Executive Summary

The 10th Session of the CLIVAR's Asian-Australian Monsoon Panel (AMMP10) was held at the APEC (Asia-Pacific Economic Cooperation) Climate Center, Busan, and Republic of Korea from 15-19 June 2010. AAMP10 was held jointly with the First meeting of the YOTC Task Force on the Madden Julian Oscillation and the AAMP/MJOTF Workshop on Modelling Monsoon Intraseasonal Variability.

The CLIVAR AAMP and the YOTC MJO Task Force have held the Modelling Workshop with a focus on modelling and predicting monsoon intraseasonal variability (ISV) and the MJO. This cross-cutting activity provided a framework for assessing predictability of the MJO and other monsoon ISV from hindcast experiments, assessing skill of real-time forecasts for monsoon ISV, and reported on recent advancements and highlighted ongoing shortcomings in the simulation of monsoon ISV and the MJO, including results from simple models, global climate models and high resolution global models.

The design of diagnostics, especially focusing on convective processes was discussed so as to provide necessary insight into model representation of physical processes, thereby providing pathways for model improvement. Attendance at the workshop was roughly 66, which included 15 graduate and early career researchers.

2 Actions arising from Joint MJO TF/AAMP Workshop 2010

1. Prepare Intraseasonal Modelling Workshop summary, including recommendations (K. Sperber, H. Hendon, D. Waliser, M. Wheeler); then circulate

3. Actions arising from Joint MJOTF/AAMP and AAMP meeting 2010

ISV Hindcast Experiment

2. MJOTF (M. Wheeler) to interact with Monsoon ISV Prediction Experiment (B. Wang/Jun-Yi Lee) to develop systematic verification methods that are applicable to forecasts and hindcasts of the MJO. The verification and skill measures should assess performance using EOF based indices and the spatial representation of MJO forced response (e.g., anomaly correlation of spatial fields). They should be useful for evaluation of single and multi-model skill).

3. AAMP (H. Hendon and B. Wang) instigate discussions with MJOTF to consider additional "analyses" of Monsoon ISV hindcasts aimed at assessing "simulations", in addition to forecast skill.

4. M. Rajeevan to initiate a discussion with B. Wang/Jun-Yi Lee to investigate possibility of developing statistical-dynamical forecasts of Indian summer monsoon intraseasonal rainfall (dynamically predict MJO indices and then using composite rainfall patterns associated with those MJO indices to make probabilistic ISV rainfall predictions). Compare with direct rainfall forecasts from models.

5. AAMP recommends that MJOTF begin thinking about how to quantify multi-scale interactions of relevance to MJO/ISV; need objective methods (H.Hendon/K. Sperber to convey to MJOTF).

YOTC case studies (Joint with AAMP and AMY)

6. AAMP/AMY/YOTC to invite/endorse NICAM to run additional boreal winter cases. M. Wheeler/D. Waliser to correspond with M. Moncrief.

7. Facilitate model validation activity between YOTC and AMY (H. Hendon to correspond with B. Wang and Jun-Yi Lee). Need to address:
   - Clarify how simulations/predictions can be confronted with the AMY observations

- AMY needs to feed back to YOTC what are the unique data sets that can be used to evaluate processes in the monsoon
- A. Kitoh to communicate with M. Moncrief/YOTC about configuring high-res models for Indonesian region, where AMY has good/unique observations
- B. Wang/Jun-Yi Lee need to clarify what needs to be focused on from AMY perspective
- K. Sperber will convey to Ruby Leung that she is encouraged to extend her South Asian Regional Reanalysis (SARR) through the YOTC period (April 30, 2010), and ideally through the CINDY2011/DYNAMO observational period (October 1, 2011 – March 31, 2012). It is suggested that she interface with AMY to use their field data for assimilation in her regional reanalysis and for evaluation of regional model process studies over this region
- M. Wheeler to clarify relationship between TGGE MJO forecast with WGNE effort lead by Jon Gottschalck and MJOTF (in progress)

CINDY2011/DYNAMO

8. AAMP to support the CINDY-DYNAMO request for provision of high res forecasts and analyses from available forecast centres. H. Hendon will correspond with C. Zhang and Kunio Yoneyama.

9. AAMP/YOTC to promote coordinated numerical experimentation for CINDY-DYNAMO, perhaps drawing upon pre-existing YOTC protocol and/or ISV hindcast protocol, and making use of the full range of modelling abilities (AGCMs, OGCMs, CGCMs, tropical channel, coupled regional mesoscale, regional, cloud resolving, SCM, ocean mixed layer models). H. Hendon to coordinate discussion between YOTC/ CINDY-DYNAMO.

4 Action arising from AAMP meeting 2010

Regional Climate Modelling

10. Sperber to inform Ruby Leung (and F. Giorgi) of efforts in which regional climate modelling can make important contributions:
    - As noted under YOTC and CINDY2011/DYNAMO it is suggested that the South Asian Regional Reanalysis (SARR) be extended through the YOTC period (April 30, 2010), and ideally through the CINDY2011/DYNAMO observational period (October 1, 2011 – March 31, 2012)
    - It is suggested that RCM community interface with AMY to use their field data for assimilation in the regional reanalysis and for evaluation of regional model process studies over this region
    - Regional Climate Outlook Fora, held in April and November, are interested in regional downscaling of the respective summer season and winter season forecasts

Land Surface Interactions (Joint with AMY, and GLACE)

11. X. Zeng to contact the Global Land–Atmosphere Coupling Experiment (GLACE) to discuss possible monsoon seasonal land surface prediction project.

Monsoon Diagnostics for AR5 (Joint with AMY)

12. A task team has been established (A. Kitoh, A. Turner, B. Wang, In-sik Kang, K. Sperberg, and T. Zhou) to design a project to evaluate Asian-Australian monsoon in the CMIP5 models. AMY (through B. Wang and T. Zhou) endorsed participation in this effort at the Kun Ming, China Meeting in December 2009. The task team will consider:
    - The list of diagnostics that K. Sperberg presented (developed jointly with B. Wang and H. Hendon, and H. Annamalai), the global monsoon evaluation that B. Wang presented, and the monsoon indexes that A. Kitoh presented at AAMP10
    - Setting up a conference for the presentation of CMIP5/AR5 monsoon evaluations or in a session at the CLIVAR Open Science Meeting in October 2011, and establishment of special journal issue for publishing results in a timely manner to meet the deadline for inclusion in the AR5

The Asian Monsoon Years (AMY)

13. Foster interaction with other programs/projects
    - J. Matsumoto/A. Kitoh to contact M. Moncrieff/D. Waliser/YOTC about:
        - Availability of MRI/JMA reanalysis (Jan 2008-Dec 2009 reanalysis by JMA 60km 3-hourly) which should be ready end 2011
        - Availability of Harimaru and Indonesian radars, wind profilers, etc, useful for MJO passage. Data from 2007 onward needs to be made accessible to YOTC
    - Will AMY be a partner in the 2011 April AAMP/RCOF workshop?
    - AMY Open Science Conference could perhaps be held in conjunction with the monsoon conference proposed by B. Hoskins
    - AAMP should consider planning new Asian Monsoon program (2013-?), which includes Indian Ocean Panel's new effort to monitor monsoon onset in Bay of Bengal.

ITF Working Group

14. AAMP supports the establishment of the ITF Working Group, to be conveyed to Yukio Masumoto (IOP chair), suggesting that:
    - Dr. Jong-Seong Kug and Dr Jae-Hak Lee should be considered as members
    - G. Vecchi to communicate to IOP the need for modelling perspective and also to ensure that ISV to seasonal time scale is considered since the Indonesian region is highly relevant to monsoon ISV/seasonal variability
    - ITFWG should have a coordinated modelling activity that focuses on assessing impacts and mechanisms of ITF variability (encourage development of diagnostics to evaluate impact of ITF on ISV and seasonal cycle; eg ENSO teleconnection to IO (compare to altimeter data), but need others, which can help "tuning", sculpting of bathymetry

AAMP

15. Prioritize our focus for next year and for AR5. Key items are:
    - Organize next AAMP meeting in conjunction with RCOF
        - C. Ereno to contact K. Takano to discuss the possibility of holding meeting jointly with the Forum on Regional Climate Monitoring, Assessment and Prediction for Asia (FOCRAII) or the South Asia Climate Out-Look Forum (SASCOF).
        - M. Rajeevan and C. Ereno to pursue possibility of meeting with SASCOF.
        - B. Wang, In-sik Kang, and A. Turner to pursue organizing a workshop on Monsoon Decadal Variations, perhaps with PAGES.
        - H. Meinke to take lead on the aspect of the workshop that focuses on application/capacity building and instigate dialogue with Jim Hansen (IRI; CGIAR?) to communicate our desire to have stakeholder engagement/adaptation, etc. (or could be key focus of the workshop)
        - B. Wang to contact AMY to consider joint involvement in workshop
    - As noted above the monsoon diagnostics task force will develop diagnostics to support coordinated analysis of the CMIP5/AR5 models, including establishment of a conference and possibly dedicated journal issue(s) to present results in time for AR5

16. Consider new directions/emphasis for AAMP
    - ISV activities are well established; consider new efforts for decadal/millennium monsoon variability that will make strong contribution to AR5.

17. Miscellaneous
    - Have an AAMP member on scientific organizing committee of Hoskins proposed monsoon conference, C. Ereno to contact organizers (David Burridge).

5 Summary of the Sessions

5.1 Joint Session of the CLIVAR AAMP and the YOTC MJOTF

Intraseasonal Hindcast and Prediction

Hindcast Experiment for Intraseasonal Prediction (Bin Wang and June-Yi Lee)

Determination of intraseasonal variation (ISV) prediction skill and estimate ISV predictability in current AOGCMs is a pressing scientific need for developing 2-6 week subseasonal prediction. Forecast of MJO and MISV is one of the major concerns of APCC, YOTC, CLIVAR/AAMP and AMY (2007-2012). It is also a central theme for WCRP cross-cutting monsoon research.

Launching a coordinated ISV Hindcast Experiment (ISVHE) was recommended at the Nov 2007 CLIVAR MJO Workshop, endorsed and supported by APCC, CLIVAR/AAMP, and the SSC of AMY (2007-2011), and echoed by THORPEX. Such an experiment is an intrinsic need for development of a multi-model ensemble (MME) prediction and estimation of the level of predictability that can be ascribed to the MJO and boreal summer intraseasonal oscillation.

The objectives of ISVHE include (a) Better understand physical basis for intraseasonal prediction, (b)Estimate potential and practical predictability of ISV in a multi-model frame work, (c) Develop optimal strategies for MME ISV prediction system, including effective initialization schemes and quantification of the MME's ISV prediction skills with forecast metrics under operational conditions, (d) Identify model deficiencies in predicting ISV and suggest ways to improve models' convective and other physical parameterizations relevant to the ISV through development of model process diagnostics, (e)Revealing new physical mechanisms associated with ISV that cannot be obtained from analyses of a single model, and (f) Study ISV's modulation of extreme hydrological events (e.g., midlatitude weather, monsoon depressions, and tropical cyclones) and its contribution to seasonal and interannual climate variation.

The ISVHE includes a free simulation and hindcast experiment. The 20-year or longer free run (without impacts of initial conditions) will serve as a control experiment. There is no restriction as to the types of GCM. Although AOGCMs are preferable, AGCM alone is also acceptable – however SSTs CANNOT be specified from observations for the forecast periods. There is no uniform specification regarding model resolution, initialization procedures, and initial conditions. The hindcast experiment requires a set of retrospective ISV forecasts, which covers the last 21 years from 1989 to September 30th 2000 (cover the YOTC period). The minimum (standard) specifications of the hindcast are: (a) Prediction is initiated every 10 days on 1st, 11th, and 21st of each calendar month throughout the entire 20-year period; (b) Integration length for each forecast is 45 days (or up to 60 days); (c) The number of ensemble for each forecast is at least 5. Currently there are 19 models have registered for participation and 12 models have submitted the results.

Detailed information on the ISVHE are posted on the website (http://iprc.soest.hawaii.edu/~jylee/clipas/ISV.html). If you have any questions regarding the experiment design and data submission, please contact coordinator, Dr. June-Yi Lee (jylee@soest.hawaii.edu).

Modelling group presentations – INGV (A. Alessandri)

CMCC-INGV contributes to the CLIPAS ISO hindcast experiment with the latest development of its short term climate prediction system (Alessandri et al., 2010a). Preliminary analysis shows that the system is able to reproduce eastward propagating intraseasonal wind and precipitation anomalies in good agreement with observations. The system shows a considerable skill in predicting above normal (upper tercile) and below normal (lower tercile) MJO amplitude (PC1^2+PC2^2).

Realistic initialization of the atmospheric component of the prediction system is shown to significantly contribute to the predictability of early than normal Indian monsoon onsets. In three out of the 5 years with

the earliest monsoon onsets, northward propagating ISV modes appear to trigger onset. Phase initialization of these modes, in better accordance to observations, appears to advance monsoon onset predictability (Alessandri et al., 2010b).

*Alessandri A., A. Borrelli, S. Masina, A.F. Carril, P. Di Pietro, A.F. Carril, A. Cherchi, S. Gualdi and A. Navarra, 2010a: The INGV-CMCC Seasonal Prediction System: Improved Ocean Initial Conditions, Mon. Wea. Rev., **138 (7)**, 2930-2952 doi: 10.1175/2010MWR3178.1*

Alessandri A., et al., 2010b: Seasonal to intra-seasonal predictions using a dynamical seasonal forecasting systems. In preparation.

Progress with convective parameterization for Improved simulation of the MJO (In-sik_Kang)

The presentation covers several topics related to improvement of MJO simulation and prediction, which have been worked at SNU for last few years. The work started with modifications of Arakawa-Schubert convection scheme for better simulating MJO and leaded to development of a new convection scheme based on a bulk formula. The importance of cumulus momentum transport for the northward propagation of MJO during boreal summer is demonstrated with GCMs and its basic mechanism is explained with a simple dynamical framework. He also shows the performance of a high-resolution global model with a horizontal resolution of 25 km in simulating the MJO and tropical cyclone.

YOTC Case Study Modelling - NICAM (Nasuno)

The Japan Agency for Marine-Earth Science and Technology has been developing a global cloud-system resolving model (GCRM), NICAM (Satoh et al. 2008). Several series of hindcast experiments targeting MJO and monsoon ISV events have been performed (Miura et al. 2006, 2009; Oouchi et al. 2009; Taniguchi et al. 2010), using horizontal mesh sizes of 3.5 to 14 km. Recently, tropical cyclogenesis of Fengshen, which occurred after a weak ISV during the YOTC IOP, was simulated. The simulations were initialized using the ECMWF YOTC operational data retrieval on 00UTC 15 June, 2008. This talk summarizes our view on the ability of the GCRM in reproducing ISV, and proposes effective use of our simulation data in the community.

The GCRM simulation is useful to investigations of scale interactions, such as the relationship between the equatorial waves, diurnal variation of convection, tropical cyclogenesis and the Monsoon ISV. In the physical context, diabatic heating rate, cold pools, transport of heat, moisture, and momentum by convection which are explicitly calculated in the global domain are of relevance.

Joint analysis of GCRM simulation data and field observation measurements is a productive method to get insight into the targeted events. We have been in tight collaboration with observational teams in JAMSTEC. Typhoon Fengshen passed over the observational array of the field campaign (PALAU2008) in its genesis stage, and simulations of the next field campaign (CINDY2011/DYNAMO) are also planned.

On the Initiation of the Madden-Julian Oscillation (MJO) (Zhang and Ray)

A mesoscale tropical channel model is used to study the long-standing problem of the initiation of the Madden-Julian Oscillation (MJO). With initial and lateral boundary conditions provided by a global reanalysis, this model is able to reproduce the initiation and gross features of two observed MJO events up to two months after the start of simulations. This leads to a conjecture that these two MJO events are generated by the influences from the lateral boundaries. This conjecture is supported by a series of sensitivity tests that demonstrate that the simulated MJO initiation does not critically depend on detailed characteristics of sea surface temperature, initial conditions, the latitudinal location of the lateral boundaries, and even latent heating and moist processes. The only factor found critical to the reproduction of the MJO initiation is time varying lateral boundary conditions from the reanalysis. When such lateral boundary conditions are replaced

by time independent conditions, the model fails to reproduce the MJO initiation. These results support the idea that extratropical influences can be an efficient mechanism for MJO initiation. The diagnoses of the zonal momentum budget for the MJO initiation region reveal that the advection by meridional winds could be important prior to the initiation of the MJO. The time evolution of the wave activity identifies its source over the southern Indian Ocean where it grows by extracting kinetic energy from the mean flow.

These results lead to a hypothesis that multi-year simulations using a tropical channel model would reproduce reasonable MJO statistics under the influence of prescribed lateral boundary conditions derived from global reanalyses. Interestingly, the MJO statistics in such a multi-year simulation by a high-resolution tropical channel model are not better than those from global climate models. The error in the atmospheric mean state is found to be a possible reason for the poor MJO statistics in the simulation.

Observational Campaigns - CINDY2011 (Cooperative Indian Ocean experiment on ISV in the Year 2011)/DYNAMO Status and Modelling Plan (C. Zhang)

Dr. Chidong Zhang presented the goal of the Cooperative Indian Ocean experiment on intraseasonal variability in the Year 2011 / Dynamics of the Madden-Julian Oscillation, which essentially collect in-situ observations to advance our understanding of MJO initiation process and to improve MJO prediction and simulation. Key objectives of the experiment are to document and understand 1) the evolution of heating and moisture profiles associated with the MJO, 2) convective, meso-scale, and synoptic evolution through the life cycle of the MJO, and 3) air-sea interaction associated with the MJO.

Special remarks are the multi-national participation (Australia, India, Indonesia, Japan, Kenya, Maldives, France, Seychelles, UK, US), the observation-modeling synergy (forecast, simulation, reanalysis), and the endorsement from CLIVAR-SSG.

After showing the arrangements for the field campaign, the Sounding-Radar Network and the Air-Sea Interaction network, he brought some details of the DYNAMO/CINDY 2011 observation period, October 2011-February 2012. C. Zhang also mentioned some DYNAMO Modeling Activities (via DYNAMO Modeling Group), which include Global AGCMs, OGCMs, CGCMs, Tropical channel model (nested to cloud resolving resolution), Coupled regional meso-scale model, Regional cloud resolving modeling, and Single column atmospheric model and ocean mixing-layer model.

The challenges of the experiment are:

- model-observation synergy: applications of field observations to modeling activities
- more engagement of modeling centers
- entraining existing modeling activities

And he ended stressing the need international coordination on modeling activities

Observational Campaigns - DISGO (A. Matthews)

The impacts of the Madden-Julian Oscillation (MJO) extend well beyond the core region of the main tropical convective anomalies over the warm pool. The response to the latent heat release in these convective anomalies includes an equatorial wave response that transmits the MJO signal throughout the tropics. This dynamical signal can then induce convective anomalies, modulating remote monsoon systems such as that over West Africa during northern summer. The divergent outflow from the warm pool MJO heating also interacts with the subtropical jets to produce an extratropical Rossby wave response, that can then impact on the annular modes (e.g., SAM, NAO). Given the predictability of the tropical MJO, these global MJO impacts raise the prospect of enhanced predictability in selected regions worldwide. The MJO also has a global response on the

world oceans. Oceanic equatorial waves are forced by MJO tropical wind stress anomalies. These are instrumental in triggering El Nino under certain conditions, and also propagate into the deep oceans. Recent work has shown a role for an ocean dynamical feedback mechanism on the MJO itself. The extratropical atmospheric response to the MJO can also force a response in the ocean through surface wind stress anomalies. The dynamical ocean response is such that the extent of the MJO even reaches to the ocean floor around Antarctica.

5.2 CLIVAR AAMP 10th Session

CLIVAR/WCRP report (C. Ereno)

After an introduction on CLIVAR objectives and structure C. Ereno announced that as from 1st September 2010, Dr. Bob Molinari would join the ICPO as new Director replacing Dr. Howard Cattle. Then he made a quick review of the main outputs of the last CLIVAR SSG meetings, SSG16 Madrid, May 2009 and SSG17 Boulder, May 2010. In particular he referred to the need of building consensus on the overall imperatives for CLIVAR science and their implementation over the next 5 years, for feed into the overall WCRP Implementation Plan 2010-2015. Ereno reminded that each panel/WG had been asked to identify imperatives for the coming years to 2013/15 and, perhaps, continuing over the next decade. That is activities that "must" be continued and/or implemented because they are of the highest scientific importance and have high likelihood of success.

Then he referred to some of the outcomes factored in the WCRP Implementation Plan, in particular, the crosscutting topics (ACC, AC&C, decadal and seasonal prediction, sea level rise, monsoon and extremes) under WCRP. He made some comments on the JSC views on the future structure for WCRP and its Projects post 2015, and the overall SSG view that CLIVAR could adapt to a new structure with attention to issues like: Scope, Structure (including SSG), Partnerships (WCRP, Global Change Programs), Interfaces (Regions, Applications), and Deliverables (Data, Models, Information-Services). He also announced and gave some details of the next WCRP Open Science Conference, Denver, 24-28 Oct 2011, Climate Research in Service to Society.

Finally he summarized some assignments for the AAMP panel: the need to debate on the total WCRP effort on monsoons and continued need for overall coordination, the request for the panel to consider how it might contribute to the pan WCRP Conference, to explore the writing of synthesis papers as input to IPCC AR5 and to coordinate analysis of CMIP-5 runs, and the need to review the panel membership, in particular of those members whose terms expire at the end of 2010.

Collaboration with other panels and proposed new activities

Regional Climate Modelling (R. Leung; presented by K. Sperber)

Leung described a few on-going regional climate modeling research activities that are relevant to the Asian-Australian monsoon region. The Weather Research and Forecasting (WRF) model is used in each of the studies. The first study investigates the thermodynamics of the Madden-Julian Oscillation (MJO) using WRF. Two MJO episodes between December 2007 and January 2008 were simulated using WRF at 36 km grid resolution driven by the GFS global forecast data. Important features of the MJO were realistically simulated when the simulated moisture was constrained by the global analysis. Analysis of the eddy available potential energy budgets in the simulation with constrained moistening shows that instabilities and damping associated with variations in the diabatic heating and energy transport work in concert to provide the MJO with its observed characteristics. The results were used to construct a simplified paradigm of MJO thermodynamics. Without moisture nudging, the parameterizations used in the WRF simulation failed to provide adequate low-level (upper-level) moistening during the early (late) stage of the MJO active phase.

The moistening plays a critical role in providing stratiform heating variability that is an important source of eddy available potential energy for the model MJO. More recent WRF simulation at 4 km grid resolution without a deep convective parameterization was able to capture the salient features of MJO without the need of moisture nudging. Analyses are being performed to further examine the energy and moisture budgets of MJO to understand the role of deep and shallow convection as well as stratiform instability in the initiation and maintenance of MJO.

Leung also described a poor man's regional analysis performed for Asia using the WRF model. In this study, WRF was applied at 18 km grid resolution to a region covering South Asia, East Asia, and Southeast Asia. Large-scale conditions for the atmosphere were assimilated in the regional simulation through spectral nudging for 1997 – 2008. The WRF model outputs were used to improve our understanding of diurnal variability in the Tibetan Plateau and the surrounding area. A number of dynamical and thermodynamical processes were analyzed along a north/south transect that cuts across the Tibetan Plateau. Preliminary analyses showed how the plateau-plain circulation and upslope/drainage flow play a role in diurnal variability of cloud and rainfall.

Leung also briefly described two modeling studies over East Asia to study the role of land-atmosphere interactions on droughts and the effects of aerosols on the regional climate and hydrological cycle in China. For the former, her research currently focuses on understanding the role of surface-subsurface water interactions on land-atmosphere interactions in semi-arid regions. For the latter, previous analyses of observed daily precipitation over the last 50 years suggest that aerosols may have played in role in suppressing light precipitation in China. Using measurements from the US Department of Energy Atmospheric Radiation Measurement (ARM) Mobile Facilities deployed in China during 2008 (AMF-China), Leung and her colleagues are modeling aerosol effects on cloud and precipitation under different cloud regimes observed during the field campaign.

Land Surface Monsoon Interactions (X. Zeng)

Previous studies on land-monsoon interactions can be divided into four categories

1) as part of general land-atmosphere interactions (e.g., GLACE, GSWP);
2) winter/spring land state (e.g., snow cover and depth) on subsequent summer monsoon (numerous studies);
3) impact of using more comprehensive land models (versus simpler land models) on monsoon simulation (numerous studies); and
4) intraseasonal monsoon variability (northward propagation) (e.g., AMMA).

Suggestions for future land-monsoon interaction research include new experiments:

1) atmospheric models with multiple land models;
2) run atmosphere/land coupled models with fixed soil moisture from one simulation and with interactive land processes (GLACE design);
3) crop/irrigation effect on monsoon development;
4) impact of Interannualvegetation variability over monsoon regions; and
5) terra-planet experiment (versus aqua-planet).

Suggestions are also made on land-related analyses:

1) averaged diurnal cycle of surface variables over different phases of intraseasonalvariability; and
2) quantify the land-atmosphere coupling strength of different models at intraseasonalscale by computing the various indexes suggested in recent years.

AMY: Asian Monsoon Years (J. Matsumoto)

The "Asian Monsoon Years (AMY 2007-2012)" Program is an integrated observation and modeling initiative that investigates the variability of the Asian monsoon and associated ocean-land-atmosphere interaction, aerosol-monsoon interaction, and the multi-scale interaction under the World Climate Research

Programme (WCRP), as well as the WCRP core projects CLIVAR (Climate Variability and Predictability)/AMMP and GEWEX (Global Energy and Water Cycle Experiment)/MAHASRI (Monsoon Asian Hydro-Atmosphere Scientific Research and Prediction Initiative). The Program has also gained grassroot level support within the broad community represented by many national projects, operational centers and monsoon research scientists at large in Asia and USA. Since the first workshop in April 2007, we have organized 6 workshops in total, 2-3 times in a year. We also organized AMY Session(s) in AOGS (Asia Oceania Geosciences Society) every year since 2008.

The main activities conducted since the last CLIVAR/AMMP meeting is as follows:

- Joined the YOTC Implementation Meeting at Honolulu in July 2009 and started our collaboration with YOTC.
- AMY Session was organized in the 6th AOGS Meeting at Singapore in August 2009. AMY Mini-Workshop was also organized there.
- The 6th AMY Workshop at Kunming, China was organized in December 2009. We re-organized our SSC (Science Steering Committee) members and Working Group in order to activate our activity after our main intensive observation period (IOP) in 2008-2009. We decided to have centralized data archiving systems (CDC) in Japan (Univ. Tokyo) and China (SCSIO). We also decided to conduct AMY-Reanalysis for the years 2008-2009 by the Meteorological Research Institute (MRI)/JMA by utilizing obtained data in AMY IOP. Also planned was contribution of MAY to the CMIP5.
- MJO/MISO Hindcast Experiment has been conducted as a joint effort by CLIVAR/AAMP, APCC, YOTC and AMY and now initial results have just been obtained.
- Special Issue on MAHASRI is under editorial processes with the aid of AMY colleagues to be editorial committee members. It will be published in January 2011.
- The 1st Data Workshop was organized at Tokyo, Japan in June 9-11, 2010. The current status of each participating project was introduced and the AMY Data Policy was discussed. Training on the data management in CDC at the Univ. Tokyo was also conducted.

Now we are almost in the middle way of the planned activities. We should plan publication plan(s) and future successor program.

CLIVAR Pacific Ocean Panel Update (Bo Qiu)

One major activity of the CLIVAR Pacific Ocean Panel in 2009/10 that is highly relevant to AAMP is the endorsement of the "Northwestern Pacific Ocean Circulation and Climate Experiment (NPOCE)" by the International CLIVAR Office. There are four scientific themes in NPOCE; the two themes relevant to AAMP are (1) Roles in warm pool maintenance and variability and (2) regional air-sea interaction and climate impact. Specifically, theme (1) attempts to clarify oceanic processes critical to the formation/evolution of the western Pacific warm pool and to quantify the ocean-atmosphere feedback processes leading to warm pool's low-frequency changes. Theme (2) will focus on air-sea interactions in the western tropical Pacific on the temporal scales of MJO, monsoon, TBO and ENSO phenomena. For more complete NPOCE scientific rationales, themes, and plans, see http://npoce.qdio.ac.cn/ .

The NPOCE program officially started in June 2010 and will involve the countries of China, France, Germany, Indonesia, Japan, Korea, the Philippines, and the U.S. The CLIVAR Pacific Panel is playing a role in coordinating designs of field observations and numerical simulations and experimentations. As the two themes listed above are closely connected to the goals and activities of AAMP, exchange of information, seeking of advice, and possible coordination of observational and modeling activities between the two Panels are clearly desirable as the NPOCE program moves forward in the coming years.

Northwestern Pacific Ocean Circulation and Climate Experiment (NPOCE) - KORDI/GAIA: Modeling component (Jong-Seong Kug)

Recently, we have launched a research program (GAIA project) to develop KORDI climate system model, which consist of various climate component models such as ocean, atmosphere, land, sea-ice, dynamic

vegetation and so on. One of most important missions is to construct seamless climate prediction system using the KORDI climate system model, targeting for MJO prediction, ENSO forecast, seasonal prediction, decadal prediction and climate change projection. In particular, we are planning to contribute to IPCC 6th Assessment Report with our own climate model simulations. In order to accomplish our missions, we have a close domestic collaboration with climate modeling teams in Seoul National University and Yonsei University. As well as the domestic collaboration, it is obvious that an international cooperation on climate modeling will promote our research progress.

Regional Climate Outlook Fora (Dr. K. Takano)

The World Climate Conference-3 (WCC-3) was held in Geneva, Switzerland, from 31 August to 4 September 2009. At the WCC-3, it was decided to establish the Global Framework for Climate Services (GFCS) to provide more climate information to users around the world. To implement GFCS, it is needed to strengthen the cooperation between operational climate services and research communities because the advance of climate science is very rapid and the latest achievement of climate science should be provided to users as much as possible. In concrete terms in Asia, we would like to propose that more scientists join the Regional Climate Outlook Forum in which seasonal forecasts in the region are discussed by corresponding national climate services such as FOCRAII (Forum on Regional Climate Monitoring, Assessment and Prediction for Asia) and SASCOF (South Asian Climate Outlook Forum).

ITF working group proposal (H. Hendon)

At the request of Yukio Matsumoto (Chair of of the CLIVAR Indian Ocean Panel), Harry Hendon presented a proposal for the formation of a new Working Group on Indonesian Throughflow and Indonesian Sea Variability. Despite the global importance of ITF/Indonesian Sea variability, it has been somewhat overlooked by the CLIVAR basin panel.

The proposed WG would:

- Promote better estimates of ITF magnitude and its variability, 3-D structures in the Indonesian Sea, and utilize them for validation/tuning of model results
- Promote better understanding of ITF's role in climate system/variations
- Promote collaborations between existing and planned observational and modeling studies:
- Develop strategy to monitor ITF for long term.

This will be achieved by

- Reviewing the current understanding and uncertainty in ITF and Indonesian Sea variability and their influence on climate variations. *[deliverables: a white paper?]*
- Facilitating collaboration between existing and planned observational and modeling studies to minimize the gaps in the research and maximize the scientific outcome. *[organize one or two workshops?]*
- Developing strategy to monitor ITF for long term. *[deliverables: a document for the strategy]*
- Developing Coordinated modeling studies of sensitivity of ITF and its impacts: *specify metrics/diagnostics*

The member structure would number around 10, be internationally recognized researchers who are studying ITF and Indonesian Sea variability (including ocean/coupled climate modelers) and liaise with with IOP, PP, and AAMP. At least one member should be from Indonesia, and possibly be a co-chair.

The AAMP subsequently sent a letter to the IOP supporting this proposal.

AAMP Modeling at JMA/MRI (A. Kitoh)

Kitoh first made an overview of JRA-55 and AMY-RA. He showed the Isewan Typhoon (Typhoon Vera in 1959) Reanalysis and Reforecast as an application of JRA-55. Using the 60-km resolution JRA-55 as initial and lateral boundary data with aircraft data, global model is used for extended forecast, and regional model downscaling as well as tidal model are used for regional forecast and storm surge forecast. Second, TIGGE MJO index forecast platform is shown. This is automatically updated at http://tparc.mri-jma.go.jp/TIGGE/tigge_MJO.html. Third, he presented an outline of a project (FY2007-FY2011) "Projection of the Change in Future Weather Extremes Using Super-High-Resolution Atmospheric Models" in which he is a PI. Simulation of the tropical cyclone formation and tracks with the global 20-km mesh AGCM is shown.

Brief update on some stakeholder interactions & capacity building activities relevant to the AAMP agenda (H. Meinke)

Challenge Program on Climate Change, Agriculture and Food Security (CCAFS)

- CCAFS is a new 10-year research initiative launched by the *Consultative Group on International Agricultural Research* (CGIAR) & the *Earth System Science Partnership* (ESSP). CCAFS seeks to overcome the threats to agriculture and food security in a changing climate, exploring new ways of helping vulnerable rural communities adjust to global changes in climate. http://www.ccafs.cgiar.org/node/1. CCAFS aims to developing adaptation pathways & identifying mitigation options for agricultural and food systems in the face of climate change via 6 research themes:
- Theme 1: Diagnosing vulnerability and analysing opportunities
- Theme 2: Unlocking the potential of macro-level policies
- Theme 3: Enhancing engagement and communication for decision-making
- **Theme 4: Adaptation pathways based on managing current climate risk (Theme leader: Jim Hansen, IRI)**
- Theme 5: Adaptation pathways under progressive climate change
- Theme 6: Poverty alleviation through climate change mitigation

Wageningen University (Netherlands)
Establishment of a 'Masters of Climate Studies' at WUR (first graduations: 2009; http://www.mcl.wur.nl/UK/

Three project focusing on the impacts of climate variability and change on the Ganges / Brhamaputra Basin (jointly with India, Nepal and Bangladesh)

1. EU FP6 Watch (www.eu-watch.org)
2. EU FP7 HighNoon (www.eu-highnoon.org)
3. Strengthening the Resilience of the Water Sector in Khulna to Climate Change a project funded by the ADB. This project looks at the combined impact of changes in climate, river run-off and sea level rise on: Urban water supply (salinity) and Urban flooding.

Some relevant activities at KNMI (Netherlands)

- NATEX, a joint project between KNMI, NIOZ and University of Utrecht on oceanic and atmospheric teleconnections from the Indian Ocean (both modelling work and observational oceanographic work; links with the Indian Ocean Panel)
- Regional climate scenarios for Indonesia in collaboration with Indonesian institutes
- Recovering climate archives from Indonesia in collaboration with Indonesian institutes
- Contribution via EC-Earth to the CMIP5 global coupled climate model runs

Some relevant activities from Australia

- New APN project `web-based discussion support agricultural-climate information for regional India'. New climate science initiatives will be fed into this project through a new dedicated web site

for potential use by users in India through the 'internet kiosks' funded by the India Government (Roger Stone).

- Queensland Water Infrastructure (QWI) Project – aspects related to the MJO and seasonal forecasting provided into tactical management decisions to assess 'climate input value' to water supply and storage management' (Roger Stone).
- Recently completed 'Northern Australian Climate Knowledge' review project (Wheeler/Hendon?) of key industry needs in northern Australia: almost all decision were at the Intraseasonal time scales, not at seasonal (three or six month) timescales, hence strong need for further application of MJO-like work.
- Major review of climate drivers for the Murray Darling Basin, especially in relation to drought; includes recommendations made for further research. Key aspects:
    1. need for pre-instrumental information on wet/dry cycles in Australia, especially the MDB;
    2. more research on understanding interactions between the various climate drivers affecting the MDB (whether they be regional or global-scale);
    3. need for improved understanding of interactions between climate processes and hydrological processes;
    4. need for continued improvement in climate modelling, especially to offer a potential alternative for simulating seasonal to multi-decadal variations in a region such as the MDB
- NCCARF-related projects reviewing aspects related to 'climate extremes' e.g. heatwave and flood extremes, including their climate drivers.

Recommendations

- AAMP to consider if / how it wants to support the process of science – stakeholder interactions (e.g. special session at WCRP Open Science Conference in Denver)
- AAMP to seek WCRP support a workshop and/or a session at a high-profile climate variability meeting on success and failures of stakeholder engagement
- AAMP with the support of CLIVAR actively seek input into their science agenda from the broader ESSP community such as CCAFS (e.g. land surface – atmosphere interactions)
- CLIVAR to support the concept of 'Adaptation Science', i.e. an interdisciplinary approach that identifies threats, risks, uncertainties and opportunities that uses monsoon-related science to increase the adaptive capacity and performance of climate-sensitive systems.

Monsoon Prediction Research in India (M. Rajeevan)

In the presentation, Dr Rajeevan summarized the efforts made in India on monsoon prediction research, especially on intra-seasonal and seasonal time scales. A new operational system for monitoring the active and break phases of Indian monsoon using new criteria has been developed. The method is based on daily rainfall data averaged over the Indian monsoon core region. New studies using MODIS data revealed that during the breaks, large amount of aerosol is advected into the monsoon core region. To understand the complex interaction of aerosol-cloud-precipitation, an experimental campaign (Cloud Aerosol Interaction and Precipitation Enhancement Experiment, CAIPEEX) has been initiated using multiplatform sensors including aircraft sensors. This experiment is expected to provide valuable data on cloud microphysics together with aerosol properties.

For the prediction of monsoon rainfall on intra-seasonal time scale, efforts are being made to develop models based on Analogue and Self-Organized Maps (SOM) methods. The results on probabilistic forecasts based on these methods are encouraging for the prediction up to 3 pentads in advance. For the prediction of Indian monsoon rainfall on seasonal time scale, more efforts are being put to make use of dynamical models. An operational system has been developed at the Indian Institute of Tropical Meteorology (IITM), Pune, to make use of the NCEP CFS coupled model for preparing real-time seasonal forecasts. Analysis of the coupled model hindcasts of the recent ENSEMBLES project revealed that the ENSEMBLES coupled models have improved in predicting the Indian summer monsoon rainfall compared to the DEMETER models. Ministry of Earth Sciences (MOES) has initiated a national mission on Monsoon Prediction involving national and international institutes to improve the prediction capability of Indian monsoon.

Some current and proposed UK activities in Asian-Australian monsoon research (A. Turner)

Current work at University of Reading (UoR)

Work is being done on examining errors in Arabian Sea SST in coupled GCMs: CMIP3 models predominantly contain a cold bias here through boreal winter and spring, coupled with biases in windstress and cold surface air temperatures over northern India and Pakistan. In collaboration with the Met Office, a further study is examining the effect of regional seas coupled model SST biases on seasonal Indian monsoon precipitation in an AGCM. In a similar vein, the impact of the effects of the large seasonal cycle in chlorophyll in the Arabian Sea on SST there and Indian summer monsoon rainfall are also being examined. Other work at UoR is testing the effects of the rapid industrialisation of China and consequent aerosol emission on the East Asian summer monsoon. A further study is testing the impacts of monsoon variability and change on crop-climate relationships using GCM inputs into crop growth models. Finally, another study at UoR shows the importance of highly resolved ocean thermodynamic coupling (1m vertical resolution near the surface, and 3-hourly coupling frequency) for good simulation of monsoon intraseasonal variability.

Current work at UK Met Office (UKMO)

The UKMO has recently completed its MORPH3 assessment (Model for improved Regional Prediction - HadGEM3) comparing regional climate simulations in its latest model incarnation against previous model versions. This has involved expert assessments and construction of metrics measuring seasonal cycle, interannual and intraseasonal variability, and teleconnections for the Asian monsoon domains. The newly established CAPTIVATE project (Climate Processes, Variability and Teleconnections) will continue the work of MORPH3, with a greater focus on teleconnections and comparisons with other modelling groups. Work between the UKMO and academe is strengthened by the Monsoon Working Group, joint between UKMO and UoR/National Centre for Atmospheric Science-Climate and established in 2006 to improve the simulation of monsoon systems in the UKMO models. A particular aspect of its work is the use of NWP techniques to explore climate model biases: many biases in seasonal mean fields are apparent within a few timesteps of initialisation. Recently a post has been funded in the Natural Environment Research Council-UKMO Joint Weather and Climate Research Programme (JWCRP) on Modelling Monsoon Systems, to be based both at UoR and UKMO.

Upcoming research programmes

The Natural Environment Research Council (NERC) is funding major new initiatives in Ecosystem Services for Poverty Alleviation (ESPA) and the Changing Water Cycle (CWC). Both of these new programmes have South Asia as a particular focus region, hence there are likely to be several research projects over the coming years in these areas.

Direction for Monsoon Research (X. Zeng)

The role of land (including crops/irrigation) in monsoon is emphasized, including:

1) crop/irrigation effect on Asian monsoon development;
2) water table depth effect; and
3) water source for irrigation.

Also emphasized is the need to look at monsoon as a global monsoon system, because there is spatial coherence in global monsoon onset and retreat. Furthermore, a single value monsoon index for a whole monsoon region should be complemented by grid cell-based index.

Asian Metrics (A. Kitoh)

In a project (FY2007-FY2011) "Evaluations of CMIP3 Model Performances for Various Phenomena in the Atmosphere and Oceans, in the Present-Day Climate and in Future Projections", metrics to evaluate the climate model skills have been developed. In the AAMP-10, the metrics for the following phenomena are shown: 1) tropical cyclones, 2) teleconnection pattern (PJ pattern), 3) rainfall distribution in relation to ENSO, 4) seasonal march of the rain band in the East Asian and Northwestern Pacific. An "Asian Metric", which is relevant to several phenomena with significant impacts to the Asian society is produced.

6 Acknowledgements

The Asian-Australian Monsoon Panel would like to express their gratitude to the the APEC (Asia-Pacific Economic Cooperation) Climate Center (APCC) for their excellent support to the local organization of AAMP10. Everyone agreed that the facilities were excellent and appreciated the attention to details by the APCC.

Annex A – List of Participants of the CLIVAR AAMP and YOTC MJO Task Force Joint Session

Jean-Philippe Duvel
LMD
ENS, 24 rue Lhowond 75231
Paris cedex 05
Tel +33 1 4432 2237
Email jpduvel@lmd.ens.fr

Hirokazu Endo
Meteorological Research Institute
Japan Meteorological Agency
1-1 Nagamine, Tsukuba
Japan
Tel +81 29 853 8609
Email hendo@mri-jma.go.jp

Carlos Ereno
International CLIVAR Project Office
Dep. Atmospheric & Oceanic Sciences
University of Buenos Aires
Pab II – 2nd floor - Ciudad Universitaria
1428 Buenos Aires
Argentina
Phone: +54-114576 3364 x 21
Fax: +54-11-4732-2098
E-mail: carlos_ereno@yahoo.com

Xiouhua Fu
IPRC
University of Hawaii at Manoa
1680 East-West Rd
Post 409D, Honolulu, HI 96822
USA
Tel +1 808 956 2629
Email xfu@hawaii.edu

Jon Gottschalck
NOAA, Climate Prediction Center
5200 Auth Road,
Camp Springs, MD 20746, USA
Tel +1 301 763 8000 x 7753
Email Jon.Gottschalck@noaa.gov

Harry Hendon
CAWCR
CPO Box 1289 K
Melbourne 3001, Australia
Tel +61 39669 4120
Email hhh@bom.gov.au

Emilia K. Jin
George Mason University
Center for Ocean-Land-Atmosphere Studies
4041 Powder Mill Rd. Suite 302
Calverton, MD 20705, USA
Tel +1 301 595 7000
Email kjin@cola.iges.org

In-Sik Kang
Seoul Nacional University
School of Earth Environment Sciences
Kwanwak-Gu, Seoul 151-742, Korea
Tel +82 2 880 6718
Fax +82 2 885 7357
Email kang@climate.snu.ac.kr

Daehyun Kim
Lamont-Doherty Earth Observatory of
Columbia University
400 W 119th St. 15 v
New York 10020, USA
Tel +1 845 365 8317
Email kim@climate.snu.ac.kr

Akio Kitoh
Meteorological Research Institute
1-1 Nagamine, Tsukuba,
Ibaraki 305-0052, Japan
Tel +81 29 853 8590
Fax +81 29 855 2552
Email kitoh@mri-jma.go.jp

Jong-Scong Kug
KORDI
Tel +82 2 16 114 2199
Email jskug@kordi.re.kr

June-Yi Lee
IPRC
University of Hawaii
2333 Kapiolan Blvd #2204
Honolulu HI 96826, USA
Tel +1 808 956 7544
Email jylee@soest.hawaii.edu

Mijung Lim
Seoul National University
Gwanak-599, Gwanak-ro
Gwanak-gu, Seoul 151-742
Korea
Tel +82 2 880 8124
Email mjlim@climate.snu.ac.kr

Hai Lin
Environment Canada
2121 Trans-Canada Highway,
Dorval, QE, Canada H9P1J3
Tel +1 514 421 7276
Fax Hai.Lin@ec.gc.ca

Eric Maloney
Colorado State University
Department of Atmospheric Science,
Colorado St University
Tel +1 970 491 3368
Email emaloney@atmos.colostate.edu

Jun Matsumoto
Tokyo Metropolitan University
JAMSTEC
1-1 Minami, Osawa
Hachi-oji, 192-0397, Japan
Tel +81 42 699 2596
Email jun@center.tmu.ac.jp

Adrian Matthews
School of Environmental Sciences
University of East Anglia
Norwich, UK
Tel +44 1603 593733
Email a.j.matthews@uea.ac.uk

Holger Meinke
Wageningen University
PO Box 430 NL 6700 AK
Wageningen, Netherlands
Tel +31 317 484772
Email holger.meinke@wur.nl

Mitch Moncrieff
NCAR
Climate & Global Dynamics Division
Boulder, Co 80305, USA
Tel +1 303 497 8960
Email moncrief@ucar.edu

Tomoe Nasuno
RIGO/JAMSTEC
3173-25 Showa-machi
Kanazawa-ku, Yokohama
Kanagawa, 236-0001, Japan
Tel +81 778 5624
Email nasuno@jamstec.go.jp

Kazuyoshi Oouchi
JAMSTEC
3173-25 Showa-machi,
Kanazawa-ku, Yokohama
Kanagawa, 236-0001, Japan
Tel +81 778 5775
Email k-ouchi@jamstec.go.jp

Madhavan Nair Rajeevan
NARL, India
National Atmospheric Research Laboratory
Tirupati, India 517502
Tel +91 8585272026
Email rajeevan@narl.gov.in

Pallav K Ray
RSMAS, University of Miami
4600 Rickenbacker Causeway,
Miami, FL 33149, USA
Tel +1 305 663 4535
Email pray@rsmas.miami.edu

David Raymond
New Mexico Tech
Physics Dept., New Mexico Tech
Socorro, NM 8780, USA
Tel +1 575 517 9422
Email raymond@kestrel.nmt.edu

Ann Shelly
UK Met Office
Met Office, Fitzroy Rd
Exeter, EX1 3PB, UK
Tel +44 1392 884253
Email ann.shelly@metoffice.gov.uk

J Shukla
GMU/COLA
4041 Powder Mill Road, Suite 302
Calverton, MD 20705, USA
Tel +1 301 595-7000
Email shukla@cola.iges.org

Ken Sperber
Lawrence Livermore National Laboratory
7000 East Ave,, L-103
Livermore, CA 94550, USA
Tel 1 925 422 7720
Fax 1 925 422 7675
Email sperber@llnl.gov

Kiyoharu Takano
Japan Meteorological Agency
1-3-4 Otemachi Chiyodaku. Tokyo,
Japan100-8122
Tel +81 3211 8406
Email k_takano@met.kishou.go.jp

Andy Turner
University of Reading
Dept. of Meteorology, Univ. of Reading
RG66BB, UK
Tel +44 118 378 6517
Fax +44 118 378 8905
Email a.g.turner@reading.ac.uk

Gabriel Vecchi
NOAA/GFDL
Princeton University, Forrestal Campus
201 Forrestal Road,
Princeton, MS, 08540-6649, USA
Tel +1 609 452 6583
Fax +1 609 987 5063
Email Gabriel.A.Vecchi@noaa.gov

Frederic Vitart
ECMWF
Shinfield Park, Reading, RG2 9AX, UK
Tel + 118 949 9650
Email Frederic.Vitart@ecmwf.int

Duane Waliser
JPL
4800 Oak Grove Dr.
Pasadena, CA 91109, USA
Tel 1 818 393 4094
Email waliser@caltech.edu

Bin Wang
SOEST
University of Hawaii
1680 East-west Rd, POST Bldg. 401,
Honolulu, HI 96822, USA
Tel 1-808-956-2563
Fax 1-808-956-9425
Email wangbin@hawaii.edu

Matthew Wheeler
Bureau of Meteorology/CAWCR
P.O.Box 1289 K,
Melbourne, VIC 3001, Australia
Tel +61 3 9669 4068
Email m.wheeler@bom.gov.au

Xubin Zeng
University of Arizona
Department of Atmospheric Science
Tucson, AZ 85721, USA
Tel +1 520 621 4782
Email xubin@atmo.arizona.edu

Chidong Zhang
RSMAS/MPO
University of Miami
4600 Rickenbacker Causeway
Miami, FL 33149, USA
Tel +1 305.421.4042
Email czhang@rsmas.miami.edu

Tianjun Zhou
LASG, Institute of Atmospheric Physiscs,
Chinese Academy of Sciences
P.O. Box 9804,
Beijing 100029, China
Tel +86 10 8299 5279
Email zhoutj@lasg.iap.ac.cn

Annex B – Meeting agenda

Tenth Meeting of the

CLIVAR/Asian-Australian Monsoon Panel (AAMP10)

Busan, Korea, 18-19 June 2010

Location: Asian Pacific Climate Center (APCC), Busan, Korea

Friday, June 18, 2010

Joint Session of the CLIVAR AAMP and the YOTC MJOTF

09.00 Chair's introduction (Hendon and Sperber, Waliser and Wheeler)

Intraseasonal Hindcast and Prediction

09:10 Hindcast Experiment for Intraseasonal Prediction (Bin Wang and June-Yi Lee)
- Scope of the experimentation
- Dissemination of model data
- Preliminary analysis
- Coordinated analysis

09:40 Hindcast Experiment for Intraseasonal Prediction
- Modelling group presentations
  - COLA (E. Jin)
  - INGV (A. Alessandri)
  - SNU (In-sik_Kang)

10:10 YOTC Update and Data (Moncrieff)
- Available products (NWP Analysis and Satellite data)
- Preliminary results

10:40 Coffee/Tea Break

11:00 YOTC Case Study Modelling
- NICAM (Nasuno)

11:30 MJO in Tropical Channel Models (Zhang and Ray)
- Ray et al. (2009) and Ray and Zhang (2010)

12:00 Observational Campaigns
- CINDY2011 (Cooperative Indian Ocean experiment on ISV in the Year 2011)/DYNAMO Status and Modelling Plan (C. Zhang)
- DISGO (A. Matthews)

12:30 Lunch (End of the Joint Session)

CLIVAR AAMP 10th Session

14.00 Chair's introduction (Hendon and Sperber)

14.10 CLIVAR/WCRP report (C. Ereno)

Collaboration with other panels and proposed new activities

14:30 Regional Climate Modelling (R. Leung; presented by K. Sperber)
- Coordinated Regional Climate Downscaling Experiment (CORDEX)
- Process studies vs. climate change projections (downscaling)

14:50 Land Surface Monsoon Interactions (X. Zeng)
- Importance for ISV, especially boreal summer northward propagation
- Role in seasonal prediction

- Experimentation
    - Possible AR5 project
    - Collaboration with WGSIP/GLACE

15:10 Monsoon Diagnostics (Wang, Sperber, Hendon, Zhou, Kitoh)

- Propose a list of Asian-Australian monsoon diagnostics for validating/evaluating monsoon variability from diurnal to interdecadal time scales
- Should AAMP propose an effort to develop these diagnostics into a user package, and apply them to CMIP5 as part of a coordinated analysis?
    - Analyze control, 20th century, and climate change simulations?

15:30 Coffee/Tea Break

15:50 Monsoon Activities in China (T. Zhou)

- Modelling and Observations
- Suggested interactions with AAMP

16:10 AMY: Asian Monsoon Years (J. Matsumoto)

- Current status and outcome of Kun Ming China Workshop (December 2009)
- AAMP/AMY Joint Activities
    - Workshop in February-March 2011

16:30 CLIVAR Indian Ocean Panel Update (G. Vecchi)
16:50 CLIVAR Pacific Ocean Panel Update (Qui from slides)
17:10 Northwestern Pacific Ocean Circulation and Climate Experiment (NPOCE)

- KORDI/GAIA: Modeling component (Jong-Seong Kug)

17:30 Break for the day

Saturday, June 19, 2010

CLIVAR AAMP

Direction for monsoon research

09:00 Regional Climate Outlook Fora (Dr. K. Takano, Coordinator of the Sub-group on "Climate Applications and Services" for WMO's Regional Association II)
09:20 H. Hendon: ITF working group proposal
09:35 I.-S. Kang: Monsoon Research in Korea
09:50 AAMP Modeling at JMA/MRI (A. Kitoh)
10:05 AAMP Aplication & Capacity Building (H. Meinke)
10:20 Monsoon Prediction Research in India (M. Rajeevan)
10:35 Coffee/Tea Break
10:55 UK activities on Asian_Australian Monsoon (A. Turner)
11:10 High Resolution Model Development at GFDL (G. Vecchi)
11:25 Diagnostic Metrics (B. Wang)
11:40 Direction for Monsoon Research (X. Zeng)
11:55 Asian Metrics (A. Kitoh)
12:10 Monsoon Workshop 2011 (as proposed by B. Hoskins)

- Suggest topics

12:25 Improved Coordination of Monsoon Research
12:45 Lunch

AAMP Business

14:00 AAMP business (Sperber, Hendon)

- Membership
- Next meeting (in conjunction with Monsoon Workshop 2011???)

14:45 Actions items/ new directions for AAMP (Carlos; co-chairs)
15.15 AAMP10 ends

European Way, Southampton SO14 3ZH
United Kingdom
Tel: +44 (0) 23 8059 6777
Tel: +44 (0) 23 8059 6204
Email: icpo@noc.soton.ac.uk