

Collaboration with the South China Sea Institute of Oceanology



Left: Director of the South China Sea Institute of Oceanology Ping Shi (right) at IPRC meeting and IPRC's Team Leader for Indo-Pacific Climate Research, Shang-Ping Xie.

Right: R/V *Kilo Moana* with Diamondhead Crater and Waikiki in the background.



The Director of the South China Sea Institute of Oceanology (SCSIO) **Ping Shi**, and the Director of its Laboratory of Environmental Dynamics **Dongxiao Wang**, visited the IPRC in February 2006. Based in Guangzhou and part of the Chinese Academy of Sciences system, the SCSIO is a major national Chinese laboratory with a staff of nearly 400. The South China

Sea plays an important role in research on climate and the Pacific warm pool. Collaboration between the SCSIO and the IPRC has been growing over recent years and includes the development of a South China Sea *in situ* dataset, satellite data analysis, and numerical modeling. At a meeting on February 17, IPRC Director **Jay McCreary** and Director Shi agreed to establish closer ties by developing a memorandum of understanding that will include a joint research group to study the circulation and climate of the South China Sea.

Shi capped his visit to the University of Hawai'i with a guided tour by Captain **Gray Drewry** of the double-hulled Research Vessel *Kilo Moana*, which is administered by the School of Ocean and Earth Science and Technology at the University of Hawai'i. The SCSIO is in the process of building a twin-hull research vessel, and Director Shi's visit to the *Kilo Moana* will help the design and instrumentation of this planned ship.

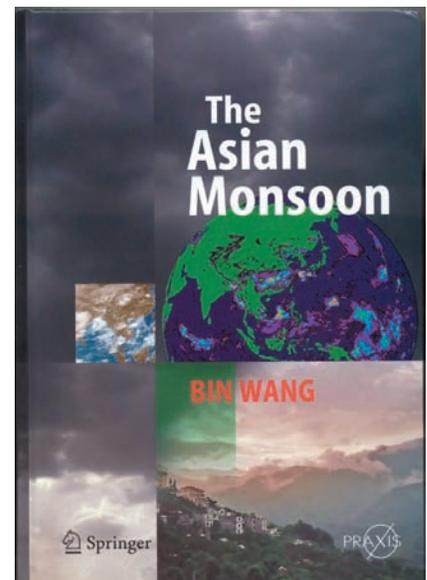
Published: *The Asian Monsoon*, edited by IPRC's Bin Wang

The Asian Monsoon, edited by **Bin Wang** (see page 20, "Seasonal Climate Forecasts for the APEC Region") has just been released by Springer Verlag. The giant Asian monsoon system dominates the climate of the entire tropical and subtropical Eastern Hemisphere and influences climate in regions far beyond. The social and scientific importance of the monsoon cannot be overemphasized.

Our scientific knowledge of this complex monsoon system has advanced enormously over the last two decades due to a wealth of new data from satellite observations and field experiments and due to advances in

computing power and mathematical representations. In this book, scientists at the forefront of monsoon research provide an account of our ever-expanding understanding of the physics associated with monsoon weather and climate and offer timely and authoritative summaries of recent progress and remaining gaps in our knowledge.

The book is intended as a comprehensive interdisciplinary text for college students, both graduate and undergraduate, and as a reference for scientists and professionals in the Earth sciences and social sciences.



IPRC Featured in Newsletter of Japanese Ocean Think Tank

The Ocean Policy Research Foundation in Tokyo has published in its *Ship and Ocean Newsletter* an essay by IPRC Director **Jay McCreary** that features the International Pacific Research Center and its activities. The Foundation functions as a think tank for Japan on ocean matters, and the Foundation's white papers and newsletter are a source of important information for legislators, government officials, and ocean policy decisions. Advocating that mankind live harmoniously and sustainably with the ocean, the Foundation encourages international collaboration and exchange of views on ocean affairs. The *Ship and Ocean Newsletter* publications are to facilitate a wide range of discussion and exchange on oceanic topics to raise the awareness of the importance of the world oceans and their resources.

McCreary wrote "the IPRC is an ideal model of cooperation between Japan and the United States, focused on the most serious world-wide challenge facing us today—understanding the causes of climate variability and change and the effects of global warming. Such bilateral cooperation contributes not only to science but to the exchange and understanding between Asian and western cultures." Professor **Toshio Yamagata**, co-chief editor for the newsletter, translated the article into Japanese.

This essay in the *Ship and Ocean Newsletter* is an excellent medium to apprise Japan's decision-makers of the IPRC and its research on the ocean and climate. The article is available in English at www.sof.or.jp/index.html.en and in Japanese at www.sof.or.jp/index.html.ja.

Seasonal Climate Forecasts for the APEC Region

The new project "Climate Prediction and its Application to Society" or CliPAS (*IPRC Climate*, Vol. 5, Nos. 1 and 2) is helping the Asia-Pacific Economic Cooperation (APEC) Climate Center (APCC) with the development of a system for forecasting seasonal temperature and rainfall. Principal investigator, **Bin Wang**, co-leader of the IPRC Asian-Australian Monsoon Research Team, is spearheading this research effort that includes ten institutions in the United States, Korea, and

Japan, and leading scientists in the field of climate prediction and societal application. The CliPAS strategy, called multi-model ensemble prediction, uses a set of well-validated climate models to make forecasts from their pooled simulations. The current prediction system includes five air-sea coupled models (called one-tier system) and five atmospheric circulation models driven by sea surface temperature data predicted from a dynamic-statistical model (called two-tier system).

As a first step, climate features over the last 24 years have been simulated with the group of models in a "hindcast" (1981–2004) study. The data set is now being compared with observations for that period to see how well the one-tier and two-tier systems have "predicted" the climate.

The initial seasonal prediction efforts will focus on forecasting features of the El Niño-Southern Oscillation and the Asian-Australian Monsoon. Understanding and predicting subseasonal climate variations is also planned. To assess, for example, the models' ability to predict conditions favorable to hurricane and typhoon activity, simulation of these high-impact weather events is being planned. This experiment is based on a proposal by NASA scientist **Siegfried Schubert**.

CliPAS held its first annual meeting at the Center for Ocean-Land-Atmosphere in May 2005 and its second annual meeting at the University of Hawai'i in January 2006. At the meetings, scientists from the various research teams reported on the status of seasonal climate prediction, discussed major issues, and produced a specific coordinated work plan.

The project is currently supported by the APEC Climate Center in Busan, whose executive director is **C.-K. Park**. The air-sea coupled models are from National Centers for Environmental Predictions, Frontier Research Center for Global Change, NASA (GMAO), Seoul National University, and the University of Hawai'i. The two-tier system atmospheric models are from Florida State University, Geophysical Fluid Dynamic Laboratory, Seoul National University, and the Community Atmospheric Model (CAM2)-University of Hawai'i version. The Australian Bureau of Meteorology Research Centre (BMRC), the Beijing Climate Center, and the Institute of Atmospheric Physics of the Chinese Academy of Sciences will soon join the project.



Bin Wang

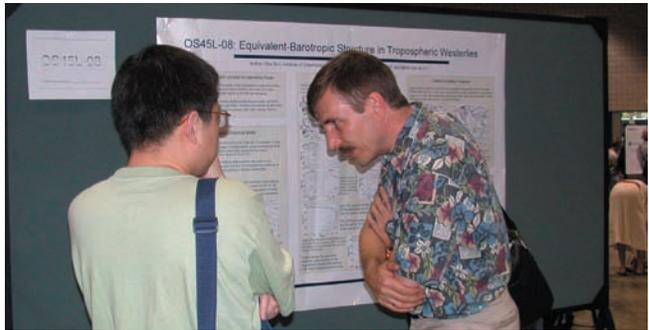
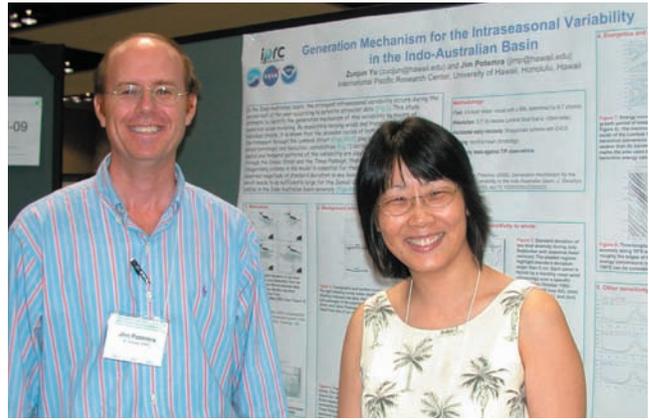
IPRC Scientists Active in the Climate Research Community

Kevin Hamilton, co-leader of the IPRC Impacts of Global Environmental Change Research and chairman of the University of Hawai'i Meteorology Department, is serving on the External Advisory Committee for the NCAR Institute for Integrative and Multidisciplinary Earth Studies (TIIMES). TIIMES conducts and promotes Earth science research across disciplines, and provides leadership and fosters interactions in support of initiatives on multi-disciplinary Earth studies. Hamilton is also serving as President of the International Commission for the Middle Atmosphere (ICMA), which fosters international cooperation in research of the middle atmosphere (the tropopause into the lower thermosphere). Recent ICMA activities include coordinating the middle atmospheric science sessions at the next IUGG General Assembly to be held in Perugia, Italy, in 2007.

Axel Timmermann, also co-leader of the IPRC Impacts of Global Environmental Change Research Team, is serving as chair of the International CLIVAR Pacific panel, an international effort to oversee, coordinate and facilitate CLIVAR objectives related to the Pacific Ocean. He is also vice-president of the Division on Nonlinear Processes in Geophysics of the European Geosciences Union. The division is an international, interdisciplinary organization for promoting knowledge on nonlinear processes in all branches of Earth, planetary and solar system science.

Niklas Schneider, co-leader of the IPRC Indo-Pacific Climate Research Team, was co-convener for the 14th Conference on the Interaction of the Sea and Atmosphere, which was held as part of the 86th Annual Meeting of the American Meteorological Society in January in Atlanta, Georgia.

Two IPRC monsoon researchers were invited to give key note speeches at the Workshop on the Organization and Maintenance of Tropical Convection and the Madden-Julian Oscillation, held in Trieste, Italy, in March 2006. **Bin Wang**, co-leader of the Asian-Australian Monsoon System Research Team, spoke on "Fundamental Processes in the Tropical Intraseasonal Oscillation." IPRC researcher **H. Annamalai** spoke on the "Quadrupole Structure in Convection and its Implications for the Asian Summer Monsoon Intraseasonal Variability." The workshop focused on the current state of knowledge of the initiation and maintenance of organized tropical convection and its relationship to tropical weather



Top, L to R: Jim Potemra and Zuojun Yu at the Ocean Sciences Meeting. Above: Nikolai Maximenko (on the right) during the Poster Session he convened for Ocean Sciences.

systems. Future directions in observing, simulating, modeling, and predicting the Madden-Julian Oscillation were planned. The meeting was sponsored by the Observing System Research and Predictability Experiment and the World Climate Research Programme.

Moreover, **Bin Wang** and **Tim Li** were invited to give talks at the Symposium on the Winter Asian Monsoon, "Winter MONEX: A Quarter Century and Beyond" this past April in Kuala Lumpur. Wang's speech dealt with dominant modes of Asian-Australian Monsoon interannual variability in observation and climate prediction models; Li spoke on the interaction between the monsoon and the warm ocean and its effect on the tropospheric biennial oscillation.

IPRC scientists also contributed to the American Geophysical Union Ocean Sciences Meeting, held this spring here in Honolulu. **Jay McCreary** was co-convener for sessions on the Tropical Pacific, Biochemistry and Air-Sea Interaction, and **Nikolai Maximenko** on Zonal Jets in Geophysical Turbulence: Theory and Observations. IPRC scientists also authored and coauthored over 15 papers and posters presented at the meeting.

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Yang “Edward” Yang joined the IPRC as a postdoctoral fellow after receiving his PhD in meteorology from the University of Hawai‘i in December 2005. His dissertation focused on the island-scale atmospheric summer circulation of the island of Hawai‘i. Having improved simulation of the island’s diurnal cycle circulation, Yang studied the effects of trade-wind strength and directions, terrain size, and height on island summer circulation and weather. He showed that in the model, terrain height impacts the thermodynamics of the circulation and affects island weather. Island area also affects the orographic lift and surface thermal impact, showing that rainfall over islands depends partly on their area size.



Yang “Edward” Yang

Yang is now working with **Shang-Ping Xie**, co-leader of IPRC Indo-Pacific Climate Research, on the PRIDE project Development of an Integrated Data Product for Hawai‘i Climate. Together with IPRC’s **Jan Hafner**, the group is integrating NOAA ground-radar and satellite observations with other observations and meso-scale model output into a single format. From this integrated data set they will produce Hawai‘i monthly and seasonal mean precipitation maps at unprecedented spatial resolution. These precipitation maps will then be used for further applications, for example, the development of brush-fire probability tables for certain locations as a function of wind and drought conditions. Such applications will be very useful for Hawai‘i residents and such industries as tourism, fishery, and US naval operations in Hawai‘i.

Linlin Pan joined the IPRC as a postdoctoral fellow in January 2006. Growing up in a small village in southeastern China, Pan recalls, “My father was a farmer and very concerned about the weather. Every-day he listened carefully to the weather forecast. It was a real ritual. One time the forecast predicted sunny weather for the next several days. Instead a severe storm came... the Meiyu season had started. The harvested crop was still outside and got totally



Linlin Pan

ruined by the storm.” Realizing how important weather forecasts are for agriculture and how much they can affect people’s daily lives, Pan studied meteorology and in 1994 obtained his master’s degree in atmospheric science from Beijing University. Pan then wanted to “delve deeper” into climate dynamics and climate change and came to the University of Hawai‘i, where he received his PhD in meteorology in 2003 with a dissertation on the dynamic origin of the annular (ring-structured) modes, which include the Arctic Oscillation (AO), the Antarctic Oscillation (AAO), and the North Atlantic Oscillation (NAO), which can be regarded as the regional expression of AO.

Pan has expanded his research interests to large-scale air-sea interaction, climate change, climate dynamics and prediction. His studies involve theoretical, numerical, and observational analyses and are geared toward understanding the physics governing the variations in low-frequency climate variability seen in such climate phenomena as the Arctic and Antarctic Oscillations and the Pacific–North American pattern. With **Tim Li**, co-leader of IPRC Asian Australian Monsoon System Research, Pan is studying the connection between the Madden-Julian Oscillation and midlatitude atmospheric disturbances.

IPRC Bids Sayonara

Dailin Wang, who has been an associate researcher with the IPRC since its inception, has joined the NOAA Pacific Tsunami Warning Center in Hawai‘i. As oceanographer with the Center, he must determine quickly the location and magnitude of an earthquake and assesses whether a tsunami can be generated. The main detection tools are tide gauges and so-called DART buoys. Wang finds his new work challenging and rewarding: challenging in that he must broaden his knowledge of seismology and rewarding because it serves the public. He wrote in an email: “We receive visiting requests from people around the world. There are also individuals who would like to receive tsunami warning messages on their cell phones or via emails.” Wang’s many years of experience in ocean modeling at the IPRC will definitely be useful in modeling tsunamis.

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