

JAMSTEC Executive Director Visits IPRC



Meeting between JAMSTEC Executive Director and IPRC scientists: (seated from left) Yukihiisa Washio, Kiyoshi Suyehiro, Brian Taylor, Axel Timmermann, Shang-Ping Xie, Kevin Hamilton, Jay McCreary, Niklas Schneider, Kelvin Richards, Peter Hacker (standing).

To strengthen IPRC–JAMSTEC (Japan Agency for Marine–Earth Science and Technology) partnership in climate research, JAMSTEC Executive Director **Kiyoshi Suyehiro** and Manager of the International Affairs Division, Planning Department, **Yukihiisa Washio** visited the IPRC and the University of Hawai‘i on October 10 and

11, 2006. They met with Vice President for Research **James Gaines**, Vice Chancellor for Research and Graduate Education **Gary Ostrander**, Dean of SOEST **Brian Taylor**, and IPRC Director **Jay McCreary**. The visitors also attended overviews of IPRC research activities and met with team leaders of IPRC’s five research areas.

IPRC Expands Research Partnerships

IPRC Director **Jay McCreary** and South China Sea Institute of Oceanology (SCSIO) Director **Ping Shi** signed a memorandum of understanding on July 18, 2006, in Guangzhou, China. Under the agreement, a Joint Laboratory for South China Sea Research will be set up to promote research by the two institutions on the ocean circulation and climate of the South China Sea and the Indo-Pacific warm-pool region.

The South China Sea is not only a very important economic region, but it also has strong impact on regional

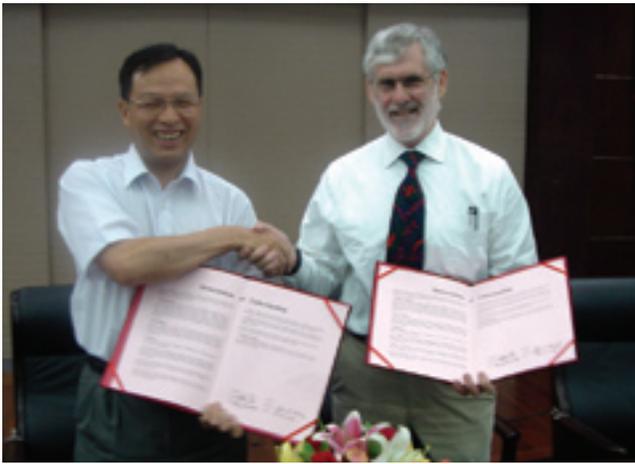
climate, affecting close to one billion people; scientific evidence suggests it may even impact the large-scale Pacific climate. Topics for research under this partnership include the impact of South China Sea surface temperatures on tropical cyclone tracks and on locally generated tropical cyclones: measurement and description of the South China Sea Throughflow; the development of a regional East Asia climate model based on the IPRC model iROAM, and establishment at the SCSIO a data-center that mirrors IPRC’s

Asia-Pacific Data-Research Center and serves climate data to both scientists and the general public.

Following the signing of the memorandum, Inspector **Anshuo Gen** of the Chinese Academy of Sciences gave his congratulations, and Jay McCreary and **Dongxiao Wang**, Director of the Chinese Academy of Sciences Laboratory for Tropical Marine Environmental Dynamics, gave presentations on ongoing research activities at their two institutions.

The IPRC and SCSIO already have a history of successful partnership leading to joint publications in well-known climate journals. The development of the memorandum for more systematic joint research began when Director Ping Shi visited IPRC in February 2006. The China News Agency published a report on the signing ceremony.

The IPRC also signed in December a memorandum of understanding with the Institute of Tropical and Marine Meteorology (ITMM) of the China Meteorology Administration. Under the agreement, a Cooperative Tropical Climate Research Laboratory (CTCRL) will be set up that has as its research focus the tropical atmospheric and oceanic circulations and the climate of the Indo-Pacific warm-pool region. The research partnership will include the following activities: assessing the impact of ocean–atmosphere interactions on the intraseasonal and interannual variability of the East Asian monsoon, developing an effective approach for seasonal climate prediction, determining changes in tropical cyclone tracks and intensity, and studying the impact of global warming on regional climate and weather. The agreement will



SCSIO Director Ping Shi (left) and IPRC Director Julian McCreary (right) celebrate signing of the Memorandum of Understanding between the SCSIO and the IPRC (photo courtesy of Dongxiao Wang).

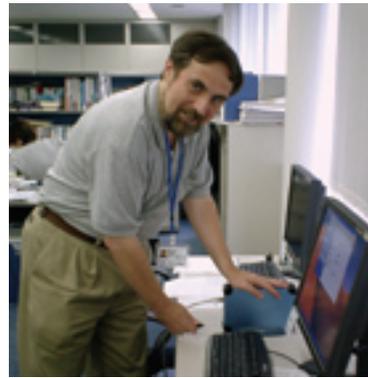
cover observational data collection and application of climate models to diagnose the underlying climate processes. Each institution already has secured two three-year research grants from the Chinese National Science Foundation to jointly study the subseasonal and year-to-year fluctuations of the East Asian monsoon.

In addition to the above partnerships, the IPRC has signed in November an agreement with the College of Earth Sciences at the National Central University in Taiwan to cooperate on research related to regional climate and the water cycle.

IPRC–Earth Simulator Collaboration Attracts Attention

Publication of work by the JAMSTEC – IPRC – Hokkaido University collaboration on high-resolution atmospheric modeling attracted favorable attention in the scientific community. As described in *IPRC Climate* Vol 3, No 2, **Kevin Hamilton**, IPRC Team Leader for Research on Impacts of Global Environmental Change, **Wataru Ohfuchi**, Leader of the Atmosphere and Ocean Simulation Research Group at the JAMSTEC Earth Simulator Center, and **Yoshiyuki Takahashi**, now at Hokkaido University, have been analyzing output from very fine-resolution global atmospheric models run on the Earth Simulator.

The American Geophysical Union featured as a Journal Highlight the first publication by the group, “Explicit Global



Kevin Hamilton downloads AFES data onto a portable hard disk at the JAMSTEC Earth Simulator Center for transportation back to Hawaii.

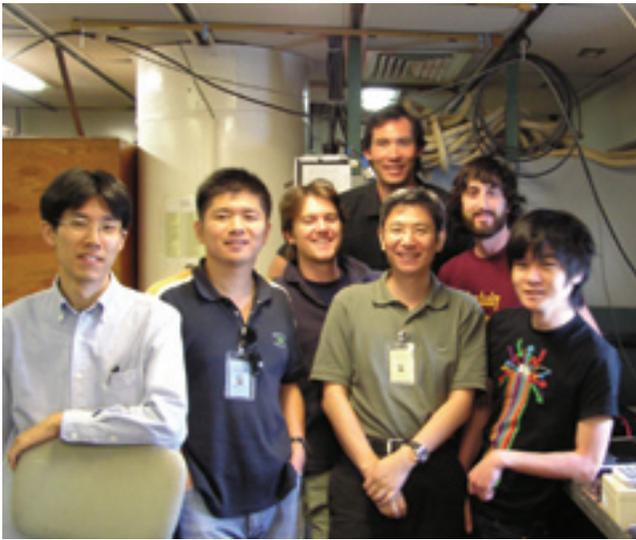
Simulation of the Mesoscale Spectrum of Atmospheric Motions,” which appeared in the June 2006 *Geophys. Res. Lett.* issue (www.agu.org/sci_soc/prll/jh060724.html#1).

This publicity led to an interview with Hamilton and a news story on high-resolution atmospheric modeling in *Science* (“Sharpening Up Models for a Better View of the Atmosphere” by R. Kerr, in the August 25, 2006, issue). The article emphasized the crucial role of the JAMSTEC Earth Simulator in sparking a surge in climate research.

IPRC and Japanese Scientists Conduct Atmospheric Soundings in the Northwest Pacific

IPRC team leader of Indo-Pacific Climate Research **Shang-Ping Xie** organized an atmospheric sounding survey in the Kuroshio Extension (KE) region east of Japan with **Youichi Tanimoto** of Hokkaido University and other scientists in Japan. For this survey, IPRC postdoctoral fellow **Takeaki Sampe**, **Jian Ma** (UH Meteorology Department), **Karl Stein** (UH Oceanography Department), and **Kohei Kai** (Hokkaido University) were aboard the National Science Foundation Research Vessel *Melville* from June 1 to July 5, 2006. They launched 140 GPS sondes to measure temperature, humidity, pressure, and wind velocity from the sea surface to a height of 24 km. Continuous observations of surface meteorological variables and observations with a lidar ceilometer, an instrument for detecting the presence of clouds overhead and measuring the height of their bases, were also made from the ship during this period.

The research cruise was part of the Kuroshio Extension System Study (KESS) field experiment funded by the U.S. National Science Foundation. Xie, Tanimoto, and their col-



Aboard the RV *Melville* (front, from left) Takeaki Sampe, Tony Ma, Shang-Ping Xie, Kohei Kai; (middle) Karl Stein, Jason, (back) Timothy Lim.

leagues have already conducted three such cruise surveys in the region in which otherwise few atmospheric soundings are being made. The data are now being studied to determine how the ocean affects the atmospheric boundary layer, the clouds, and the Meiyu–Baiu front, the northeastward tilted rain band that stretches from eastern China through Japan to the Northwest Pacific.

IPRC Scientists in the Media and Public

IPRC Director **Julian McCreary** and IPRC Research Team Leader **Kevin Hamilton** took part in the Hawai'i Public Radio show “Beyond the Reef” with host **Alvin Adams** on October 17, 2006. They were joined by **Andy Nash**, director of operations at the National Weather Service Honolulu Forecast Office, and **Gerard Fryer**, seismologist at the NOAA Pacific Tsunami Warning Center. The topic of the show was Mother Nature: Climate Change, Hurricanes, and Earthquakes. McCreary and Hamilton were interviewed about climate change. A podcast of the interview is available at iprc.soest.hawaii.edu/news/news.html.

Following the FRCGC's successful prediction of the 2006 Indian Ocean dipole, **Shang-Ping Xie** and **H. Annamalai** sent out a news release predicting that the unusual cool sea surface temperatures off the Sumatra Coast in the Indian Ocean could affect the ongoing El Niño this fall and winter. Their release resulted in a flurry of interviews by various me-



At the Hawaii Public Radio Show “Mother Nature: Climate Change, Hurricanes, and Earthquakes,” (from left) Julian McCreary, Kevin Hamilton, host Alvin Adams, Andy Nash, and Gerard Fryer.

dia sources. Links to the news release and to some of the news coverage are found at iprc.soest.hawaii.edu/news/news.html.

IPRC research team leaders **Kevin Hamilton**, **Shang-Ping Xie**, and **Axel Timmermann** participated in discussion panels following showings of the climate-change movie, “An Inconvenient Truth.” The movie, which was shown several times by the University of Hawai'i Sustainability Group, was open to the public and attracted several hundred viewers.

IPRC Scientists Active in the Climate Research Community

IPRC Director **Julian McCreary** was appointed in Spring 2006 to serve on the Earth Science Subcommittee of the NASA Advisory Council (NAC). The subcommittee provides recommendations and advice to NASA on Earth science through the NAC Science Committee. NASA Earth Science deals with the scientific exploration of the Earth system, particularly with issues critical to the future of humankind. This includes understanding variability and change of the Earth system, which requires maintaining long-term continuity of highly accurate measurements.

Yuqing Wang, IPRC Scientist and Associate Professor of Meteorology, has accepted the invitation to serve as an Associate Editor of *Weather and Forecasting* for the term beginning in January 2007. This journal of the American Meteorological Society publishes research on techniques for weather forecasting and analysis, forecast verification studies, and case studies useful to forecasters. Included in the journal



Shang-Ping Xie answering questions after the showing of "An Inconvenient Truth."

are studies that show the transfer of research results to the forecast community, or illustrate the societal use and value of forecasts.

Bin Wang, co-leader of Asian-Australian Monsoon System Research at the IPRC and professor of Meteorology, co-chaired the workshop on "Decadal-Centennial Variability of the East Asian Monsoon" from July 7 to 9, 2006, and co-chaired the organizing committee for the meeting Winter MONEX: A Quarter Century and Beyond, April 4 to 7, 2006, Kuala Lumpur.

Jim Potemra, assistant researcher at the IPRC, chaired the Fourth Meeting of the Pacific Argo Regional Center (PARC), which was hosted by the Korean Oceanographic and Research Development Institute (KORDI) in Ansan, Republic of Korea, on October 26, 2006.

Shang-Ping Xie, co-leader of Indo-Pacific Climate research at the IPRC and professor of Meteorology, has been elected to the Council of the Oceanographic Society of Japan (OSJ) for a two-year term beginning in 2007. The OSJ has about 2700 members, organizes two scientific conferences

each year, and publishes two journals: *Oceanography in Japan* (*Umi-no-Kenkyu*) in Japanese, which contains original papers, contributions, and communication articles for the members; and *Journal of Oceanography* in English, which is devoted to the publication of original articles, short contributions, reviews, and correspondence in oceanography and related fields.

Axel Timmermann, co-leader of Impacts of Global Change Research at the IPRC and associate professor of Oceanography, co-chaired the workshop on Multidecadal to Centennial Global Climate Variability, held November 15 to 17, 2006, in Honolulu.

Becoming a Climate Researcher at the IPRC

Four years ago, the *IPRC Climate* featured **Bunmei Taguchi** in "The Makings of a Climate Researcher." Taguchi had joined the IPRC under a contract from a Japanese company to study the Kuroshio with **Humio Mitsudera**. When Taguchi's company wanted him to return to Japan, Taguchi decided to forgo the security of a good job and to follow his research interests. He enrolled in the UH Meteorology graduate program with IPRC's **Shang-Ping Xie** as his dissertation advisor. The IPRC gave financial support.

This spring Taguchi completed his dissertation, which dealt, not surprisingly, with the Kuroshio Extension (see p. 6 this issue). Upon submitting to the *Journal of Climate* the manuscript based on this research, Taguchi received this note from Chief Editor **Andrew Weaver**: "I wanted to personally congratulate you on this fine manuscript and thank



Bunmei Taguchi (right) and his dissertation adviser Shang-Ping Xie at Taguchi's graduation in 2006.

you for submitting it to the *Journal of Climate*. You will see that you received four sets of reviewer comments. In my years as an editor, I have rarely (if ever) seen four sets of reviewers comments unanimously describe a manuscript as excellent with such minor suggested revisions."

Before even the graduation festivities, Taguchi had secured a position as a scientist at the JAMSTEC Earth Simulator Center and returned to Japan. Now at the Earth Simulator Center, he is working on the ocean component of the Coupled GCM for the Earth Simulator (CFES), and continuing research with OFES.

Congratulations, Bunmei!!

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NEW IPRC STAFF

Shinichiro Kida joined the IPRC as a postdoctoral fellow in September 2006 after receiving his PhD from the Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanography/Applied Ocean Science and Engineering.



Shinichiro Kida

A friend at the University of Tokyo had introduced Kida to the field of oceanography. He recalls, "I was fascinated by the beautiful pictures from satellites and numerical models. Turns out, learning the underlying physics that result in these beautiful pictures is even more exciting. Ever since then, I have been trying to learn and understand how the complex ocean and climate system works."

Kida's dissertation deals with the interaction between the Mediterranean Overflow and the upper ocean. Marginal sea overflows are an important source of dense water in the deep open ocean. But as overflows descend the continental slope, they take along a substantial amount of upper-ocean water. The upper ocean balances this loss of mass and the associated vortex stretching by establishing a horizontal circulation along the continental slope. Known as a *beta-plume*, this circulation transports more water than required to balance the mass loss, and its strength is largely controlled by the background topography. The study showed that along a steep slope, such as Cape St. Vincent for the Mediterranean Overflow, the beta-plume can escape from the continental slope and form a basin-scale circulation. This may be the mechanism that forms the Azores Current, a current whose origin is intriguing oceanographers.

At the IPRC, Kida is working with team leader for Regional Ocean Influences Research **Kelvin Richards** on the interaction among the Indonesian Throughflow, the surrounding marginal seas, the Pacific and Indian oceans and the atmosphere.

Elodie Martinez joined the IPRC as a postdoctoral fellow in summer 2006. She recalls, "I have always been fascinated by the ocean. So I studied physical oceanography at the Université de la Méditerranée in Marseille and ocean engineering



Elodie Martinez

at the Ecole Supérieure d'Ingénieurs de Marseille. As part of my training, I spent half a year at the University of French Polynesia." Martinez returned to Marseille in 2002 to receive her master's degree in both physical oceanography and in engineering.

"For a short while, I worked for an oil company, designing risers for pumping oil from the bottom of the ocean to the surface. This work was not for me, though, and I returned to physical oceanography and to the University of French Polynesia, from where I obtained my PhD in April 2006."

For her dissertation, Martinez used satellite wind and sea surface anomaly data to determine the surface currents in the South Pacific Ocean basin and then used these results to study the floating debris drift in the Economic Exclusive Zone of French Polynesia. With this approach, she could show the extent to which invasive brown algae had dispersed among the French Polynesian archipelagoes and how the input of nutrients around islands increased the phytoplankton in Marquesan waters. Using a regional ocean circulation model, she extended her work to below the ocean surface and studied the seasonal and annual temperature and current variability of the region's thermocline.

Martinez is now working with **Kelvin Richards**, IPRC team leader for Regional Ocean Influences Research. They are examining the impact of mixing and stirring on the interactions among populations in the "twilight zone," the ocean depth that still receives a little a bit of sunlight, but not enough for photosynthesis to take place.

Ingo Richter joined the IPRC as a postdoctoral fellow this past September. His path to climate science was rather indirect, starting with linguistics classes at university. He soon switched to study fluid dynamics and physics at the University of Göttingen. During his studies there, he worked at the Institute for Bio-



Ingo Richter

climatology, an interdisciplinary research center devoted to the study of ecosystems from physical, biological, and chemical perspectives. His research there included measuring turbulent fluxes of CO₂ and water vapor in a nearby forest.

"My work," he recalls, "required climbing up and down a 52-m-high tower to collect data and maintain the equipment."

In winter it could get pretty uncomfortable on the top platform with the ice-cold wind blowing in your face.”

“While at Göttingen, I got to know Americans on exchange programs from University of California campuses. After finishing my Diplom, I took advantage of this exchange program and went to UCLA because it is famous for general circulation modeling. Although I had planned just a one-year exchange, I stayed, working in the GCM group led by Professor Mechoso.”

For his dissertation, Richter focused on subtropical stratocumulus clouds and the large-scale factors controlling them. The work involved AGCM experiments with idealized SST distributions and no-mountain experiments. After receiving his PhD in 2005, he stayed on as a postdoctoral fellow.

At the IPRC Richter is working with **Shang-Ping Xie**, team leader for Indo-Pacific Ocean Climate Research. Using the IPRC Ocean–Atmosphere Coupled Model, iROAM, they are studying the ITCZ-cold tongue complex in the eastern tropical Atlantic in order to understand better the processes responsible for region’s climate. The goal is to get information that can be applied to reduce model biases and improve prediction.

Takeaki Sampe joined the IPRC as a postdoctoral fellow this past summer after obtaining his PhD from the Department of Earth and Planetary Science, University of Tokyo.

“I became interested in weather forecasting when I was 10 or 11 years old,” Sampe recalls. “It was exciting that the weather chart I drew from the weather report on radio gave me a prediction of the future. I wanted to become a weather forecaster. Unfortunately, before I entered university, numerical models on high-speed computers came to do a much better job in forecasting than human insight and experience. But the dynamics of the atmosphere are so complex and many things are not yet elucidated that I find research in climate dynamics fascinating.”

Sampe’s research for his master’s degree at the University of Tokyo focused on the dynamics and variations of storm tracks. In contrast to the North Atlantic, storm activity over the northwestern Pacific tends to be weaker in midwinter than in late fall and early spring. His research with Profes-



Takeaki Sampe

or **Hisashi Nakamura** showed that during the northwestern Pacific midwinter, the upper-level core of the storm track tends to shift southward and upward, away from the oceanic front. This results in more uniform air temperatures over the ocean in the storm-track region and in weaker storms.

For his dissertation, Sampe studied the impact of oceanic fronts on storm tracks and on the general circulation of the atmosphere. In simulations from AFES (Atmospheric GCM for Earth Simulator), he determined that oceanic fronts enhance and anchor storm tracks. The storms help to maintain midlatitude westerly surface winds, which in turn drive oceanic currents. In other words, storms and storm tracks are a matter of atmosphere-ocean interaction, and oceanic fronts significantly affect the atmospheric variability at mid- to high-latitudes.

Working with **Shang-Ping Xie** at the IPRC, Sampe is examining storm-track data in satellite observations of surface winds affected by sea surface temperature (SST). Storm tracks in these surface wind fields differ from traditional ones: wind intensity correlates remarkably well with SST around the fronts. The initial research will study the dynamics of Meiyu–Baiu front. This front is important for southern China and Japan because it brings about their rainy season.

IPRC Bids Sayonara

N.H. Saji has taken a position as Senior Research Scientist with the APEC Climate Center in Busan, Korea, where he manages the center’s Climate Information Services. **Chi-Yung Francis Tam** has also joined the APEC Climate Center as a research scientist for climate prediction and model development. **Hongwei Yang** has become an associate researcher at the Institute of Atmospheric Physics, Chinese Academy of Sciences. **Hiroshi Yoshinari** is now working for the National Research Institute of Fisheries Science, Fisheries Research Agency. He is developing methods to predict the tuna population around Japan by using ocean condition prediction system: FRA-JCOPE System. **Simon de Szoeke** has been awarded a National Research Council Research Associateship and has chosen to work at NOAA’s Earth System Research Laboratory in Boulder.

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