

## UH and JAMSTEC Renew IPRC Scientific Partnership

With the negotiation and signing of a new three-year Cooperative Agreement between the University of Hawai'i at Mānoa (UHM) and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), the IPRC research partnership with JAMSTEC, which began in 1997, will continue at least through March 2017. JAMSTEC and UHM now envisage their IPRC collaboration within a broader partnership in the study of earth science. This broader framework is outlined in a new five-year (2014–2019) Memorandum of Understanding signed by JAMSTEC President **Asahiko Taira** and UHM Chancellor **Tom Apple**.

Commenting on the new agreements, IPRC Director **Kevin Hamilton** said, “We are very grateful to JAMSTEC for its continued commitment to support IPRC research activities and the unique opportunities our enduring partnership provides for extended and profound scientific collaborations with our JAMSTEC colleagues.”



JAMSTEC President Asahiko Taira after signing the JAMSTEC-UHM Memorandum of Understanding in Tokyo on February 7.

## New JAMSTEC–IPRC Collaborative Studies Framework

With the updating of the institutional arrangements between IPRC and JAMSTEC in the new Cooperative Agreement, the science goals embodied in the *JAMSTEC–IPRC Initiative* (established in 2007 and revised in 2010) are being replaced with a new series of goals within a framework called the *JAMSTEC–IPRC Collaborative Studies* (JICS). JICS consists of five projects each with JAMSTEC and IPRC leaders, who are listed

below together with their projects. The JICS projects will initially be funded for three years by JAMSTEC.

The JICS does not encompass all joint JAMSTEC–IPRC activities, and many IPRC and JAMSTEC scientists are continuing their scientific research partnership in various areas. IPRC and

JAMSTEC will also continue to collaborate on data management activities of general interest, notably as partners in operating the Pacific Argo Regional Center, which provides the global community with near real-time, quality-controlled gridded products derived from raw Argo profiling-float observations ([tinyurl.com/IPRCparc](http://tinyurl.com/IPRCparc)).

### JICS Projects and Leaders

- Project 1.** Tropical and extratropical climate modes and their variability. Tim Li (IPRC); Swadhin Behera (JAMSTEC)
- Project 2.** High-resolution atmospheric modeling, diagnosis and applications. Yuqing Wang (IPRC); Tomo Nasuno (JAMSTEC)
- Project 3.** Midlatitude ocean-atmosphere variability. Niklas Schneider (IPRC); Masami Nonaka (JAMSTEC).
- Project 4.** Past and future earth system responses to external forcing. Axel Timmermann (IPRC); Naomi Harada and Ayako Abe-Ouchi (JAMSTEC)
- Project 5.** Unravelling the coupled air-sea interaction processes in CFES. H. Annamalai (IPRC); Bunmei Taguchi (JAMSTEC)

## IPRC Welcomes Al Gore

By **Kevin Hamilton**

The IPRC was privileged to host **The Honorable Albert Gore** on the afternoon of April 15. Al Gore has had a remarkably distinguished career in American public life spanning several decades. He has been a US Congressional Representative, a US Senator and was the 45<sup>th</sup> Vice President of the United States. Gore is a best selling author and a winner of the Nobel Peace Prize, among many other awards. Through his activities in government, and now as a private citizen, Gore has become the world's most famous, and most important, advocate for mankind's concerns about global climate.

Gore was in Honolulu to deliver a public lecture on the evening of April 15 at the University of Hawai'i (UH). I had written to Gore as IPRC Director to invite him to visit us during his time in Honolulu, noting that almost two decades ago Vice President Gore's negotiations with Japan on scientific cooperation in climate research had played a critical role in establishing the IPRC at UH.

Gore graciously accepted the invitation to speak with our scientists. The meeting was deliberately low key and free of news media. Gore met for over an hour in the IPRC conference room with 22 of IPRC's faculty, staff and postdoctoral fellows. Present were also two UH Oceanography faculty members who played key roles in the creation of the IPRC: Professors Emeriti **Lorenz Maggaard** and **Roger Lukas**. **Aska Vanroosebeke** of JAMSTEC's International Affairs Division was also present.

In his opening remarks Gore made clear that he regarded the diplomatic negotiations with Japan that led to the creation of the IPRC as a highlight of his government career, and he expressed his excitement in being able to now visit the mature IPRC. I presented a brief slideshow describing the history of IPRC and highlights of our research accomplishments and contributions to the climate science community. This was followed by a general discussion led off by questions from Gore.

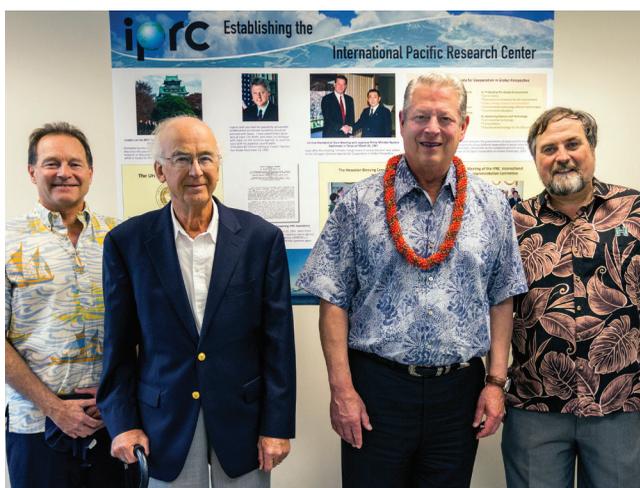
Everyone at the meeting was impressed by Gore's disarming manner and keen interest in climate science. Gore concluded the meeting with a reminder that the work of climate scientists such as those here at IPRC has a great practical importance for dealing with the urgent global climate challenge now facing mankind.

Gore's public lecture in the evening was held in UH's basketball arena and attracted an audience of nearly 7000. Gore took time during his engaging and inspiring talk to express his pleasure in interacting with IPRC scientists earlier in the day. Everyone at IPRC is grateful to Al Gore for his gracious visit and kind words!

IPRC's **Sharon Decarlo**, **Jim Potemra**, **Gisela Speidel**, **Jeanie Ho** and **Aimee Nakajima** deserve special thanks for their help in preparing for the visit and in ensuring a smooth and productive event.



**US Vice President Al Gore and Japanese Prime Minister Ryutaro Hashimoto meeting in Tokyo March 24, 1997. The Gore-Hashimoto accord was critical to establishing the IPRC as a Japan-US partnership. (AP news photo).**



**From left, Roger Lukas, Lorenz Maggaard, Al Gore, Kevin Hamilton at the IPRC on April 15, 2014. Photo credit, Colin Macdonald.**

## JAMSTEC President Visits

IPRC was very pleased to host JAMSTEC President **Asahiko Taira** during his visit to the University of Hawai'i (UH) where he took part in the 25<sup>th</sup> Anniversary celebration of the School of Ocean and Earth Sciences and Technology (SOEST) held in mid-April. Taira, a distinguished marine geologist and former professor at the University of Tokyo, joined JAMSTEC as Executive Director in 2002. In April 2012 Taira became the first research scientist ever to be appointed as JAMSTEC President.

On April 16 UH Interim President **David Lassner** held a meeting to discuss JAMSTEC–UH relations with Taira, IPRC Director **Kevin Hamilton** and UH Geology Professor **Greg Moore**. Then on April 18, Taira spent the day in a very informal workshop with IPRC scientists in the IPRC conference room. In addition to 15 IPRC scientists, the participants included JAMSTEC senior scientist **Yoshio Kawatani**, who was visiting the IPRC.

The workshop with Taira featured talks by the following junior and senior IPRC scientists: Assistant Researcher **Kazuyoshi Kikuchi**, postdoctoral fellow **Kohei Takatama**, Senior Researcher **H. Annamalai**, Scientific Computer Programmer **Jan Hafner** and faculty members **Niklas Schneider**, **Axel Timmermann**, **Jim Potemra** and **Yuqing Wang**. In their presentations, the scientists described research results and plans that focused on collaborations with JAMSTEC colleagues.

In addition to these presentations, Hafner showed Taira a display of marine driftage collected on Hawai'i beaches and brought to the IPRC, including some that have been identified as coming from the 2011 Japan tsunami. Taira also viewed some animations of global data sets shown on IPRC's "Magic Planet" spherical projection system, including a number of animations of global model results produced by IPRC postdoctoral fellow **Tobias Friedrich**.

Taira remarked on the successes of the IPRC–JAMSTEC partnership. He described a recent report that had shown that UH (mainly IPRC) was second only to the University of Tokyo in terms of the numbers of coauthored papers with JAMSTEC scientists. He noted that IPRC collaborations also accounted for a very large fraction of published papers concerning results obtained with JAMSTEC's "OFES" ocean simulation model.

In his closing remarks, Taira stated that he wanted to encourage the partnership with IPRC despite very severe budget cutbacks at JAMSTEC and that he looked forward to seeing the results of the next three years of joint research. Hamilton echoed these sentiments and expressed IPRC's gratitude for JAMSTEC's continued support and for Taira's participation in the workshop.



IPRC faculty member **Jim Potemra** (left) and JAMSTEC President **Asahiko Taira** with IPRC's Magic Planet.



From left, **Aska Vanroosebeke** (JAMSTEC International Affairs Division), **Greg Moore**, **Asahiko Taira**, **David Lassner** and **Kevin Hamilton** in front of a mural outside the UH President's office.

## IPRC Director to Step Down

IPRC Director **Kevin Hamilton** has announced his intention to step down after more than six years leading the center. Hamilton arrived at the IPRC as a faculty member in 2000 and was appointed Interim Director in April 2008 and Director in April 2010.

Reflecting on the current state of the IPRC, Hamilton said, “In the 17 years since its founding, the IPRC has developed into a powerhouse for climate modeling and diagnostics and now enjoys a global reputation for research achievement. From the beginning IPRC’s mission has been broader than just our own research projects, and the climate-science enterprise in the Asia-Pacific region has benefitted from IPRC’s multifaceted activities. Through its Asia-Pacific Data-Research Center the IPRC provides valuable climate data services to the research community and the broader public.

“The IPRC has contributed significantly to the professional development of over 100 young scientists, mainly from Japan and other Asian nations, who have come as graduate students, postdoctoral fellows, researchers, other scientific employees or long-term visitors. These IPRC alumni are now populating the universities and research institutes of Asia, the US and elsewhere in the world.

“The IPRC has become the mid-Pacific hub for climate science by serving as the temporary home of a diverse group of scientists and by organizing and hosting numerous international meetings that have brought thousands of researchers to Hawai’i for scientific dialogue.

“The hard-working scientists and support staff at IPRC over the years deserve the credit for IPRC’s success. It has been a common experience for me to hear visitors remark with admiration on how much IPRC has accomplished in various areas relative to the number of staff involved.”

Regarding IPRC’s unique relation with Japan, Hamilton said, “The Japanese connection has been central to IPRC’s mission and operations since our inception. The very generous support from Japanese agencies, the extensive partnerships with JAMSTEC scientists, and the opportunity to host outstanding young Japanese scientists have allowed the IPRC to develop into a very special organization. On a personal

note, I have enjoyed tremendously the opportunity to collaborate with my JAMSTEC colleagues, first as a researcher and then later also as an administrator, as well as the chance to spend a considerable period in Japan each year.”

Looking towards the future, Hamilton said, “With the signing of a new cooperative agreement between UH and JAMSTEC (p. 22) and continued interest from the NOAA National Climatic Data Center in IPRC’s data activities, a future path for IPRC is laid out. However, I anticipate in the next few years there will be unprecedented challenges in an ever more competitive environment for research support.

“Despite the challenges clearly on the horizon, I expect in the long term the IPRC will benefit from a continuing broad interest in high-quality climate research that helps inform societal response to global change and that the IPRC will thrive for many years to come.”



Tending to IPRC’s business in Japan. IPRC Director Kevin Hamilton in February 2012, photographed by a JAMSTEC colleague after a meeting in Tokyo.

## Students from a Japan Super Science High School Visit IPRC Again

Masuda High School, the alma mater of IPRC Researcher **Ryo Furue**, was again selected as a Super Science High School by Japan's Ministry of Education, Culture, Sports, Science and Technology (see *IPRC Climate* vol 12, no. 2). The school used the extra funding from the award again for travel: 9 students from Furue's high school and 3 from neighboring schools, accompanied by 3 teachers, visited the IPRC in January.

Furue had asked the students beforehand to prepare presentations on such global warming issues as "What are other explanations for the global warming trend than anthropogenic greenhouse gases? How likely are those explanations?" and "Suppose that global mean temperature continues to rise. What good and bad changes will happen? Would agricultural production, for example, increase?"



Super Science High School students visit Ryo Furue (first row, second from left). Jan Hafner (back row, first from left) talked about the tsunami driftage in the IPRC Ocean Drift Model.

During lively discussions in the IPRC conference room, the students presented in Japanese their answers. Furue said, "I was impressed by their hands-on approach. For example, one student presented results of her science club project on cleaning river water. The students had taken water samples from the river near their school; into some samples they put charcoal to observe whether organic matter

is absorbed, and into others they put dish detergent to see if it increases the amount of phytoplankton."

The students also listened attentively to IPRC Scientific Programmer **Jan Hafner** talk in English about the driftage from the 2011 tsunami. Hafner showed pictures and animations from the IPRC Ocean Drift Model (see p. 12), and students questioned him in English about the debris paths.

## IPRC Issue of *Blue Earth Magazine*

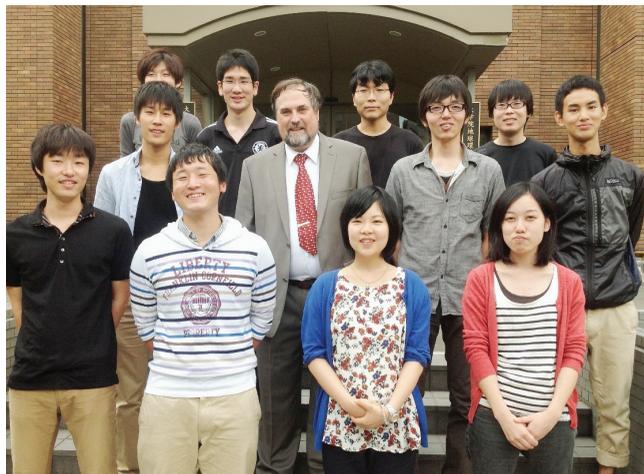
Six times a year JAMSTEC publishes *Blue Earth*, a glossy magazine for the general public describing JAMSTEC activities in ocean and earth science. In the January 2014 edition, the JAMSTEC-IPRC partnership was the featured cover story, occupying almost the entire issue. Though the bulk of the article was written by professional writers on contract to JAMSTEC, the issue also includes the individual reflections on their IPRC experiences written by JAMSTEC scientists **Masami Nonaka** and **Yoshio Kawatani** as well as former IPRC faculty member **Shang-Ping Xie**, who is now the Roger Revelle Professor of Environmental Science at the Scripps Institution of Oceanography. IPRC Director **Kevin**

**Hamilton** wrote an afterword on the future of the IPRC-JAMSTEC partnership. IPRC appreciates the invaluable assistance of University of Tokyo Professor **Yukio Masumoto** in the conception and execution of this project.



## IPRC Partnership with Hokkaido University Continues

Since 2008 Hokkaido University has partnered with IPRC in an exchange program designed to enhance the educational experience for students in the Hokkaido University Graduate School of Environmental Science. Over the years



Kevin Hamilton with Hokkaido University students.

## IPRC Featured in Newsletter of Japanese Ocean Think Tank

The Ocean Policy Research Foundation (OPRF) published in its newsletter an essay by IPRC Director **Kevin Hamilton** describing IPRC's mission and activities. OPRF, a nongovernmental organization based in Tokyo, has a special consultative status with the Economic and Social Council of the United Nations. The Foundation functions as a think tank for Japan on ocean matters, and its white papers and newsletter are a source of important information for legislators, government officials, and other ocean policy decision makers. Advocating that mankind live harmoniously and sustainably with the ocean, OPRF encourages international collaboration and exchange of views on ocean affairs.

Hamilton's essay focuses on IPRC's strong connections with Japan. He writes that IPRC has "become a crossroads of the Pacific in climate science, contributing significantly to the education and professional development of many young climate scientists, especially from Japan." Reflecting on IPRC's long-term partnership with JAMSTEC, Hamilton writes, "The expertise of IPRC collaborators in diagnostic analysis of the climate system has helped JAMSTEC fully capitalize on

several Hokkaido Ph.D. students have visited IPRC for extended periods. Several IPRC faculty have also contributed by presenting series of guest lectures for Hokkaido University graduate students (see list below).

In September 2013 IPRC Director **Kevin Hamilton** continued this tradition and gave several lectures to a group of 19 masters degree program students, introducing the study of the meteorology of the tropical stratosphere and mesosphere. He also presented a seminar for faculty and students of the school entitled "Martian Meteorology from Surface Observations Including from the 2012 Mars Curiosity Rover." This seminar was taped by the Center for Planetary Science (CPS), based at Kobe University in Japan; a video of the lecture is posted on the CPS website ([tinyurl.com/IPRCmars](http://tinyurl.com/IPRCmars)).

### IPRC Faculty Lecturers

**2008 Shang-Ping Xie** – Air-sea interaction and tropical climate

**2008 Kelvin Richards** – Tracers in the ocean and atmosphere

**2009 Axel Timmermann** – Dynamics of El Nino

**2010 Jay McCreary** – Large-scale coastal dynamics

**2012 Yuqing Wang** – Dynamical downscaling of global climate simulations

**2013 Kevin Hamilton** – Dynamics of the tropical middle atmosphere

its major investments in areas such as high-resolution global computer modeling, ocean sediment coring, oceanographic cruises and participation in international field campaigns."

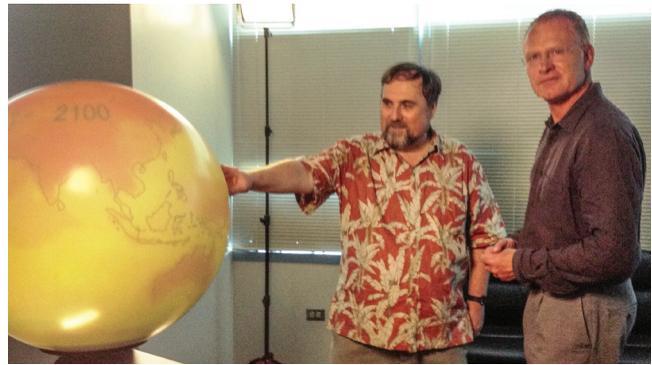
Hamilton's article was translated into Japanese by the newsletter's Chief Editor, former Dean of Science at the University of Tokyo and current Director of the JAMSTEC Application Laboratory, **Toshio Yamagata**. The article is available in English at [www.sof.or.jp/en/news/301-350/317\\_2.php](http://www.sof.or.jp/en/news/301-350/317_2.php) and in Japanese at [www.sof.or.jp/jp/news/301-350/317\\_1.php](http://www.sof.or.jp/jp/news/301-350/317_1.php).



Toshio Yamagata with Kevin Hamilton.

## IPRC in ARTE TV Documentary

In August a film crew from ARTE TV visited the IPRC, seeking help in the production of an episode in their documentary series *Point du Jour: Entre Terre et Ciel*. Series host **Serge Brunier** interviewed IPRC Director **Kevin Hamilton** about predictions of future climate trends. ARTE TV is a publically-funded European educational and cultural television network for French and German speakers.



Kevin Hamilton (left) with program host Serge Brunier.

## Tsunami Debris Documentary in the Making

**Jennifer Rainsford**, an independent filmmaker and artist supported by the Swedish government through a fund for culture and arts, visited the IPRC in November 2103 to interview **Nikolai Maximenko** and **Jan Hafner** about their work on the driftage from the 2011 tsunami in Japan. She is planning a full-length documentary, called “Stories from the Debris” for cinema and TV to be released in 2015. Rainsford was particularly intrigued by the animations of the IPRC Ocean Drift

Model featuring the paths taken by tsunami driftage of different shape and buoyancy. The work is taking her and

her associate to the US West Coast, Hawai'i and Japan to film and collect stories about the debris.



Nikolai Maximenko during tsunami documentary interview with Jennifer Rainsford.

## IPRC Scientists Share Discoveries at AGU Ocean Sciences 2014

The IPRC left its mark at the *Ocean Sciences Meeting 2014* held in Honolulu end of February. Our scientists spoke on topics that ranged from climate predictability (**Yoshimitsu Chikamoto**), to impacts of the continental slope on the deep overturning circulation (**Ryo Furue**), to the seesaw in sea level occurring across the equator in the western Pacific during what has been coined *El Niño Taimasa*, after the wet stench from dying marine life at very low tides in Samoa (**Matthew Widlansky**).

Other presentations featured results from the new Aquarius sea surface salinity products (**Oleg Melnichenko**; **Peter Hacker**; **Tangdong Qu**). The 3-year story tracking the various kinds of tsunami debris as it flowed from Japan across the Pacific and circulates back towards Hawai'i using the IPRC Ocean Drift Model was told by **Jan Hafner**. The special two-day session, *Mesoscale ocean processes and their representation in earth*

*system models*, which IPRC's **Nikolai Maximenko** helped to organize, featured 32 talks and 46 posters and attracted at times a standing-room only audience.



## RCUH Employees of the Year

At an awards luncheon in February, IPRC's Senior Researcher **Nikolai Maximenko**, Scientific Programmer **Jan Hafner** and Outreach Specialist **Gisela Speidel** were honored as "RCUH 2013 Outstanding Employees of the Year." The award recognized their achievements as a team dealing with the scientific and public outreach aspects of tracking the floating debris following the March 2011 Japan tsunami; their work has produced exciting research results and played an important public service role in providing officials and the public with a realistic assessment of the concerns about the debris issue.

With more than 3000 employees, the Research Corporation of the University of Hawai'i (RCUH) handles over

\$400,000,000 per year of external funding for the University and other Hawai'i state departments. Over 20 IPRC scientists and support staff are employed through RCUH.



From Left, RCUH Executive Director Michael Hamnett, Nikolai Maximenko, Gisela Speidel, Jan Hafner, and Kevin Hamilton.

## Hawai'i Media Briefing on IPCC Climate Assessment Report

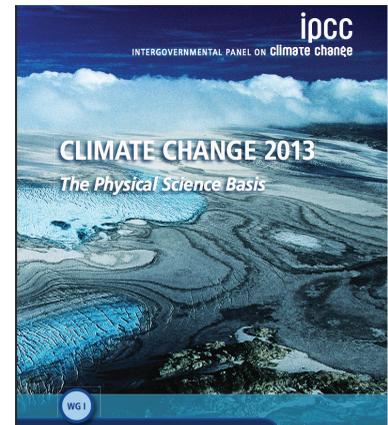
"Human influence on climate is clear." This electrifying statement was released end of September in the "Summary for Policymakers" of the *Scientific Basis of Climate Change* in the Fifth Climate Assessment Report of the Intergovernmental Panel on Climate Change.

Following on the heels of this announcement, two IPCC lead authors at the University of Hawai'i, IPRC's **Axel Timmermann** (Paleoclimate Chapter), and UH Sea Level Center Director, **Mark Merrifield** (Sea Level Chapter), summarized the report's findings to a

packed audience of colleagues and students at C-MORE Hale. **David Karl**, Director of the Center for Microbial Oceanography Research and Education (C-MORE) and a lead author of the IPCC companion report "Impacts, Adaptation and Vulnerability", hosted and moderated the special event.

Reporters and cameramen from two television stations and the local newspaper extensively interviewed Timmermann, Merrifield and Karl after the briefing. "UH Mānoa professors say climate change is real & here in Hawai'i"

and "Rise in sea level puts Waikiki, Kakaako at Risk,' researchers say," read the headlines.



## Tim Li Appointed Associate Editor

IPRC's **Tim Li** was appointed an associate editor of the Elsevier journal *Dynamics of Atmospheres and Oceans*, an international journal for research related to the dynamical and physical processes governing atmospheres, oceans and climate. The journal publishes papers of theoretical, computa-

tional, experimental and observational investigations, particularly those that explore the fundamental nature of dynamical and physical processes at all scales and explore air-sea interactions and the coupling between atmospheres, oceans, and other components of the climate system.

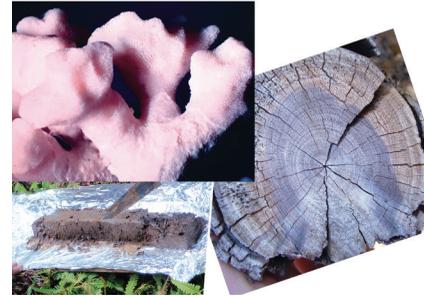


## IPRC Research in the News

### *El Niño is becoming more active*

A new approach to analyzing paleo-climate reconstructions of the El Niño – Southern Oscillation (ENSO) resolves disagreements among scientists and reveals that ENSO activity during the 20<sup>th</sup> century has been unusually high compared to the past 600 years. The study, published in the October 2013 issue of

*Climate of the Past*, was authored by **Shayne McGregor** of University of New South Wales, IPRC's **Axel Timmermann**, and scientists at the NOAA Geophysical Fluid Dynamics Laboratory. It was featured in *Nature World News*, *Colorado News*, *Honolulu Star-Advertiser*, and on *KITV4 News*.



### *Increase in greenhouse gases and aerosols has similar effects on rainfall*

Although greenhouse gases and aerosols have very distinct properties, their effects on spatial patterns of changes in rainfall with global warming are surprisingly similar, according to new research by IPRC's **Shang-Ping Xie**, currently Roger Revelle Chair

in Environmental Science at Scripps Institution of Oceanography, and his colleagues. The study, published in the September 1, 2013, online issue of *Nature Geoscience*, was featured in the *French Tribune.com*, and in the *Honolulu Star-Advertiser*.



### *Global warming dries up monsoon over India*

The *Indian Express*, the Indian English-language daily newspaper read widely across India, published a 400-word story on the changing monsoon rainfall over India, detailing the findings of a study by IPRC's **H. Annamalai**, who is quoted as follows: "Various observations have shown that the Indian monsoon has weakened by around

5-6 per cent over the past few decades. Also, there has been an increase in the instances of rainfall over the west Pacific ocean. In fact, India has not observed any strong rainfall activity... since the monsoon of 1994." The study, "Global warming shifts monsoon circulation, drying South Asia," appeared in the May 2013 issue of *Journal of Climate*.



### *IPRC Featured in JAMSTEC 2013 Highlight Video*

JAMSTEC has created a YouTube video showing five highlights of JAMSTEC research for the year 2013. IPRC is mentioned as JAMSTEC's partner, and one of the highlights featured is a paper by JAMSTEC scientist, **Yoshio Kawatani** and IPRC's Director

**Kevin Hamilton** in *Nature*, "Weakened stratospheric quasi-biennial oscillation driven by increased tropical mean upwelling." Watch video in English: [tinyurl.com/IPRCvideoE](http://tinyurl.com/IPRCvideoE); in Japanese: [tinyurl.com/IPRCvideoJ](http://tinyurl.com/IPRCvideoJ).

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#### LETTER

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#### Weakened stratospheric quasi-biennial oscillation driven by increased tropical mean upwelling

Yoshio Kawatani<sup>1</sup> & Kevin Hamilton<sup>2</sup>

The zonal wind in the tropical stratosphere matches between prevailing easterlies and westerlies with a period of about 28 months<sup>1</sup>. In the lowermost stratosphere, the vertical structure of this quasi-biennial oscillation (QBO) is linked to the mean upwelling<sup>2</sup>, which itself is a key factor in determining stratospheric composition. Evidence for changes in the QBO have until now been equivocal, raising questions as to the extent of stratospheric circulation changes in a global warming context. Here we report an analysis of

such factors as solar activity or the El Niño/Southern Oscillation (ENSO)<sup>3</sup>. There does not seem to be a clear long-term trend in the period of the QBO, and we will not provide a detailed explanation of the cycle. However, the variability of the QBO period appears in the observations, whereas the variability of the period has been treated consistently, there are apparently no earlier studies on the question of systematic long-term QBO amplitude changes, possibly because a simple upwelling, raising questions as to the extent of stratospheric circulation changes in a global warming context. Here we report an analysis of

## *Nikolai Maximenko talks about tracking debris from 2011 tsunami*

On the 3-year anniversary of the tragic tsunami in Japan, **Nikolai Maximenko** was interviewed by a KITV4 reporter about his work on tracking the tsunami driftage in his model and in observations. He described the different types of debris arriving in Hawai'i during the three years: very boyant objects about 18

months after the tragedy, then refrigerator parts and little boats, and recently pieces sitting deeper in the water such as large beams and poles. Many pieces, especially plastic ones will break apart with time into smaller and smaller pieces recirculating in the ocean and becoming ingested by birds and marine animals.



## *What is El Niño Taimasa?*

During very strong El Niño events, sea level drops abruptly in the tropical western Pacific and tides remain below normal for up to a year in the South Pacific, especially around Samoa. The Samoans call the wet stench of coral die-offs arising from the low sea levels *taimasa* (pronounced [kai' ma'sa]).

The international study to uncover the reasons for this phenomenon and its climate effects was spearheaded by IPRC's **Matthew Widlansky** and published in the February 2014 issue of the *Journal of Climate*. It was featured in the Italian online *Meteogiuliaci* and in *Science Daily*.



## *Climate research at the International Pacific Research Center*

IPRC's Director **Kevin Hamilton** and Meteorology Professor **Yuqing Wang** were featured on **Jay Fidell's** *ThinkTech Hawaii* internet tv show on February 17. They described the climate research conducted at the IPRC and the close partnership with the Japan Agency for Marine-Earth Science

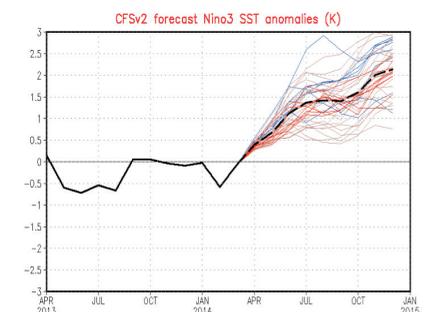
and Technology. Of particular interest on the show was IPRC's Hawai'i Regional Climate Model that Wang is developing for climate forecasts for Hawai'i, with its complex topography and associated microclimates. See: [tinyurl.com/IPRCthink](http://tinyurl.com/IPRCthink).



## *The tropical Pacific is primed for El Niño*

"I would say there is an 80 percent chance that a big El Niño will develop by the end of the year. Just how powerful the phenomenon will be is the subject of intense debate within scientific circles," IPRC's **Axel Timmermann** was quoted as saying on April 11 on the front page

of the *Honolulu Star-Advertiser* with regard to the recent predictions from NOAA about the possibility of an El Niño building up this summer through winter. In Timmermann's opinion the El Niño will rival the one in 1997/98, the largest on record.



# IPRC Takes Part in SOEST Open House



Every two years since 1991, the School of Ocean and Earth Science and Technology (SOEST) at the University of Hawai'i has held Open House for the local elementary, middle and high schools as well as for the broader community. The 2013 Open House, on October 25 and 26, corresponded with SOEST's 25<sup>th</sup> Anniversary. This year's event set a record with an attendance estimated at 7,600. As in previous years, IPRC participated in the activities, entertaining and informing many school groups with a series of lecture-demonstrations.

IPRC's **Jim Potemra** showed how storms far away from Hawai'i create the powerful surfing waves for which Hawai'i is known.

Postdoctoral fellows **Malte Heinemann** (left in picture above) and Tobias Friedrich donned white lab coats to demonstrate how atmospheric  $CO_2$  can dissolve coral.



**Jan Hafner** told about marine debris and the driftage from the 2011 Japan tsunami that has travelled across the Pacific toward the US and Canada and circulated back, reaching Hawai'i windward shores. The audience was awed seeing an actual oyster buoy and a refrigerator door that had come all the way to Hawai'i from the tsunami.

Using a water-filled rotating tank, **Niklas Schneider** gave lively demonstrations of atmospheric weather and oceanic processes, including the converging surface currents that produce the Great Pacific Garbage Patch.



IPRC's **Ryo Furue**, **Megumi Chikamoto**, **Yoshimitsu Chikamoto**, **Matthew Widlandsky**, **François Ascani**, **Kin-Lik Wang** and **Chunxi Zhang** made up the logistic team ensuring that everything ran smoothly. Outreach Specialist **Gisela Speidel** led the IPRC effort.