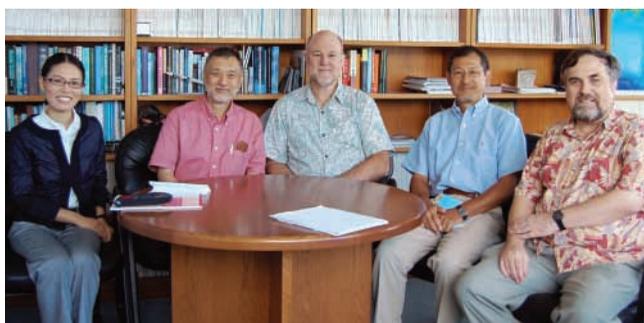


JAMSTEC Executive Director Visits

JAMSTEC Executive Director **Yoshihisa Shirayama** visited the IPRC on August 30–31 to discuss future collaborations between the IPRC and JAMSTEC. Accompanying Shirayama were **Yukio Masumoto**, Program Director in JAMSTEC's Research Institute for Global Change (RIGC), and **Chihiro Baba** from JAMSTEC's International Affairs Division.



From left, Chihiro Baba, Yoshihisa Shirayama, SOEST Dean Brian Taylor, Yukio Masumoto and IPRC Director Kevin Hamilton.

Hiroki Tokinaga Awarded the Yamamoto-Shyono Medal

IPRC Assistant Researcher **Hiroki Tokinaga** was awarded the prestigious Yamamoto-Shyono Medal by the Meteorological Society of Japan at the society's Fall meeting in Sapporo, Hokkaido. Each year the society selects two top papers written by young scientists for the award. Tokinaga, who received the medal for his work on the detection of regional patterns of tropical Indo-Pacific climate change over the past six decades, gave a lecture at the meeting on this topic.



Hiroki Tokinaga receives the Yamamoto-Shyono Medal from Hiroshi Niino, president of the Meteorological Society of Japan.

IPRC Model Used by Japanese Research Groups

The field of numerical simulation of atmospheric and oceanic circulation has come to be dominated by a limited number of global and regional models developed by large national centers or large consortia. In this environment it is remarkable that IPRC's locally-developed regional atmospheric model (iRAM) and coupled ocean-atmosphere regional model (iROAM) are in demand for use by colleagues internationally. These models, developed by IPRC faculty member **Yuqing Wang**, have features that make them attractive for many investigations, and they have been shown to produce quite good simulations when applied to individual regions stretching from East Asia to the eastern Pacific.

Over the last decade, IPRC scientists have benefitted enormously from the model development at JAMSTEC (e.g. the AFES, OFES, CFES, and NICAM models). Thus, it is par-

ticularly gratifying when our JAMSTEC colleagues use an IPRC model in their research. For example, **Toru Miyama**, research scientist with the Climate Variation Predictability and Applicability Research Program of the Research Institute for Global Change (RIGC), recently led a team of JAMSTEC scientists in applying iRAM to a case study of the formation of an unusual narrow rainband over the East China Sea. This work was published in October in the journal *Tellus A*.

Another recent Japanese study, this one led by **Shunya Koseki** of Hokkaido University, used iRAM, together with reanalysis data and satellite observations, to investigate the formation of low-level clouds in summer over the Okhotsk Sea. This study appeared in the January 2012 *Journal of Geophysical Research*.

Students from Japan's Super Science High School Project Visit IPRC

To strengthen mathematics and natural science education, the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) funds the "Super Science High School (SSH)" project for designated high schools. With these funds the schools can send students for short visits to overseas universities and research institutions. Such a Super Science High School is Masuda High School, the alma mater of IPRC's Assistant Researcher **Ryo Furue**. The school sent a group of students to Hawai'i in October to visit the Base Facility of the Subaru Telescope on the Big Island of Hawai'i. The students and their teachers then came to O'ahu to visit the IPRC.

Furue welcomed the students and teachers in the IPRC conference room, where they honored Furue with a gift of the school's mascot, a mask for a dance representing a famous story about the Chinese Emperor Xuanzong of the Tang Dynasty, who recovered from a serious illness after he dreamed he was rescued by Zhong-Kui, the king of the ghost world.



Student presenting Masuda High School mascot to Ryo Furue. Images courtesy of Masuda High School.

The two-day program for the students included lectures by **Jan Hafner** on the debris released into the ocean by the March 2011 tsunami, and by Furue, who spoke about observing and predicting the atmospheric and oceanic circulation, and about the nature and culture of Hawai'i. One of the students presented the results of his science project on river-water quality. Furue also took the students on a field trip to the eastern side of O'ahu to look at weather systems, ocean waves, geology, and plants.



Students from Masuda High School, during their visit to the IPRC.

Pacific Land Grant Association Workshop

The Pacific Land Grant Association (PLGA) connects across the American-affiliated Pacific region those post-secondary educational institutions that have academic programs in agriculture. Members are University of Hawai'i Mānoa, University of Alaska Fairbanks, University of Guam, College of Micronesia, Northern Marianas College, and American Samoa Community College. In October the PLGA sponsored a workshop in Honolulu on the implications of projected climate change for regional agriculture. IPRC Director **Kevin Hamilton** was invited to present IPRC's work on climate projections for Hawai'i and other Pacific Islands. The meeting brought together scientists and administrators from the PLGA colleges along with other officials and educators interested in this important issue.



IPRC's Kevin Hamilton with Dan Aga, Dean of Community and Natural Resources, American Samoa Community College, at the PLGA workshop.

IPRC Participates in Two NOAA Conservation Panels

NOAA has important responsibilities for nature conservation in the Pacific and earlier this year hosted two workshops in Honolulu on urgent conservation issues. IPRC Director **Kevin Hamilton** was invited as a panelist in both workshops to provide expert input on regional climate change.

The workshop in early June was entitled *Managing Papahānaumokuākea in the Context of Climate Change*. Papahānaumokuākea Marine National Monument was created by presidential proclamation in 2006 to protect the extraordinary natural and cultural resources of the Northwestern Hawaiian Islands. The site, encompassing 140,000 square



Black-footed Albatross on Midway. This species breeds in the Northwestern Hawaiian Islands. They are very heat-sensitive, building their nests in sand, and large kills occur during unusually warm weather, questioning their viability in a significantly warmer climate. Image courtesy of James Lloyd.

miles, is the largest conservation area in the United States and among the largest marine protected areas in the world. In 2010 Papahānaumokuākea was designated a UNESCO World Heritage site for its outstanding natural and cultural features. As discussed at the workshop, the wildlife and other natural and cultural resources are threatened in many ways by the consequences of global warming. Rising sea level, rising air temperatures, and changing rainfall patterns may directly affect the habitability of the islands by many bird species; rising ocean temperatures and ocean acidification may affect coral reefs and other aspects of the marine ecosystem.

At the second workshop, June 18, an invited science panel reviewed NOAA's draft-response to a petition from the non-profit Center for Biological Diversity, which had asked the Federal Government to list 82 coral species as threatened or endangered under the Endangered Species Act. This petition may set a groundbreaking legal precedent for application of the Endangered Species Act, because human-induced global climate change is the main driver of potential extinction for the coral species.

At both workshops Hamilton presented the preliminary results of high-resolution regional climate projections conducted at the IPRC in collaboration with **Yuqing Wang, Chunxi Zhang** and **Axel Lauer**.

Pacific Islands Climate Science Center Inaugural Lecture

The Pacific Islands Climate Science Center (PICSC) is a new collaborative initiative of the US Department of Interior, the University of Hawai'i at Mānoa, the University of Hawai'i at Hilo and the University of Guam. The PICSC is one of a network of 8 regional climate science centers recently established by the Department of Interior. The centers are to serve the scientific needs of managers as they deal with wildlife habitats and ecosystems in a changing climate. The IPRC is playing a key role in this federally funded climate initiative in the Pacific islands: IPRC Director **Kevin Hamilton** is also serving as the University Director for the PICSC, and IPRC scientists are providing much of the PICSC research on the climate drivers for anticipated ecological changes in

the Pacific region. Among the recently funded PICSC projects, for instance, are two that are spearheaded by IPRC scientists: "Climate Change Research in Support of Hawaiian Ecosystem Management: An Integrated Approach," led by **Oliver Elison Timm**, and "21st Century High-Resolution Climate Projections for Guam and American Samoa," led by **Yuqing Wang**.

On October 26 an inaugural lecture was held on the Mānoa Campus to mark the public rollout of the PICSC. The lecture by **Loyal Mehrhoff**, field supervisor at the U.S. Fish and Wildlife Service, and **Deanna Spooner**, coordinator of the Pacific Islands Climate Change Cooperative, was titled "Navigating Change: Climate Science and Collaboration in the Pacific."



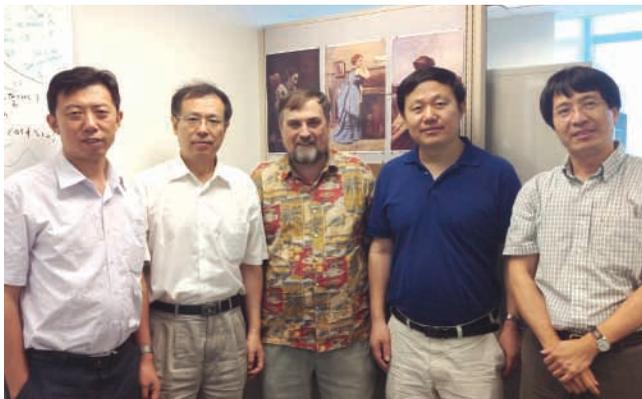
The lecture was preceded by brief remarks from University of Hawai'i at Hilo Chancellor **Donald Straney**, University of Guam Assistant Vice President **John Peterson**, PICSC Federal Interim Director **Cynthia Kolar**, University of Hawai'i at Mānoa Associate Vice Chancellor **Vassilis Syrmos**, and by Kevin Hamilton.



From left, John Peterson, Donald Straney, Kevin Hamilton, Loyal Mehrhoff, Deanna Spooner, Cynthia Kolar, and Vassilis Syrmos.

Ocean University of China Delegation Visits

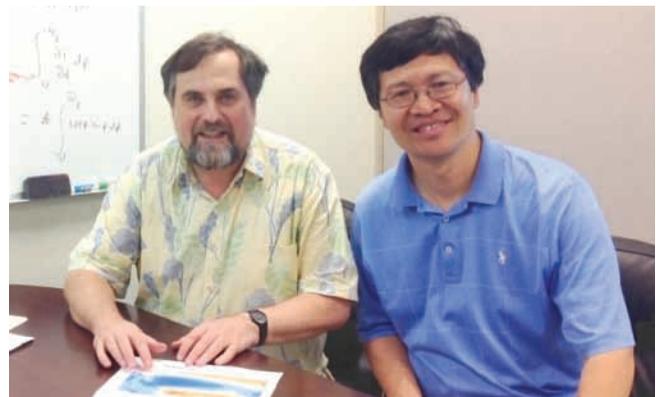
Faculty and officials from the Ocean University of China (OUC) visited the IPRC on August 7. The delegation was led by OUC Vice President **Hua Jun Li** and included **Dai Hua**, Director of the OUC International Office, and **Peiqing Guo**, professor in the OUC School of Law and Political Science. Located in Qingdao, OUC is the largest university for ocean sciences and related fields in China. The visitors met with several IPRC researchers as well as with scientists from the Oceanography Department, University of Hawai'i at Mānoa.



From left, Peiqing Guo, Dai Hua, Kevin Hamilton, Hua Jun Li, and Bo Qiu (UH).

Texas Climate Center Director Visits

Zong-Liang Yang, Director of the Center for Integrated Earth System Science and John A. and Katherine G. Jackson Professor at the University of Texas, visited the IPRC in June. His center is leading advances in satellite analysis and numerical modeling work on climate-relevant land-surface processes. He presented a seminar titled “Achievements, Challenges and Opportunities in Modeling Land Surface Processes.” In his talk Yang volunteered that he wants his center, as it grows, to take IPRC as a role model for scientific achievement in climate diagnostic and simulation work.



Kevin Hamilton with Zong-Liang Yang.

Japan-Hawai'i Workshop on Disaster Risks

On August 14, the University of Hawai'i Asia Pacific Initiative hosted a meeting on disaster risk management that was co-sponsored by the International Research Institute of Disaster Science (IRIDeS) of Tohoku University in Sendai, Japan, and the United Nations University (UNU) Tokyo campus. IRIDeS was founded at Tohoku University after the great March 2011 earthquake and tsunami. Deputy Director of IRIDeS, **Fumihiko Imamura**, described the mission and research activities of his new institute. **Brendan Barrett** of UNU discussed relevant educational programs, particularly an Asia-Pacific initiative led by UNU to teach college students about environmental planning using climate change as a cross-cutting theme. **Nikolai Maximenko** and **Kevin Hamilton**, who represented the IPRC at the meeting, took the opportunity to talk with IRIDeS tsunami modeling ex-

perts about the prospects of developing a simulation that shows the distribution of debris deposits from major tsunami wave inundations.



IRIDeS Deputy Director Fumihiko Imamura at the workshop.

Wide Interest in the IPRC and its Scientists

The IPRC reputation as an exciting international research center in the exotic Hawaiian Islands is spreading beyond the science community! In 2010 the IPRC was featured in a textbook designed to teach Japanese to Chinese speakers as an example of a workplace with a very international group of young workers (tinyurl.com/IPRCjn2010, p. 4, bottom right), and Senior Scientist **Nikolai Maximenko** appeared in the documentary on *America before Christopher Columbus: Who really discovered the new world?* aired on the US History Channel. In 2011, IPRC professor **Shang-Ping Xie** served as a tour guide for a Japanese television documentary about the rainiest spot on earth, Mt. Waialeale on Kauai.

This past October, a French television production company documented the experiences of two of our French-speaking young scientists for a French travel documentary on the Hawaiian Islands. The television crew followed IPRC postdoctoral fellows **Ali Belmadani** and **François Ascani** around for an "ordinary" day in Honolulu. After an early surfing session at Kewalo Basin near Ala Moana beach park, the two young scientists went to their University of Hawai'i at Mānoa offices. Belmadani described his

theoretical work on wind-forced beta-plumes and their application to deep currents found below the Hawaiian Lee Countercurrent. Together with IPRC Scientific Computer Programmer **Jan Hafner**, he showed the French reporters the now famous animations of the tsunami debris dispersion that followed the Great Tohoku Earthquake of March 11, 2011. The animations were derived from Maximenko's and Hafner's Surface Currents from Diagnostic (SCuD) model and are accessible on the IPRC website (tinyurl.com/IPRCdebrisnews). The prime-time documentary *Echappées Belles* (France 5 tv channel), featuring the two postdoctoral fellows, was broadcast on November 3 and again on November 11, 2012.



Ali Belmadani being filmed for French TV documentary.

IPRC Scientists Active in the Research Community

Yu Kosaka was invited this fall to become an editor of *Science Online Letters on the Atmosphere* (SOLA), a Web-based research letter, which rapidly distributes scientific discoveries and advances the understanding in the atmospheric and related sciences. The pronunciation of "SOLA" is similar to the Japanese *sora* which means *atmosphere*. SOLA is published by the Meteorological Society of Japan.

Yuqing Wang will become an editor of the AMS journal *Weather and Forecasting* beginning January 1, 2013. He has served as associate editor for the past 3 years.

IPRC's **Ali Belmadani**, **Ryo Furue** and **Nikolai Maximenko** convened a session on "Mesoscale Ocean Processes" at the 2012 American Geophysical Union Fall Meeting in San Francisco. Mesoscale processes such as eddies, waves, fronts, and jets contribute significantly to the transport of momentum, heat, and mass as they interact with the ocean circulation at larger and smaller scales. With over 50 papers pre-

sented in three 2-hour oral sessions and a 4-hour poster session, the meeting was a great success. The conveners intend to organize this session every year at the AGU Fall Meeting.

Continuing the Hokkaido University Exchange Program

IPRC's meteorology professor **Yuqing Wang** continued the long-standing partnership with Hokkaido University that was organized by Hokkaido professor **Youichi Tanimoto**. Wang gave a series of lectures over three days and one seminar at Hokkaido University in September 2012. His lectures focused on dynamical downscaling and its applications. The Hokkaido lecture series began in Spring 2008 with **Shang-Ping Xie**. More recent lectures series were given by IPRC's **Jay McCreary**, **Kelvin Richards**, and **Axel Timmermann**.

IPRC Scientists in the News

Tropical Indo-Pacific Climate Shifts to a More El Niño like State

IPRC's **Hiroki Tokinaga** and **Shang-Ping Xie** and their colleagues published in the November 15 issue of *Nature* their successful simulation of the slowdown of the Walker circulation over the last 60 years, a change that atmospheric models had difficulty simulating. The study shows that changes in the sea surface temperature pattern across the Indo-Pacific are the drivers of the slowdown. The photo on the right by **Y. Kashino**, RIGC/JAMSTEC, was featured on the National Science Foundation home-page banner, with a link to the story. The study results were picked



up by many online news outlets, such as *Science Newsline*, *Science Daily*, and the Australian Government's *Climate Science.org*. Tokinaga's work was also

featured in Honolulu's *Star-Advertiser* in a special tabloid insert on innovations at the University of Hawai'i.

Why Rainfall Projections for South Pacific Islands Are Uncertain

An international team of scientists around IPRC's **Mathew Widlansky** and **Axel Timmermann** found that with global warming rainfall in the South Pacific islands depends on two competing effects: overall warming should increase rainfall, while changes

in atmospheric water transport could decrease rainfall. The uncertainty of which effect wins out makes for highly uncertain rainfall projections. Published in the 28 October online issue of *Nature Climate Change*, the study was featured on the magazine's homepage and widely in such news media as *Science Newsline*, *Phys. Org.*, *Science Daily*, *Raising Islands*.



Earlier Monsoon Onset Impacts Tropical Cyclones in Arabian Sea

The tropical cyclones in the Arabian Sea during the pre-monsoon season (May–June) have intensified since 1997 compared to 1979–1997. IPRC'S **Bin Wang** spearheaded a study showing that this change is due to decreased vertical wind shear, resulting from an

earlier occurrence of tropical cyclones and an earlier monsoon onset. Published in "Brief Communications Arising" in *Nature* (Sept. 20), the study was featured in many online news sites in the US and in the developing world.



Marine Debris Continues to Fascinate the Media

Nikolai Maximenko's and Jan Hafner's expanded version of the IPRC Tsunami Debris model has been featured again in the media, among them the *Star-Advertiser* (August 8, 2012), and *Deep Sea News*. When the news that a blue bin, the first confirmed tsunami debris in Hawai'i, had arrived, the model animation was shown on

CBS News (Sept. 21), *KITV4* (Sept. 22), *USA Today* (Sept. 22) and other outlets. Another flurry for interview requests came when a huge orange cylinder beached on the Island of Hawai'i. The scientists' work has also been featured in the *Natural History Magazine*, the *Frenchtribune.com*, Japan's *NHK*, and other foreign language sites.

Blue bin is first confirmed Japan tsunami debris in Hawaii

Several agencies unable to locate dock

UPDATED 3:04 PM HST Sep 22, 2012

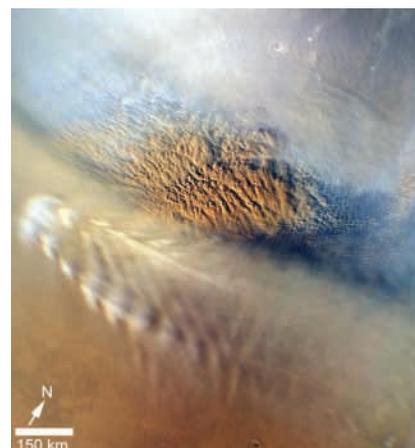


Atmospheric Resonance and Hawai'i Climate

Kevin Hamilton was involved in one of the year's top science stories: NASA's mission of the Curiosity rover on Mars. The atmospheric pressure data from the rover confirmed Hamilton's prediction from over 20 years ago of an extremely large diurnal cycle due to a natural resonance of the Martian atmosphere. This confirmation of a fundamental aspect of atmospheric dynamics theory was reported in online

media including *Popular Science* and *Space Daily*, and featured in the American Meteorological Society's *News You Can Use* and foreign language sites.

The IPRC was also featured in the August 2012 issue of *Alaska Airlines Magazine*. The story is based in part on an interview given by Hamilton about present-day climate conditions and IPRC scientists' projections for climate in the late 21st century.



Climate Change and the South Asian Summer Monsoon

The vagaries of South Asian summer monsoon rainfall impact the lives of more than one billion people. Based on an extensive review of recent research, IPRC's H. Annamalai and A. G. Turner from the University of Reading, UK, conclude that with continued rise in CO₂ the region can expect generally more rainfall. Regional projections for

devastating droughts and floods, however, are still beyond the reach of current climate models. Their review appeared in the June 24 edition of *Nature Climate Change* and was featured in many online media, such as the *New York Times environment blog*, *Science Daily*, *India's Daily News and Analysis*, and *UzbekistanNews.Net*.

