
IPRC NEWS

Governing Committee Meets

The IPRC Governing Committee held its 2011 annual meeting April 18 – 19, 2011 at the IPRC. The meeting was co-chaired by **Yoshihisa Shirayama**, JAMSTEC Executive Director for Research, and **Eric Lindstrom**, NASA Physical

Oceanography Program Scientist, and Chair, GCOS/GOOS/WCRP Ocean Observations Panel for Climate. The meeting reviewed governance and funding issues and the overall scientific achievements and progress of the IPRC.

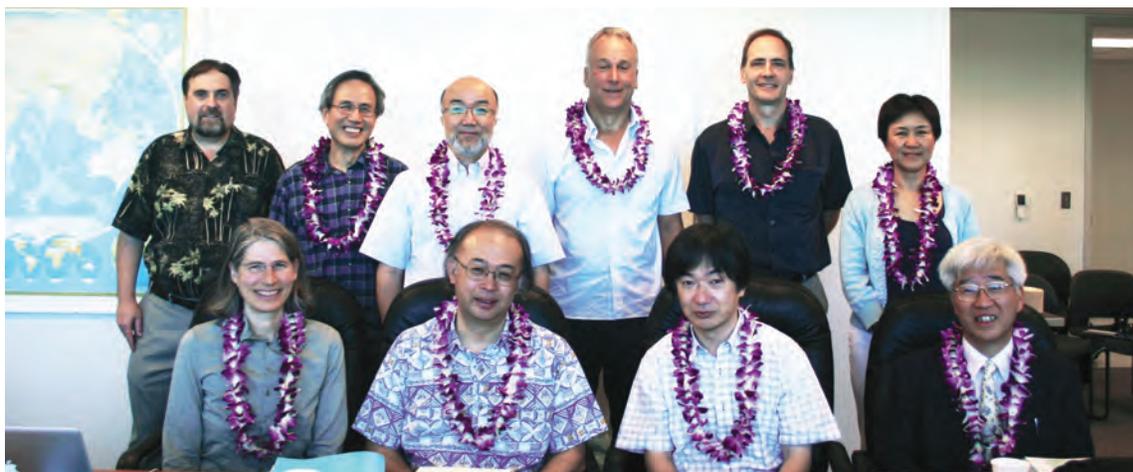


Front from left: Toru Kimoto (JAMSTEC), Shiro Imawaki (JAMSTEC), Yoshihisa Shirayama, Eric Lindstrom, Howard Diamond (NOAA), Chihiro Baba (JAMSTEC); back, Kevin Hamilton, Brian Taylor (SOEST, University of Hawai'i at Manoa), Katsufumi Akazawa (JAMSTEC), and Tetsuro Isono (JAMSTEC).

Science Advisory Committee Meets

IPRC's Science Advisory Committee met on April 19–21 at the IPRC to review the recent research achievements and progress and to learn about ongoing research and plans for future research as laid out in the *IPRC Science Plan*. The pres-

ent co-chairs of the committee are **Humio Mitsudera** from the Institute of Low Temperature Science at Hokkaido University and **Clara Deser** from the National Center for Atmospheric Research in Boulder, Colorado.



Seated: Clara Deser, Humio Mitsudera, Toshiyuki Hibiya (University of Tokyo) and Masahisa Kubota (Tokai University); standing: Kevin Hamilton, Leo Oey (Princeton University), Takehiko Satomura (Kyoto University), Harry Hendon (Australian Bureau of Meteorology), Duane Waliser (Jet Propulsion Lab), and Rong Fu (University of Texas).

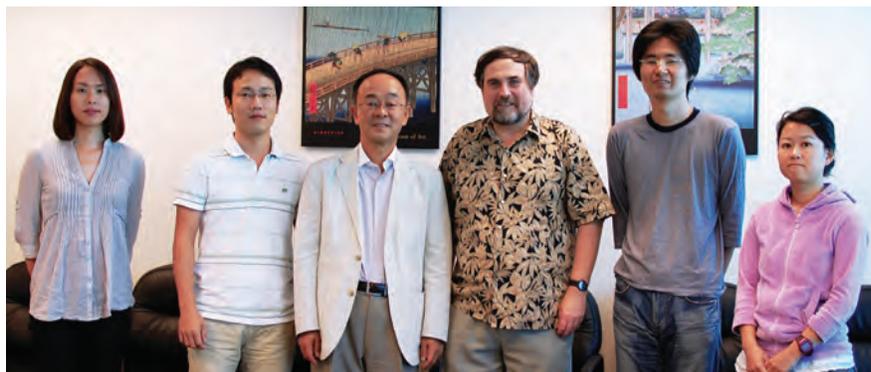
Jim Potemra Named APDRC Manager

On January 1, 2011, **Jim Potemra** became the Manager of IPRC's Asia-Pacific Data-Research Center (APDRC). A 1998 Oceanography Ph.D. from the University of Hawai'i at Mānoa, Potemra has been affiliated with IPRC since 2001 and has been a faculty member since 2008. Potemra replaces **Peter Hacker**, who led the APDRC development since its inception in 2001. Hacker remains a faculty member at UH Mānoa from which he is currently on an extended leave, working at NASA Headquarters.

Japanese Consul General Visits

The Consul General for Japan in Honolulu, the Honorable **Yoshihiko Kamo**, visited the IPRC in March. He was pleased to learn about the broad scope of the longstanding JAMSTEC

collaboration with the IPRC. Kamo was particularly interested in being briefed on IPRC's role in mentoring early career Japanese scientists, and he met with several of the Japanese post-doctoral fellows and researchers currently at the IPRC.



From left: Yu Kosaka, Hiroki Tokinaga, Consul General Kamo, IPRC Director Kevin Hamilton, Tomomichi Ogata and Miho Ishizu.

NOAA Officials Visit

Andy Winer, NOAA's Director of External Affairs, visited the IPRC on December 21, 2010. Before taking up his position in the Obama Administration, Winer was a lawyer in Honolulu for many years, and he served as Barack Obama's campaign chair for the State of Hawai'i during the 2008

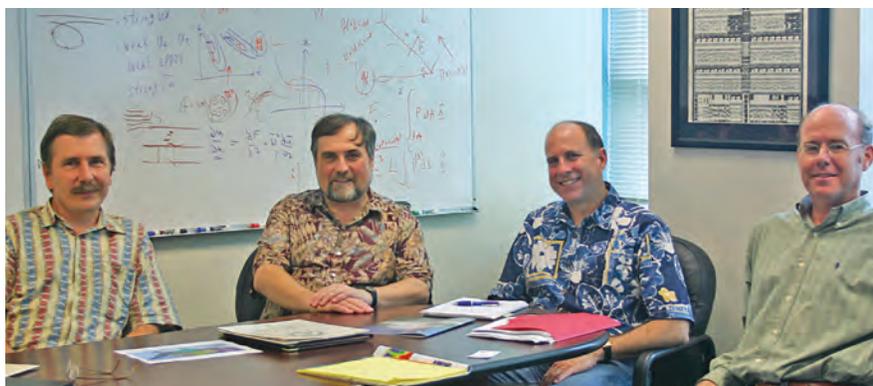
presidential election. Winer was very interested in learning about the scope of the work conducted at Hawai'i's own NOAA-supported climate center, the IPRC. As Director of External Affairs, Winer interacts with stakeholders who have practical interests in NOAA services. He was, therefore,



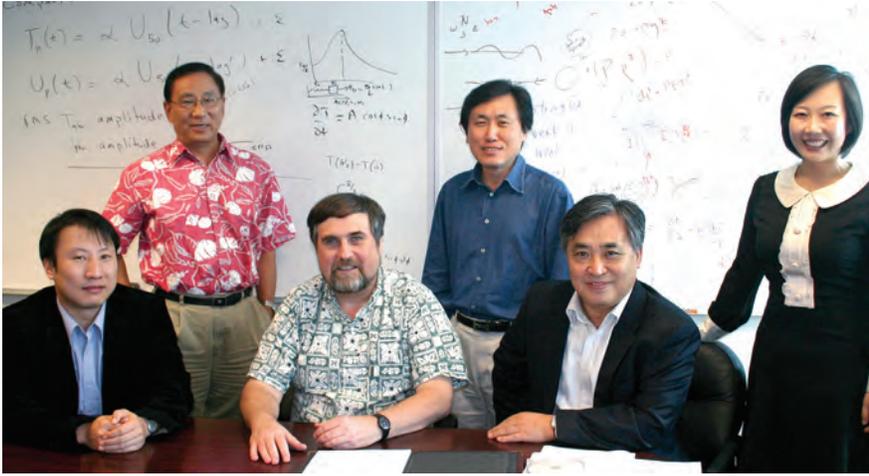
Charlie Baker with Jim Potemra.

pleased to learn about IPRC's service to the community through its APDRC and also about IPRC's recent work studying marine debris.

Charlie Baker, Deputy Assistant Administrator of NOAA's National Environmental Satellite, Data, and Information Service visited IPRC on February 24, along with **Laura Hamilton** NOAA's Pacific Regional Coordinator. They talked with APDRC Manager **Jim Potemra** about IPRC's contributions to management and serving of environmental data for the Asia-Pacific region.



Senior Researcher Nikolai Maximenko, IPRC Director Kevin Hamilton, NOAA's Andy Winer and APDRC Manager Jim Potemra.



From left, Jin Ho Yoo, IPRC Professor Bin Wang, IPRC Director Kevin Hamilton, Seoul National University Professor In-Sik Kang, Chin-Seung Chung, IPRC Assistant Researcher June-Yi Lee.

IPRC and the APEC Climate Center

The APEC Climate Center (APCC) was founded in Busan, Korea in 2005, with the endorsement of the First Senior Officials Meeting of the Asia-Pacific Economic Cooperation

(APEC). The APCC mission is “to enhance the socio-economic well-being of member economies by utilizing up to date scientific knowledge and applying innovative climate prediction techniques.” The IPRC shares with the APCC both a broad international orientation in its operations and a prime

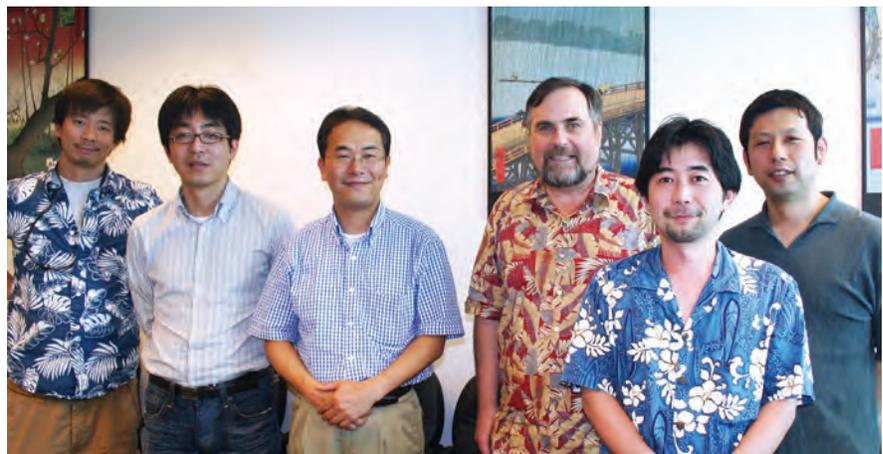
science focus on climate in the Asia-Pacific sector. As an important partner of the APCC since its inception, the IPRC seeks to enhance cooperation wherever possible. Thus it was gratifying that the APCC Director, **Chin-Seung Chung**, and the Head of the APCC External Affairs Department, **Jin Ho Yoo**, visited IPRC in January to discuss possibilities for further collaboration. An exciting topic of conversation was the *2011 APCC Annual Symposium*. Each year the APCC holds an annual scientific symposium in a different APCC country, and this year it is to be in the USA. The IPRC is delighted to continue our special relationship with the APCC by being the local host for its 2011 Symposium, which will be held October 17–20, just three weeks before the *APEC Leaders’ Meeting* will bring heads of government from the 21 APEC economies to Honolulu.

IPRC and Japanese Colleagues Discuss Next Generation Global Models

The 13th *International Specialist Meeting on Next Generation Models on Climate Change and Sustainability for Advanced High Performance Computing Facilities* was held in Honolulu on March 28–30. Organized by University of Tokyo Professor **Akimasa Sumi**, the meeting included presentations from several IPRC scientists as well as many

of IPRC’s close Japanese colleagues. A number of Japanese participants with interests in global atmospheric modeling visited the IPRC for informal discussions after the workshop. The group included **Masaki Satoh** and **Masahiro Watanabe** of the Univer-

sity of Tokyo’s Atmosphere and Ocean Research Institute, **Michio Kawamiya** of JAMSTEC’s Research Institute for Global Change, and **Hirofumi Tomita** of the RIKEN Advanced Institute for Computational Science.



From left, IPRC Assistant Researcher Kazuyoshi Kikuchi, Hirofumi Tomita, Masaki Satoh, Kevin Hamilton, Masahiro Watanabe and Michio Kawamiya.

JAMSTEC - IPRC Partnership on Marine Ecosystem Research

In early March 2011, the new director of the JAMSTEC Environmental Biogeochemical Cycle Research

Program, **Toshiro Saino**, and JAMSTEC senior scientists **Akio Ishida** and **Yoshikazu Sasai** visited the IPRC to discuss collaborations on marine ecosystem research. These collaborations include analysis of the impact of

climate variability on the ecosystem in the eastern tropical Pacific, the Arabian Sea oxygen minimum zone, and the impact of submesoscale processes on the marine ecosystem. Saino described the details of a pair moorings placed on either side of the Kuroshio extension to measure physical and biological parameters. The discussions also highlighted the exciting possibilities of comparing and contrasting the physical environments and ecosystems seen at the moorings with long-term measurements at Station ALOHA east of the Hawaiian island of Kaua'i by using the Ocean General Circulation Model for the Earth Simulator and process studies to elucidate the results.



Akio Ishida, Yoshi Sasai (left) and Toshiro Saino (right) with Kelvin Richards and postdoctoral fellow Miho Ishizu.

Senior Advisor at Norway's Bioforsk Visits

In January, **Udaya Sekhar Nagothu**, Senior Advisor and International Coordinator for India and Southeast Asia at Bioforsk, the Norwegian Institute for Agriculture & Environmental Research, visited the IPRC where **H. Annamalai** has been guiding the climate modeling efforts for ClimaRice, one of Bioforsk's projects in India. At Bioforsk, Sekhar, who had worked for many years in the Indian Forest Service, focuses on socio-economic, institutional and policy analysis in such areas as water, forestry, bio-energy, aquaculture, and fisheries. South and Southeast Asia need to develop suitable adaptation programs to meet the threats from climate change and extreme weather events. During his visit, Sekhar described how he uses the latest knowledge gained from research to promote the development of sustainable agriculture and viable farming practices geared to regional agro-cultural conditions. Much of his success rests on his skills of coordination and his ability to bring together different stakeholders, ranging from farmers to government

ministers and policymakers, and from local governments to scientists. His work with ClimaRice is an example, as seen in the publication of the book *Sustainable Rice Production on a Warmer Planet*, which has emerged from the first phases of the project (see p. 23).



Udaya Sekhar Nagothu (left) with IPRC's Senior Researcher H. Annamalai.

IPRC Scientists in the Community

Guide to the Rainbows of the Hawaiian Garden Isle

Shang-Ping Xie joined a Japanese TV crew in Kaua'i in February to be a guide in the film "A Magical, Rain-sculpted Land – Rainbow Island, Kaua'i" for the *Nippon Hōsō Kyōkai* (NHK), Japan's national public broadcasting organization. The movie is part of the series "Experience Nature's Grandeur," a series that invites viewers to experience the wonders of nature. This particular episode showcases Kaua'i, the rainiest place on Earth that "has created an environment found nowhere else." Xie was invited as a meteorological expert to explain how the mountains act as the rainmaker for the "Garden Isle"

and its many rainbows. The moisture-laden trade winds from the Pacific are forced to rise up the mountain slopes of tall Mt. Waialeale; as they rise, the winds cool and form persistent rain clouds.

The rainfall over the mountains has supplied the rivers and irrigated the taro fields for generations of Hawaiian farmers. The 1½-hour-long film was aired in Japan on April 23, 2011.



Shang-Ping Xie (middle) with the show's director, Ryo Enami (second from left) and the TV crew. Hanalei River and the taro fields it irrigates form the backdrop.

Traditional Knowledge Applied to Food Sustainability

Climate Change and Food Security was the title of the panel at the Kamakakuokalani Center for Hawaiian Studies on November 16, 2010. IPRC Director **Kevin Hamilton**, invited to participate on the panel, described the global and regional context for under-

standing and projecting climate change in Hawai'i. The panel was a lively mix, including **Lilikala Kame'eleihiwa**, Professor of Hawaiian studies at UH Mānoa; **Kanekoa Shultz**, Kane'ōhe Marine Coordinator for the Nature Conservancy; and **Kukui Maunakea-Forth**, Executive Director of MA'O Organic Farms on O'ahu. The discussions

considered adaptation strategies appropriate for Hawai'i, among them the usefulness of traditional and historical Hawaiian knowledge. The strategies used to manage resources within the traditional ahupua'a (triangular slices of land running from the mountains in the center of an island down to the ocean) provided some measure of resiliency that has been lost in modern land and water management practices. Most individual ahupua'a contained all the resources necessary for reliable food production: a seashore for fishing and perhaps aquaculture, streams for drinking and irrigation of taro fields, and forested highlands for hunting and gathering wild foods. The possible use of official records of the Hawaiian Kingdom related to land use to infer climatic conditions was raised.



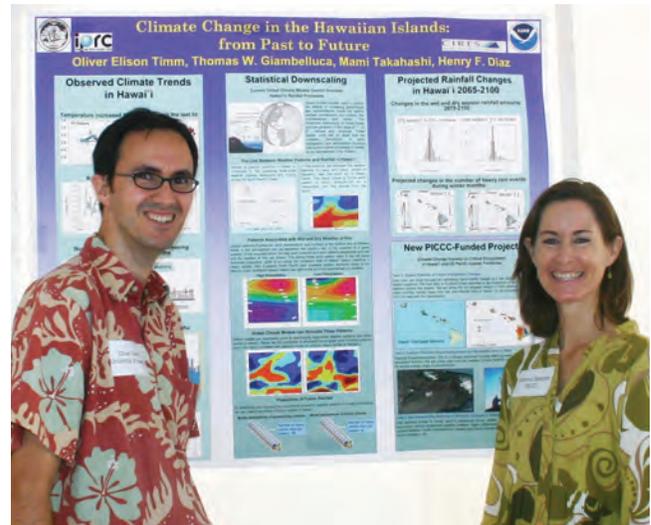
Lilikala Kame'eleihiwa, Kevin Hamilton, Kanekoa Shultz, Kukui Maunakea-Forth at the Climate Change and Food Security Panel.

Climate-Change Impacts in Hawai'i and US Pacific Islands

Rainfall in Hawai'i has decreased in the last 30 years as has the frequency of weather conditions, such as Kona Lows, that produce heavy rainfall events over Hawai'i. These are the conclusions of IPRC's Assistant Researcher **Oliver Elison Timm**, who has been studying the effects of climate change on rainfall, drought, and evapotranspiration across the Hawaiian Islands with **Mami Takahashi**, **Tom Giambelluca** (UH Mānoa Geography Department), and **Henry Diaz** (U. Colorado). To study whether these trends will persist through the 21st century, the team statistically downscaled six models that were run under global warming scenarios for the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Definitive conclusions were not possible as the global model predictions for Hawai'i disagree substantially.

Elison Timm was asked to showcase the team's findings during the December 2010 visits to Honolulu of **Tom Strickland**, the US Department of Interior (DOI) Assistant Secretary for Parks and Wildlife, and **Dan Ashe**, DOI's Deputy Director for Fish and Wildlife. The study is funded by the Pacific Islands Climate Change Cooperative (PICCC), for which IPRC scientists are the spearheading the atmo-

spheric climate-change research component. IPRC Director **Kevin Hamilton** leads the regional numerical modeling of future climate change and Elison Timm the statistical climate-change analysis. PICCC unites over 20 federal, state, non-profit agencies, and educational centers and research institutes under the umbrella of supporting climate-change research and developing adaption strategies for Hawai'i and other Pacific Islands.

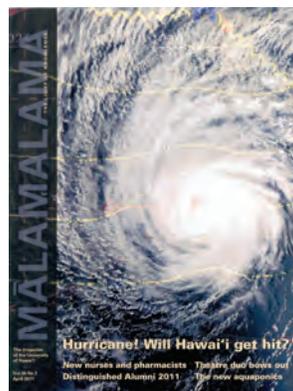


Oliver Elison Timm with PICCC Coordinator Deanna Spooner.

Hurricane Forecast: Unraveling the Storm's Dynamics

Hurricane research at UH Mānoa is the subject of the cover story in the spring issue of *Mālamalama*, the University of Hawai'i magazine. The story, written by IPRC Outreach Specialist **Gisela Speidel**, described longstanding efforts to understand hurricane dynamics at IPRC and the UH Meteorology Department. This work includes case studies of individual storms by Professor **Gary Barnes**, who has been flying for decades into hurricanes with NOAA's hurricane hunters. Professor **Steven Businger** conducts research to improve the Weather Research and Forecasting (WRF) Model of tropical storms as well as trying new technologies to garner better information about

these storms. At the IPRC, Professor **Yuqing Wang** has developed his own hurricane model and is leading many studies on aspects of hurricane genesis and development. While basic understanding is a key goal, these scientists are motivated by a desire to discover the elusive "holy grail"—a confident prediction of hurricane intensity through a storm's lifecycle.



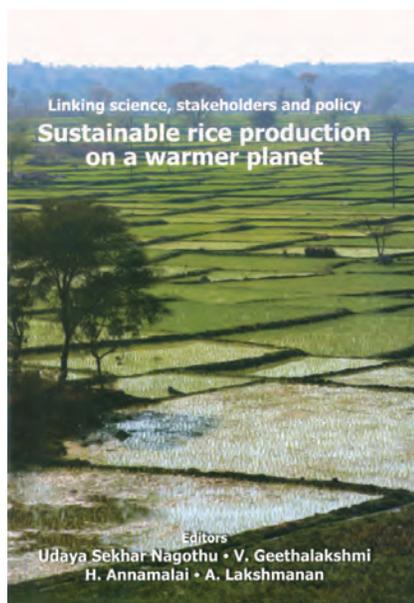
The Making of Future Scientists

UH Mānoa hosts annually the *Pacific Symposium for Science and Sustainability* for Pacific Island high school students. Students with the most outstanding research at the regional level are invited to speak at the symposium. At this year's symposium, **Jim Potemra**, manager of IPRC's Asia-Pacific Data-Research Center, moderated and helped select the best presentations. His group of students, who came from as far away as American Samoa, had such research topics as beach erosion, invasive species, and health and environmental issues. The symposium proceedings are published, and five finalists go on to the National Junior Science and Humanities Symposia.

Climate Modeling for Sustainable Rice Production

H. Annamalai is co-editor and co-author of the book, *Sustainable Rice Production on a Warmer Planet*, based on his work with ClimaRice, a project funded by the Ministry of Agriculture in Norway (see p. 20; *IPRC Climate* Vol. 10, no. 2)

“This book nicely summarizes the findings from ClimaRice, the three-year multi-disciplinary project supported by the Government of Norway, to assess climate change impacts and vulnerability of rice ecosystems and farming communities in the Tamil Nadu region of India. I believe that sharing experiences of workable solutions between farmers, researchers and other stakeholders is the only environmentally sound and socially just way... towards sustaining rice production in India. The book provides some flexible measures for climate adaption to meet the needs of farmers under different local conditions,” writes Lars Peder Brekk, the Norwegian Minister of Agriculture and Food, in the book’s foreword.



National news on the CBS Early Show on April 8 features IPRC tsunami-debris trajectory.

IPRC in the Media

The Fate of Ocean Debris from Japan's Tsunami

The powerful tsunami, triggered on March 11 by the Tohoku earthquake, destroyed coastal towns near Sendai in Japan and washed much of the region’s infrastructure into the ocean. The large amount of debris now floating in the ocean represents a potential hazard to marine traffic and will eventually impact shorelines in remote parts of the Pacific basin. The long-term impact of the debris will depend on how the individual pieces break up and how much sinks, but a key determinant is the surface current field. IPRC’s Senior Researcher **Nikolai Maximenko** has developed a statistical model of the ocean surface-currents based on many years of observations of satellite-tracked drifting buoys. Along with IPRC’s Scientific Computer Programmer **Jan Hafner**, Maximenko was able to use his model to project the likely fate of the floating debris over

the next several years. Maximenko and Hafner predict that Hawai’i could see some debris on its shores in about 1½ years and the North American West Coast in three years. But a great deal will be trapped for several years in the North Pacific Garbage Patch. In five or six years, Hawai’i shores can expect to see another, stronger and longer-lasting barrage of debris. Maximenko and Hafner presented their results in an animation, http://iprc.soest.hawaii.edu/users/nikolai/2011/Pacific_Islands/Simulation_of_Debris_from_March_11_2011_Japan_tsunami.gif

Given the great public interest in this topic, the IPRC work was featured by a large number of the many news media, including CNN, Voice of America, and the *Asahi Shimbun*. The IPRC prediction was a story covered on the national news broadcast on the CBS television network’s *Early Show* on April 8.

Ships Add to Air Pollution and Global Warming

The report on ship emissions by the German Aerospace Center's SeaKLIM, to which IPRC's **Axel Lauer** contributed, received media attention in Europe and elsewhere. In the year 2000 (year with most recent available data), ships contributed around 2.7% of carbon dioxide anthropogenic emissions, 15% of nitrogen oxides, and 8% of sulphur dioxide. Ships released about the same amount of carbon dioxide as air travel, about 10 times more nitrogen oxides and 100 more times sulfur dioxide. Of all anthropogenic aerosol sources, ship-stack emissions provide the clearest demonstration that these particles can modify the microphysical and optical cloud properties.



Climate Feedback from Low Marine Clouds

As noted in the story “How will Low Clouds respond to Global Warming?” (*IPRC Climate* Vol. 10, no. 2), a key component of the feedbacks that determine the sensitivity of the global climate to large-scale forcing is the response of low marine clouds. IPRC scientists **Axel Lauer**, **Kevin Hamilton** and **Yuqing Wang**, along with colleagues at UH Manoa and the

University of Wisconsin, addressed the issue with a regional-model study that suggested that such clouds make a strong positive contribution to the climate feedbacks. Published at the end of 2010 in *Journal of Climate*, their study received widespread media attention from *New Scientist* to the *Tehran Times* and *Japan Herald*.

Tropical Atlantic Sees Weaker Trade Winds and More Rainfall

Developing a method to remove the systematic bias in wind measurements over the ocean due to increased the height of the anemometer placement, IPRC's **Hiroki Tokinaga** and **Shang-Ping Xie** examined long-term trends in the tropical Atlantic with their corrected observations (this issue, p. 10). They found that, rather than having strengthened as indicated in the raw data, the trade winds in the tropical Atlantic have actually weakened and the pattern of ocean surface temperature has changed. As a result, the equatorial Amazon and the Guinea Coast are seeing more rainfall and the Sahel less. The findings, published in the January issue of *Nature Geoscience*, received media attention, including the *Honolulu Star-Advertiser*, India's *Daily News and Analysis*, *ScienceDaily*, *Weatherwise Magazine*, and on such webpages as the China Meteorological Administration and NOAA.

How Mountains Help Shape the Tracks of Tropical Cyclones

Among the atmospheric science highlights featured in the Winter 2011 edition of *UCAR Magazine* was a study on the effects of island topography on tropical cyclones published by IPRC's **Yuqing Wang** along with colleagues

at National Taiwan University. Titled “The influence of island topography on typhoon track deflection,” the study was published in the *Monthly Weather Review*.

IPRC Contributes to the Science Community

The WRF Model

With its Pacific focus, the IPRC has had a longstanding interest in simulating marine clouds in the stratus and trade wind regimes. Working with the IPRC Regional Atmospheric Model (iRAM), **Yuqing Wang** and his collaborators have produced a modified version of the Tiedtke cumulus parameterization that has shown considerable success in capturing these clouds. Compared with model results obtained using other popular convection schemes, simulations with the IPRC parameterization display a very active shallow convection, resulting in a dryer subcloud layer, a warmer cloud layer, and a cooler and moister layer immediately above the cloud due to evaporation of cloud water detrained from the cloud top. This success has been recognized by the scientific community, and the IPRC scheme has been added as a standard option in the latest release of the Weather Research and Forecasting (WRF) model (version 3.3 released April 6, 2011). This model is a community project led by the National Center for Atmospheric Research and NOAA. WRF is now widely applied in a range of research and operational forecast efforts around the world.

