

Asian-Australian Monsoon Panel

Harry Hendon - co-chair, Australia; Ken Sperber - co-chair, USA; In-sik Kang, Korea; Akio Kitoh, Japan; Matthieu Lengaigne, India; Holger Meinke, Australia; Madhavan Nair Rajeevan, India; Andrew Turner, UK; Gabriel Vecchi, USA; Bin Wang, USA; Xubin Zeng, USA; Tianjun Zhou, China; ICPO contact Carlos Ereño, Argentina

- Promote:** Understanding of AA Monsoon climate variability, predictability, prediction through coordinated studies with other CLIVAR and GEWEX Panels
- Model improvement, especially the representation of monsoon intraseasonal variability through model intercomparisons and prediction experiments
- International Conferences/Workshops on Monsoon Intraseasonal Variability (Hendon et al. 2011, *BAMS*, <http://dx.doi.org/10.1175/2011BAMS3164.1>) and Monsoon Decadal Variability and Predictability (September 10-12, 2012, Nanjing, China)
- Design:** Monitoring strategies, process studies, and sustained observations of Indian Ocean/Western Pacific and land regions to support understanding of monsoon processes
- Foster:** Interactions between meteorologists, oceanographers, and hydrologists to deliver improved predictions and projections with societal benefits
- Interactions with other international programs, such as WGSIP, WGCM, GEWEX, WWRP, and WGNE, to advance monsoon simulation, prediction and projection



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Promoted and Endorsed Activities

Process Studies

Observation Network of CINDY2011 / DYNAMO + Collaborative Projects

Japan / Mirai US / Roger Reville India / Sagar Kanya

Goan / Super site Indonesia/Borneo/Taya

4-8 times/day (EOP) 2-4 times/day (IOP) 4 times/day (SOP) 2 times/day (EOP)

HARIMAU 2011 Indonesia/Japan

ABRIMAU Investigation Exp. by US DOE

<http://www.wcrp-amy.org>

Asian Monsoon Years (AMN) 2007-2012

MJO/BISO Metrics

MJO Task Force : Background

- Established in early 2010.
- Sponsor: WCRP-WWRP/THORPEX under their YOTC Project
- Follow on from the US CLIVAR MJO Working Group

Daane Walker (co-chair)	MIT Population Laboratory/Catich
Matthew Wheeler (co-chair)	Centre for Australian Weather and Climate Research
Ken Sperber	Program for Climate Model Diagnostics and Intercomparison
Harry Hendon	Centre for Australian Weather and Climate Research
Eric Maloney	Colorado State University
Xubin Zeng	University of Hawaii
John Gottschalk	National Center for Environmental Prediction
Richard Neale	National Center for Atmospheric Research
Changping Zhang	University of Miami
Dae-Hyun Kim	Lamont-Doherty Earth Observatory of Columbia University
Regina Vautour	National Center for Environmental Prediction
Frederic Wurtz	European Centre for Medium-range Weather Forecasting
David Raymond	New Mexico Institute of Mining & Technology
Masaki Satoh	Frontier Research Center for Global Change
Hailu Liu	Environment Canada
Priscilla Xavier	US Mail Office

Overall Goal: Facilitate improvements in the representation of the MJO in weather and climate models in order to increase the predictive skill of the MJO and related weather

MJO TF Focus Areas

Organized into 4 Subprojects

- Process-oriented MJO diagnostics/metrics (leads: D. Kim, P. Xavier, E. Maloney)
- Boreal summer monsoon ISV forecasting metrics (leads: J.-Y. Lee, M. Wheeler, J. Gottschalk)
- Recommend MJO metric(s) to Climate Metrics Panel (leads: K. Sperber, H. Hendon)
- MJO TF + GASS Multi-Model Diabatic Processes Experiment (leads: D. Waliser, X. Jiang, J. Petch, P. Xavier, S. Woolnough, N. Klingaman)

Under consideration: Modulation of Tropical Cyclones activity by the MJO/ISV in order to improve their prediction.

The First and Second EOP Modes

MEETING SUMMARIES

Coordinated Model Evaluation

AAMP Monsoon Metrics/Diagnostics Team (contact K. Sperber)

Develop suite of diagnostics/metrics to evaluate models and track improvements (see Poster M234A)

Motivation: IPCC AR4 projections of climate change highly uncertain over the Asian-Australian monsoon region

Methodology: Evaluate CMIP-3/CMIP-5 simulations of Asian-Australian Monsoon on diurnal through interdecadal time scales using process oriented metrics to provide quantitative measure of model performance

Outcomes: Assessment of improvement in CMIP-5 vs. CMIP-3 GCM simulations
Improved assessment of the impact of climate change on the Asian-Australian Monsoon

Observations vs. CMIP3 (20c3m; 1961-1999) JJAS Rainfall Climatology

Observed and simulated results include data from the CMIP3 multi-model mean, and the two models that show the range of performance

- The CMIP-3 multi-model mean outperforms all of the individual CMIP-3 models in terms of pattern correlation with GPCP [r in (a) Poor GPCP vs. CMAP]

Observations vs. CMIP3 (20c3m; 1961-1999) JJAS Rainfall Climatology

Monsoon-ENSO Teleconnection

Lead-lag correlation of All-India rainfall vs. NiNO3.4 SSTA

- The observed lead-lag correlation between AIR and NiNO3.4 SSTA is best represented in models with a good representation of the monsoon precipitation climatology and ENSO variability (left panel, see Annamalai et al. (2007, *J. Clim.*, 20, 1071-1092)

Prediction Experiments

CLIVAR/ISVHE

Interseasonal Variability Hindcast Experiment

The ISVHE is a coordinated multi-institutional ISV hindcast experiment supported by APCC, NOAA CTB, CLIVAR/AAMP & MJO WG, NOAA CTB, and AMY.

Supporters: APCC, NOAA CTB, CLIVAR/AAMP & MJO WG, NOAA CTB, AMY, IPRC

Numerical Designs and Objectives

Control Run	ISV Hindcast EXP	YOTC EXP
Free coupled runs with AGCMs - AGCM simulation with specified boundary forcing for at least 20 years	ISO Hindcast: initialized every 10 days on 1st, 15th, and 21st of each calendar month for at least 45 days with more than 6 ensemble members from 1999 to 2009	Additional ISO Hindcast EXP from May 2008 to Sep 2009
Daily or 6-hourly output	Daily or 6-hourly output	6-hourly output

Three experimental designs among ISV

- Better understand the physical basis for ISV prediction and determine potential and practical predictability of ISV in a multi-model framework
- Develop optimal strategies for multi-model ensemble ISV prediction system
- Identify model deficiencies in predicting ISO and find ways to improve models' convective and other physical parameterization
- Determine ISV's modulation of extreme hydrological events and its contribution to seasonal and interannual climate variation

CLIVAR MJO WG Item III: Operational MJO Forecast Metric

(Gottschalk et al. *BAMS*, 2010)

Use of a common metric allows for:

- quantitative forecast skill assessment
- targeted model improvements
- friendly competition to motivate improvements
- developing a multi-model ensemble forecast

Center Participation: JMA, NCEP, ECMWF, Met Office, Indian Institute of Space Science and Technology, etc.

10 operation centers, 30 data streams, 13 ensemble forecasts (with 4-51 members)

http://www.ipc.ncep.noaa.gov/products/precip/CVllini/MJOCLIVAR/ahv_ahv.shtml