

## 1<sup>ST</sup> PAN-WCRP WORKSHOP ON MONSOON CLIMATE SYSTEMS

15-17 June 2005  
Irvine, California, USA

Tetsuzo Yasunari<sup>1</sup> and Kenneth R. Sperber<sup>2</sup>

<sup>1</sup>FRCGC/JAMSTEC and HyARC/Nagoya  
University, Japan, <sup>2</sup>Lawrence Livermore  
National Laboratory/PCMDI, USA

The 1<sup>st</sup> Pan-WCRP Workshop on Monsoon Climate systems was hosted by the University of California, Irvine and sponsored by the World Climate Research Programme (WCRP). More than 50 invited scientists from various monsoon-related projects participated. The Workshop was held to promote closer collaboration of monsoon research between GEWEX and the CLimate VARIability and predictability (CLIVAR) Project by assessing and integrating their current understanding of the fundamental physical processes governing monsoon variability. The overall goal of the Workshop was to improve monsoon predictions using global and regional models.

GEWEX promotes regional monsoon studies as a part of the Continental-Scale Experiments (e.g., the GEWEX Asian Monsoon Experiment in Asia, the GEWEX Americas Prediction Program in North America, and the Large-scale Biosphere Atmosphere Experiment in Amazonia in South America) by focusing on land-atmosphere interactions and their variability on diurnal to intraseasonal time scales. CLIVAR's primary focus is on intraseasonal, seasonal, interannual, and decadal variability of the monsoons through the study of atmosphere-ocean, and in collaboration with GEWEX, atmosphere-land interactions. Coordination of monsoon related research activities between these two projects will facilitate a better understanding and prediction of the monsoon systems.

In the first session of the Workshop, overviews of key modeling and observational issues relevant to various GEWEX and CLIVAR related projects were reported. In the second session various issues on fundamental physics and dynamics of monsoons [e.g., air-sea interaction, land-atmosphere interaction, surface flux/Planetary Boundary Layer (PBL) interaction, low level jets, role of orography, and cloud/precipitation processes] on multi-time scales (i.e., diurnal cycle, intraseasonal variability, and seasonal cycle) were comprehen-

sively reviewed. The third session was devoted to break-out and plenary discussions on the key issues in modeling and prediction of monsoons, including: 1) a strategy for parameterization development and observational data requirement for process studies; 2) a strategy for system modeling and observational data for large-scale model validation; and 3) the development of a monsoon prediction and monitoring network.

Recommendations from the Workshop include the following priorities for GEWEX/CLIVAR research to improve monsoon modeling and prediction.

- Correct simulation of diurnal cycles of precipitation and convection.
- Comprehensive modeling of surface, PBL and convection.
- Understanding of intraseasonal oscillation.
- Impact of atmospheric moisture distribution and transport.
- Further focus on process studies and modeling studies of the maritime continent and the Indian Ocean.
- Sensitivity testing to determine the resolution necessary in global models to simulate the multi-scale interactions that dominate the Earth's monsoon systems.

Initial implementation of these collaborative tasks within WCRP will occur through a series of targeted workshops that will try to meet in conjunction with (or be components of) planned meetings. In the near-term (~1 year) the emphasis will be on improving the diurnal cycle of precipitation in global models. Over both land and ocean global models typically exhibit large phase errors compared to observational estimates. Given that regional and cloud-resolving models perform much better in this respect, we envision that a better understanding of the factors involved (e.g., physics and model resolution) in realistically simulating the diurnal cycle in these models can be translated to an improved representation in global models. This will promote closer interaction in monsoon-related modeling activities under CLIVAR and GEWEX as part of a new Pan-WCRP initiative of monsoon research within the Coordinated Observation and Prediction of the Earth System (COPES) activity.