VISITING SCHOLARS

Tropical Cyclone Research

At the end of February, IPRC's **Yuqing Wang** hosted several experts on tropical cyclones: **Noel Davidson** from the Centre of Australian Weather and Climate Research (CAWRC), **Peter Black** from the Naval Research Laboratory, and **Pat Harr**, **Michael Bell** and **Robert Atkinson**, all from the Naval Postgraduate School in Monterey, California. In a joint IPRC–UH Department of Meteorology seminar, Davidson described the tropical cyclone research and operational dynamical forecasts at CAWCR, including the newly developed Tropical Cyclone Model for the Australian Community Climate and Earth-System Simulator (ACCESS-TC). Black also gave a seminar titled "Typhoons Fanapi and Megi from ITOP2010: Ocean interaction and extreme-wind boundary layer."

Front row from left: Noel Davidson, Peter Black, Yuqing Wang; back row: Pat Harr, Robert Atkinson, Michael Bell, Gary Barnes.

Alumni Return to IPRC

Three IPRC Alumni, now all working at JAMSTEC, returned to Hawai'i in late fall 2011 to give presentations at the Fourth Annual JAMSTEC-IPRC Workshop on Modeling. (see page 14). **Masami Nonaka**, now Leader of the Mid- and High-latitude Climate Predictability Research Team talked about "Potential predictability of interannual variability in the Kuroshio Extension jet speed in an eddy-resolving OGCM." **Bunmei Taguchi**, scientist with the Geophysical Fluid Simulation Research Group of the Earth Simulator Center, presented on "Propagation features of decadal-scale subsurface signals in the North Pacific Ocean." **Toru Miyama**, with the Ocean Downscaled Prediction Research Team, spoke on "Regional climate modeling study of wind variations over western Pacific warm pool before El Niño onsets." Miyama returned in late winter for an extended visit to continue work with IPRC's **Yuqing Wang** to apply the IPRC Regional coupled Ocean-Atmosphere Model (iROAM).

From left: Masami Nonaka, Bunmei Taguchi, and Toru Miyama.

Characterizing Cloud Properties

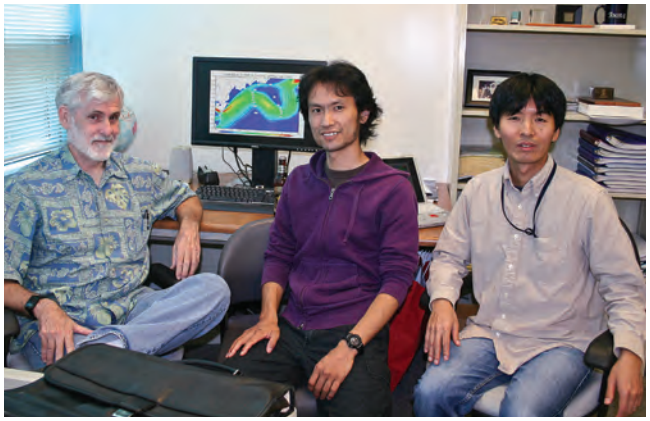
During February and March **Ralf Bennartz**, Professor of Atmospheric Science at the University of Wisconsin, visited IPRC to work with IPRC Assistant Researcher **Axel Lauer**. Bennartz is a leading authority on satellite observations of clouds and has been collaborating for the last few years with Lauer on ways to characterize the observed small-scale variability of cloud properties and applying the results to inform treatments of clouds in regional atmospheric models. While at the IPRC this winter, Bennartz worked with Lauer on ways to incorporate ground-based cloud and precipitation observations into their approach.

From left: Axel Lauer, Ralf Bennartz, and Kevin Hamilton.

Hokkaido Exchange Continues

Kunihiro Aoki, a Hokkaido University postdoctoral fellow, visited the IPRC during February and March 2012. Interested in ocean dynamics, he is currently analyzing OFES data to understand the eddy transport of heat, thickness, and momentum in the Kuroshio Extension region. During his stay, he worked closely with IPRC's professor of oceanography **Jay McCreary** and researcher **Ryo Furue**. This was Aoki's sec-

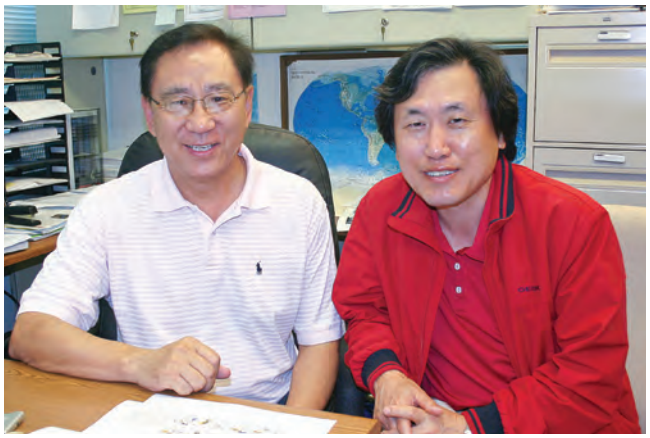
ond IPRC visit on an overseas-research grant from the President of Hokkaido University. This continues a long-standing exchange program between IPRC and Hokkaido University organized by Hokkaido professor **Youichi Tanimoto**.



From left: Jay McCreary, Kunihiro Aoki, and Ryo Furue.

Predicting the Madden-Julian Oscillation

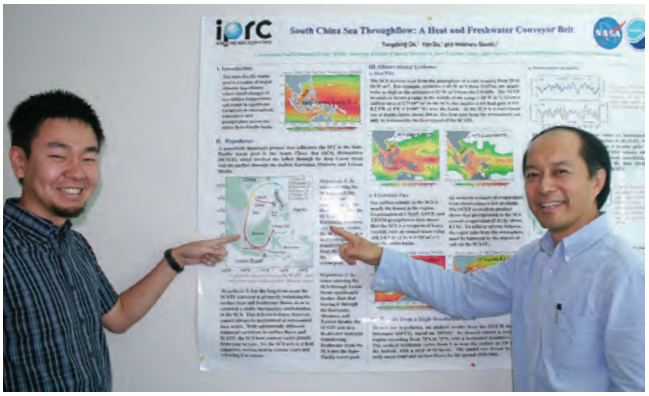
In the early months of 2012, the IPRC welcomed again **In-Sik Kang** from the Climate Environment System Research Center, Seoul National University. A member of the international Multi-model Ensemble Prediction of the Madden-Julian Oscillation (MJO) Project, Kang is working with the project's principal investigator, **Bin Wang**, in assessing the ability of current coupled atmosphere-ocean general circulation models to hindcast the MJO. Kang and Wang are also partnering on determining the essential dynamics of the MJO: Wang, together with long-term visitor **Fei Liu**, is using a theoretical model to analyze the results of Kang's numerical experiments with an atmospheric GCM.



Bin Wang with In-Sik Kang.

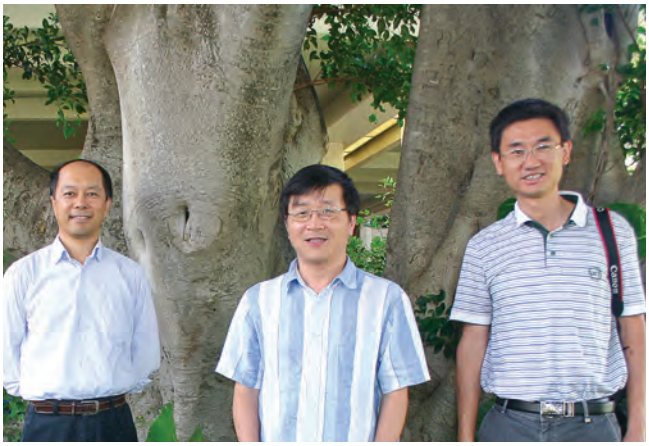
Western Pacific Circulation and Climate

Tomoki Tozuka, associate professor at the University of Tokyo, was an IPRC visitor in early 2012. Among his research interests are the western Pacific circulation, the Indian Ocean dipole, and the South China Sea/Indonesian Throughflow. He discussed with IPRC Senior Researcher **Tangdong Qu** the latest findings on the Indonesian Throughflow and gave a seminar titled "Roles of South China Sea Throughflow in the global climate as revealed by a CGCM."



Tomoki Tozuka (left) and Tangdong Qu.

Jianping Gan, professor at Hong Kong University of Science and Technology, visited the IPRC for three months during winter 2011–2012 to work with Qu on the South China Sea circulation and its interaction with the Pacific western boundary current. Also visiting Qu this winter was former IPRC postdoctoral fellow **Shan Gao**, now an associate researcher at the Institute of Oceanology, Chinese Academy of Sciences in Qingdao. Gao is collaborating with Qu on the analysis of the downstream impact of South Pacific Tropical Water.



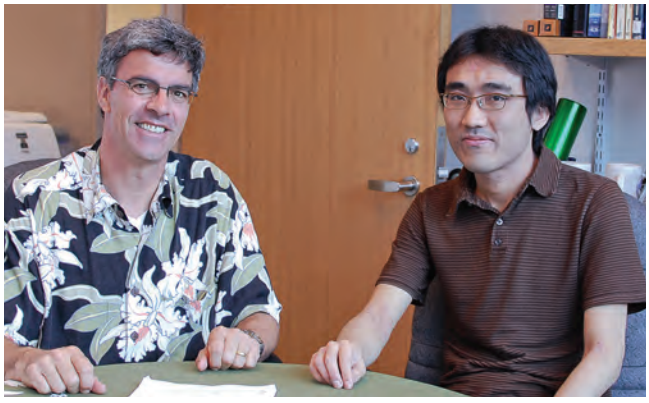
From left: Tangdong Qu, Jianping Gan, and Shan Gao.

Hisayuki Kubota visited the IPRC from mid-January to end of March to work with IPRC's faculty **Bin Wang** and **Shang-Ping Xie**. Kubota has collected a typhoon-track dataset and a surface-weather-station dataset that reach back to the late 19th century for countries in the western North Pacific. This work meant delving into paper records of libraries in the Philippines, Taiwan, Hong Kong, Shanghai, and Hawai'i, to collect the information. Based on this historical station data, he has developed with Xie and **Yu Kosaka** a new Pacific-Japan (PJ) pattern index for the western North Pacific summer monsoon that traces summer monsoon variability back to 1897. This index reveals that the relationship between the PJ index and the preceding winter El Niño-Southern Oscillation has varied, the highest correlation being today and before 1910 and the lowest from the 1910s to 1970s.

Shang-Ping Xie with Hisayuki Kubota.

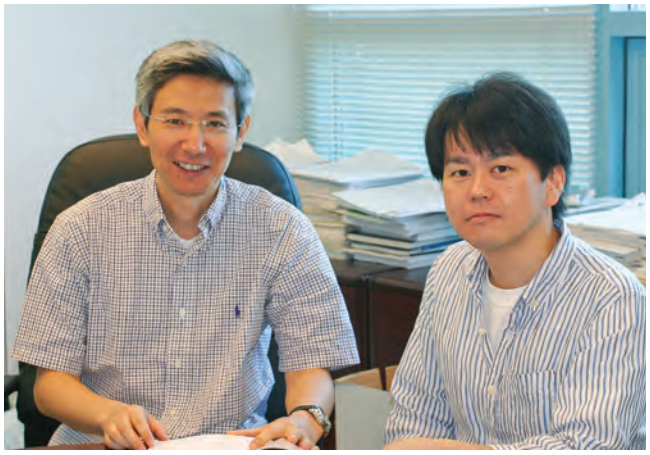
North Pacific Circulation and Climate

Yoshinori Sasaki, former IPRC Postdoctoral Fellow and now scientist at Hokkaido University, visited his IPRC mentor, **Niklas Schneider** in Spring 2012 to discuss results of a just-completed study on the decadal variability of the Kuroshio Extension. The study shows that changes in the wind stress curl in the central North Pacific shifts the axis of the Kuroshio in a north- or southward direction. Surprisingly this shift impacts the speed of the jet after a few months. For example, a weakened wind stress curl shifts the axis of the Kuroshio Extension northward, with the jet strengthening several months later.



Niklas Schneider with Yoshinori Sasaki.

Fumiaki Kobashi, a former IPRC visiting assistant researcher and now associate professor at the Tokyo University of Marine Science and Technology, returned to discuss with his former mentor **Shang-Ping Xie** his latest research on the dynamics of North Pacific mode waters and their representation in climate models and response to global warming. He also reviewed observational plans to study subduction, ventilation and dissipation of North Pacific mode waters.

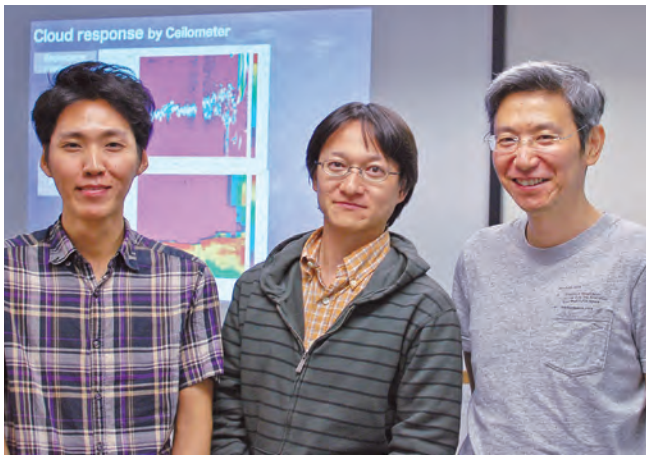


Shang-Ping Xie with Fumiaki Kobashi.

Xie also hosted **Hiroyuki Tomita**, technical staff member at JAMSTEC's Research Institute for Global Change, who visited from October 2011 to February 2012, and **Akira Kuwano-Yoshida**, scientist with the JAMSTEC Earth Simulator Center's Geophysical Fluid Simulation Research Group. While at the IPRC, Tomita analyzed the atmospheric sounding data from a research cruise that took place during a cold meander of the Kuroshio Extension, thus witnessing the meander's clearing of the low clouds, an effect also seen in satellite images. His visit included work regarding the J-KEO buoy, which his JAMSTEC group deployed north of the Kuroshio Extension.

Kuwano-Yoshida studied the differences in the Baiu simulations between the Atmospheric and Coupled GCM for the Earth Simulator (AFES and CFES) during his several month-long IPRC visit in late 2011. In AFES, the Baiu season

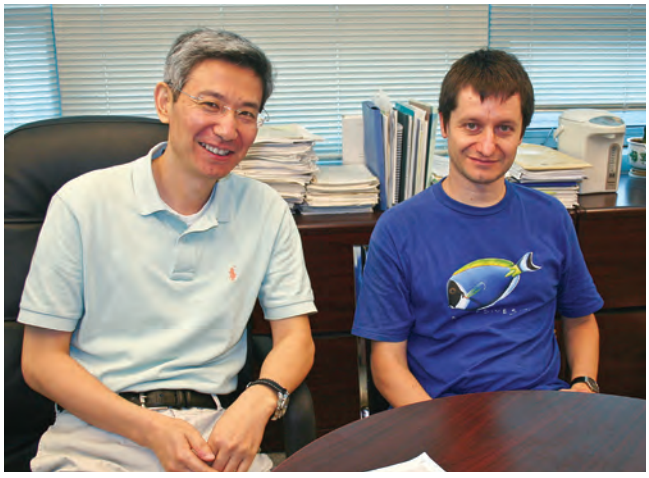
ends too early, but in CFES it ends too late. His experiments with AFES show that the model differences are due to differences in sea surface temperature, the meridional shifts in the Asian westerly jet being responsible for the Baiu behavior in both models. Specifically, low surface-evaporation north of the Kuroshio Extension brings about the end of the Baiu.



From left: Hiroyuki Tomita, Akira Kuwano-Yoshida, and Shang-Ping Xie.

Atlantic Circulation and Climate

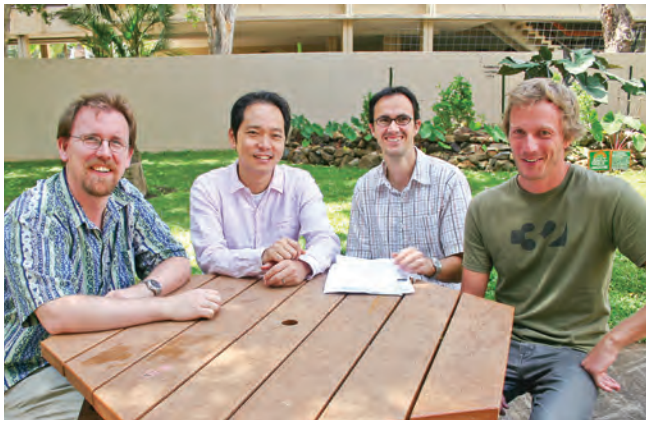
Former IPRC postdoctoral fellow **Ingo Richter**, now scientist with the Low-latitude Climate Prediction Research Team of JAMSTEC's Research Institute for Global Change, visited the IPRC for two months in late winter. He discussed with his former mentor **Shang-Ping Xie** methods for assessing model errors in simulations of the equatorial cold tongue of the Atlantic, and the mechanisms responsible for interannual variability in the equatorial zonal wind and their possible role in triggering the Atlantic Niño. Richter also gave a seminar on errors seen in state-of-the-art climate simulations of the tropical Atlantic.



Shang-Ping Xie with Ingo Richter.

Exploring New Facets of Past Climates

In March 2012, **Yusuke Yokoyama**, a leading authority in paleoclimate research and associate professor at the Atmosphere and Ocean Research Institute, University of Tokyo, met with members of the IPRC paleoclimate modeling group **Axel Timmermann**, **Oliver Elison Timm**, and **Malte Heinemann** to discuss possible collaborative research. Yokoyama is using innovative field and laboratory methods that yield new geobiochemical paleoclimate records, opening new aspects for the study of global climate change during the last glacial cycles. The scientists explored ways that IPRC's new Earth System Model of Intermediate Complexity with its newly coupled 3-D ice sheet model can help decipher information stored in Yokoyama's paleoclimatic archives. By focusing on global sea level changes during the last glacial cycles, they hope to determine the drivers of glacial cycles and the climate response to the dramatic redistribution of water masses between land and ocean. Between 30,000 and 20,000 years before present, the ice-domes in North America, Europe, and Siberia became more massive and sea level dropped 60 m. Yokoyama's geologic archive now reveals that 19,000 years ago, in the early stage of deglaciation, global sea level rose 10–20 m within a few thousand years. The joint proposed research may help answer a crucial question in climate change: How sensitivity is Earth's climate to external forcing?



From left: Axel Timmermann, Yusuke Yokoyama, Oliver Timm, Malte Heinemann.