Axel Timmermann returned to the IPRC in August 2004 as an associate professor of oceanography and co-leader of the Impacts of Global Environmental Change research team. Timmermann started his higher education in quantum field theory, writing his master’s thesis on recreating in a particle accelerator the early universe, one microsecond after the Big Bang. Although this work is still being referenced by physicists who study characteristics of these particles during collisions, Timmermann found, “This kind of science is interesting, but completely worthless for society.” He switched to climate research and obtained his PhD in meteorology from the Max Planck Institute, University of Hamburg, in 1999. For his dissertation, he conducted a multi-century simulation with a coupled atmosphere-ocean model to show that decadal and interdecadal variations in the North Atlantic can result from an interaction between the thermohaline circulation and the Arctic Oscillation: Strong winds in the North Atlantic change the ocean salinity, which in turn affects the winds by changing the meridional overturning circulation and the associated temperature.

Timmermann has several research projects at the IPRC. He is studying the emergence and physics, not of regional, but of global climate anomalies, those that affect all three major ocean basins. These basins can communicate by atmospheric bridges or, on longer timescales, by oceanic wave adjustments. Paleoclimate analysis suggests that global oceanic seiches may synchronize climate variations on timescales longer than a decade. Their relevance to climate, particular to greenhouse warming, however, has not been studied yet, something that Timmermann is now exploring with a hierarchy of climate models. Furthermore, together with Max Yaremchuk, Konstatin Lebedev and Soon-Il An, Timmermann is conducting a project that combines the advantages of two approaches to seasonal forecasting—assimilation of the best oceanic or atmospheric observations into an uncoupled system, and nudging observed sea surface temperature or wind anomalies into a coupled system. This work will yield a procedure for coupled air-sea data assimilation. With Oliver Timm, he is simulating the transition from glacial to interglacial climates with a 3-dimensional coupled atmosphere-ocean-sea ice model in order to look at the role of the North Atlantic thermohaline circulation in triggering abrupt climate transitions.

Finally, Timmermann is continuing work on the absorption of solar light by phytoplankton in the ocean. Recent studies by his research team in Germany have shown that the vertical redistribution of solar energy in the ocean due to the absorption of light by chlorophyll may change the upper-ocean thermal structure considerably.

Sharon DeCarlo joined the IPRC in October 2004 as a computer systems engineer. Already before she obtained her bachelor’s degree in computer science from the University of Hawai‘i, DeCarlo accepted a job as a computer programmer with Eric Firing at the Joint Institute for Marine and Atmospheric Research. Little did she realize that this work would lead to a career in oceanography. She later became Roger Lukas’ first employee after he obtained his PhD in 1981. During the more than 20 years of working for Lukas, Sharon developed data acquisition, processing, and analysis software for such projects as NORPAX, WEPOCS, LIA, TOGA/COARE, JASMINE and HOT. With her expertise in programming and knowledge of ocean and climate data sets and products, DeCarlo has a dual role at the IPRC: She is in charge of the APDRC web development under the direction of Peter Hacker, and she works with the IPRC computer facility team under Ron Merrill to keep our computers and servers running.

Kazuyoshi Kikuchi joined the IPRC as a postdoctoral fellow in Spring 2004, having obtained his Doctorate of Science from the University of Tokyo in Fall 2003. For his doctoral dissertation, he studied the following aspects of the important tropical atmospheric disturbance, the Madden-Julian Oscillation (MJO, p. 15): the triggering of a new cycle by the preceding one, the development of convection in the MJO over the warm pool, and a comparison of the propagation of the MJO during winter and summer. Kikuchi’s long-term goal is to determine how this tropical disturbance changes with climate change, and how a changed MJO will, in turn, affect climate change. As a first step towards this ambitious goal, he is working with Bin Wang at the IPRC to determine the
precipitation properties of the MJO by analyzing data from the Tropical Rainfall Measuring Mission.

Simon de Szoeke came to the IPRC in September 2004 as a postdoctoral fellow, shortly after receiving his PhD in atmospheric sciences from the University of Washington. His thesis on the evolution of the cross-equatorial atmospheric boundary layer in the eastern Pacific consists of large-eddy simulations to show the interactions among turbulence, clouds, and surface fluxes in the planetary boundary layer (PBL) and of an analysis of planetary boundary layer observations from the EPIC 2001 95W field project. de Szoeke was drawn to climate research because of concern for the environment and the desire to apply his knowledge of physical science to understand how climate varies and changes. Interested in the boundary layer’s response to the ocean and its downstream effects on the Intertropical Convergence Zone, de Szoeke is working at the IPRC with Shang-Ping Xie and Yuqing Wang. With the IPRC Regional Climate Model, he is studying easterly wave dynamics in the eastern Pacific ITCZ, and with the coupled IPRC Regional Ocean-Atmosphere Model, he is studying the widespread stratocumulus clouds over the eastern Pacific, which cool the ocean surface by reflecting solar radiation and cool themselves by emitting infrared radiation, affecting the boundary layer and regional-scale circulations.

Yanli Jia joined the IPRC in May 2004 as a visiting associate researcher. She went to England in 1985, to the Department of Oceanography, University of Southampton, under a PhD scholarship sponsored by the British Council and the Chinese Ministry of Education. Joining a project on the seasonal and interannual variability of the equatorial Pacific and the 1982–83 El Niño, Jia quickly became familiar with oceanography and ocean modeling. Upon completing her PhD work in 1988, she stayed at Southampton to study the effects of advection and diffusion on tracer dispersion in ocean gyres. She experimented with idealized tracers in simple gyre circulation patterns and studied deep and thermocline ventilation processes with transient tracers (tritium and CFCs) using a general circulation model of the North Atlantic. In 1990, Jia joined the present James Rennell Division for Ocean Circulation and Climate at the Southampton Oceanography Centre, working in a group that was implementing a version of the Miami Isopycnic Coordinate Ocean Model (MICOM) for the North Atlantic to study the North Atlantic circulation. This experience has prepared her well for her work at the IPRC, where, together with Peter Hacker, Jim Potemra, and Max Yaremchuk, she is setting up a high-resolution ocean model to study the circulation around islands (see p. 12).

Jiayi Peng joined the IPRC in August 2004 as a postdoctoral fellow. His interest in weather forecasting came as a child when he heard how the eastern wind helped Zhugeliang defeat Cao-cao’s army in the story Three Kingdoms. After study at the Nanjing Institute of Meteorology (NIM), he became a weather forecaster at the Chongqing Meteorology Bureau. Frustrated with the poor predictability of severe storms, he returned to NIM for graduate studies, obtaining his PhD in 1999. At Nanjing University and National Taiwan University from 2001 to 2004, Peng studied the temporal and spatial thermodynamics mesoscale convection in the Wuhan area on July 21, 1998, the day of the disastrous torrential rains and flooding. He found that low-level tropospheric potential vorticity perturbations helped trigger the convection system. Recently he has been studying tropical cyclones, particularly the formation of double eyewalls. At the IPRC, Peng is working with Tim Li and the Asian-Australian Monsoon team. Using a semi-spectral baroclinic model, he is looking at how hurricane structure and intensity interact with the vertical shear flow.

Li Tao, who joined the IPRC as a postdoctoral fellow in July 2004, received her PhD in 2000 from Nanjing Institute of Meteorology (NIM), her thesis entitled “Free mode analysis of the subtropical high over the western Pacific in summer.” She continued at NIM as assistant professor until in 2003 she became a visiting assistant researcher at the Goddard Earth Science and Technology Center, University of Maryland, Baltimore, and then at the Center for Earth Observing and Space Research, George Mason University, Virginia, where she investigated the influence of Tropical Rainfall Measuring Mission precipitation products on the structure and underlying physics of the Madden-Julian Oscillation using a
general circulation model and the data assimilation system of the Goddard Earth Observing System. Interested in atmospheric dynamics, short-term climate change, and mesoscale model-design and simulation, Li will be working at the IPRC with Xiouhua Fu in the Asian-Australian Monsoon team on developing a procedure for predicting seasonal oscillations from satellite data and simulations with the ECHAM model.

**Oliver Timm** joined the IPRC as a postdoctoral fellow in August 2004. He obtained in 2003 his PhD in meteorology from the University of Kiel. For his thesis, Timm estimated the natural variations in the North Atlantic Oscillation (NAO) over the past 300 years by means of such proxy data as tree-ring and ice-core records. Results showed that during the 17th and 18th centuries the NAO varied much as it does today, suggesting that anthropogenic forcing has not altered the variability. After completing his PhD, he worked with the Paleo-Oceanology group at the GEOMAR Institute in Kiel, analyzing coral proxy records to detect the El Niño-Southern Oscillation and NAO signals in these records. Working at the IPRC with Axel Timmermann in the Impacts of Global Environmental Change team at the IPRC, Timm is now looking even further back into Earth’s climate history. With a coupled ocean-atmosphere climate model (ECBILT-CLIO), he is simulating the effects of orbital, orographic, albedo, and greenhouse gas forcings during the last 21,000–100,000 years to study the Atlantic bipolar seesaw in glacial climates and to find links between Pacific and Atlantic climate change on millennial time scales.

**Hongwei Yang** came to the IPRC in Fall 2004 as a postdoctoral fellow. In 2000 he received from the School of Mathematical Sciences, Peking University, Beijing, his PhD in computational mathematics with a two-part dissertation: the first part consists of a series of numerical experiments to improve the design for a new detonation shock tube test facility in the National Laboratory for High Temperature Gas Dynamics, Institute of Mechanics, Chinese Academy of Sciences; the second part of his dissertation is a mathematical proof for a scalar non-homogeneous hyperbolic equation. Yang was drawn to climate research because it allows the application of computational mathematics. While doing postdoctoral research at LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences, he found that many mathematical problems in climate research had not been solved satisfactorily and that the field has many opportunities for “reality mathematics” work. At the IPRC, Yang is working with the Asian-Australian Monsoon team, studying the interaction between land-surface processes and the East Asian monsoon, particularly the effect of snow cover and changes in the underlying surface on the behavior and variability of the East Asian monsoon.

**Xin Zhang** joined the IPRC in September 2004 as a visiting assistant researcher. Zhang worked for three years as a weather forecaster at the Wuhan Meteorological Center, Hubei Province, China, before returning for graduate study. In 2002, he obtained his PhD in meteorology from the Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing, with a dissertation on data assimilation and parallel computing in climate models. Zhang will be working with Tim Li on 4-dimensional variational data-assimilation, using satellite data to improve the numerical modeling and prediction of hurricanes and typhoons.
Agreement between JAMSTEC and IPRC elaborated

Taroh Matsuno, Director-General of the Frontier Research Center for Global Change, and Toshio Yamagata, Program Director of Climate Variations Research at Frontier, visited the IPRC on July 1, 2004, to discuss with IPRC Director Jay McCreary and IPRC research team leaders the scientific work to be done under the new five-year cooperative agreement between the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and the University of Hawai‘i (IPRC Climate, Vol. 4, No. 1).

Our visitors were accompanied by Ichio Asanuma and Tetsuro Isono, both from the Frontier Research Promotion Office, and by Hideyuki Tsunoda, manager of the Knowledge Infrastructure Division Planning Department, JAMSTEC.

Awarded

IPRC’s postdoctoral fellow Haiming Xu and his research team at Nanjing University and Nanjing Institute of Meteorology were awarded the 2003 First Prize in Natural Science by the Chinese Ministry of Education for Research. They received the prize of 50,000 Chinese yuan (about $6,000) for their work dealing with the thermodynamic effect of Indochina on the South China Sea monsoon onset. The team found that strong and persistent surface sensible heating in Indochina before the onset results in strong local temperature and geopotential-height gradients and strong local southwest winds. The team showed that this sensible heating and the subsequent convective latent heating lead to the summer monsoon onset over the South China Sea, the area with the earliest onset in Asia.

Published

The book Earth’s Climate: The Ocean-atmosphere Interaction was published this fall by the American Geophysical Union. “The book represents the climate community’s first effort to summarize the modern science of ocean-atmosphere interaction and the roles that the interaction plays in climate variability in the Pacific, Atlantic, and Indian Oceans as well as interactions across basins and between the tropics and extratropics,” (Eos 2004, 85 (46), p. 486). This book on the most recent observations, theories, and models of the ocean-atmosphere interaction that shape climate over the global ocean is co-edited by Chunzai Wang, research oceanographer at the Physical Oceanography Division of the NOAA Atlantic Oceanographic and Meteorological Laboratory in Miami, Shang-Ping Xie, co-leader of Indo-Pacific Ocean Climate research at the IPRC, and James A. Carton, professor of meteorology at the University of Maryland.

Papers summarizing findings from the Darwin Area Wave Experiment (DAWEX) are collected in a special section of the Journal of Geophysical Research, October 2004 issue. The DAWEX field campaign was conducted during 2001 in northern Australia in order to examine the effects of deep tropical convection. Kevin Hamilton, IPRC co-leader of the Impacts of Global Environmental Change research and host of the 2002 workshop on the results from DAWEX held at IPRC, is the lead author of the overview paper for this special section: K. Hamilton, R.A. Vincent, and P.T. May, “Darwin Area Wave Experiment (DAWEX) field campaign to study gravity wave generation and propagation.” The special section is also available online at www.agu.org/journals/ss/DAWEX1.

A full list of IPRC publications are at iprc.soest.hawaii.edu/publications/publications.html.
Kevin Hamilton, co-leader of the IPRC Impacts of Global Environmental Change research and professor of meteorology, began on July 1, 2004, a three-year term as chair of the University of Hawai'i Department of Meteorology.

Lorenz Magaard, IPRC executive associate director and professor of oceanography, starts in January 2005 a three-year term as chair of the University of Hawai'i Department of Oceanography.

Celebrated!

IPRC Director Jay McCreary and his contributions to tropical oceanography were celebrated at a day-long special session of the Indian Ocean Modeling Workshop held from November 29 to December 3, 2004, at the East-West Center in Honolulu. The occasion, McCreary’s 60th birthday, spurred his friends and colleagues to relate the scientific impact of his work and to reminisce about past research endeavors. (The workshop will be described in the next issue of the IPRC Climate.)

At an evening reception during the workshop, the 60th birthday of Bin Wang, co-team leader of the IPRC Asian-Australian Monsoon team, was celebrated together with Jay McCreary’s at the Halekulani Hotel in Waikiki.

On Television

The IPRC was featured several times on Hawai'i television in late summer–early fall. IPRC Director Jay McCreary was interviewed about the movie The Day after Tomorrow and whether such an extreme climate event could happen on Earth. McCreary was again interviewed about El Niño and what effects it may have on Hawai‘i, following NOAA’s announcement of the arrival of El Niño. Then in the beginning of October, the IPRC was featured as the climate research center at the University of Hawai‘i. Video clips can be viewed at iprc.soest.hawaii.edu/news/ithenews.html.