

A scenic view of a river with pink cherry blossoms in the foreground and snow on the banks. The river flows through a lush green landscape with patches of snow on the banks. The cherry blossoms are in full bloom, hanging over the water. The text is overlaid on the right side of the image.

# **International Pacific Research Center**

**April 2013 – March 2014 Report**

**School of Ocean and Earth Science  
and Technology  
University of Hawai`i at Mānoa**



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## THE INTERNATIONAL PACIFIC RESEARCH CENTER

Conceived under the “US–Japan Common Agenda for Cooperation in Global Perspective,” the International Pacific Research Center (IPRC) was established in 1997 within the School of Ocean and Earth Science and Technology at the University of Hawai‘i at Mānoa. The IPRC mission is “To provide an international research environment dedicated to improving mankind’s understanding of the nature and predictability of climate variations and change in the Asia-Pacific region, and to developing innovative ways to utilize knowledge gained for the benefit of society.” The core support for the IPRC comes from the State of Hawai‘i through the University and from the principal supporting agencies: the Japan Agency for Marine–Earth Science and Technology (JAMSTEC), NASA and NOAA. Financial support for our research is also provided by other government agencies in the US and abroad. The IPRC now has an annual budget of roughly 7 million dollars.

Asia and the Pacific region are home to over half the world’s people, all of whom are affected by variations in

the climate system. IPRC researchers conduct modeling and diagnostic studies to document these variations and understand their causes, whether such causes are purely natural or have a human component. Through advances in basic research, the IPRC contributes to improving environmental forecasting for the Asia-Pacific region. One focus of IPRC investigations is the understanding of key phenomena rooted in the tropics, such as the El Niño–Southern Oscillation of the ocean–atmosphere system, monsoon circulations, interannual variability in the Indian Ocean, intraseasonal oscillations of the tropical atmosphere, and tropical cyclones. Other examples of important issues for IPRC study include the nature of decadal variability in the extratropical North Pacific Ocean, the dynamics of the very strong Kuroshio and Oyashio ocean currents in the western North Pacific and the role of marginal seas in the climate system. Concerns about climate change are addressed through modeling studies of past climate and through assessment of model predictions for future trends in climate.

### 国際太平洋研究センター

国際太平洋研究センター (IPRC) は、「地球的展望に立った協力のための日米共通課題」のもと、1997年にハワイ大学マノア校の海洋地球科学技術学部内に設立されました。その使命は、「国際色豊かな研究環境を創り、アジア・太平洋地域の気候変動及び変化について、その性質と予測可能性に対する人類の理解を向上させ、そして得られた知見を社会に役立てるために活用する革新的な手段を生み出すこと」です。IPRCの研究費は主に、ハワイ大学を通してハワイ州から、また主要支援機関である海洋研究開発機構、NASA、NOAAから支援されています。内外のその他の政府機関からも支援を受けており、現在およそ七百万ドルの年間予算により運営しています。

アジア・太平洋地域は世界人口の半分以上が居住する地域で、気候系の変動はこれらの人々

すべてに影響を及ぼします。そのような気候変動には純粋な自然現象であるものも人類活動が関係したものもありますが、IPRCでは、それらを記述し原因を探るため、モデルによる研究や診断的研究を実施しています。このような基礎研究を進展させることでアジア・太平洋地域の環境予測の改善に大きく貢献しています。現在IPRCでは、エルニーニョ・南方振動、モンスーン循環、インド洋の経年変動、熱帯大気の季節内振動、そして熱帯低気圧といった、熱帯起源の現象に注目して研究を行っています。その他の重要な課題として、北太平洋亜熱帯域における十年規模変動の性質、西部北太平洋の強い海流である黒潮・親潮の力学、気候系での縁辺海の役割に関する研究を行っています。さらに、過去の気候のモデル研究やモデルによる将来予測の評価により、気候変化に関する様々な課題に取り組んでいます。

## FOREWORD

This report summarizes the activities of the International Pacific Research Center for the period April 1, 2013–March 31, 2014. The IPRC performs research to enhance understanding of the nature and mechanisms of climate variability and change, and to improve the tools for modeling and forecasting the climate system.

The IPRC now has a scientific staff of over 50 including faculty, researchers, postdoctoral fellows, and long-term scientific visitors. IPRC faculty also supervise several graduate students in the Meteorology and Oceanography departments of the University of Hawai'i at Mānoa.

In addition, through our Asia-Pacific Data Research Center (APDRC), the IPRC operates a web-based server system that makes data resources readily accessible to IPRC researchers, the international climate community, and the wider public.

This Annual Report omits the extended narratives on individual projects that had been a feature of earlier reports. Note that brief reports on 12 selected IPRC **research highlights** during this period are available on the IPRC web site. Also the **list of publications** on our web site has links for easy access to each paper's abstract. Finally the IPRC's semiannual newsletter, *IPRC Climate*, describes highlights of ongoing

research projects and other activities at the IPRC.

March 31, 2014 was the end date of the 2009-2014 Cooperative Agreement between the University of Hawai'i and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) that is the basis for IPRC's operations. I am pleased to report that JAMSTEC has agreed to continue to support our collaboration for at least 3 more years under a new agreement through March 31, 2017. This will bring our partnership into its 20th year.

The staff of the IPRC are grateful to JAMSTEC as well as NOAA and other US and foreign science agencies for their continued support of our activities. I am pleased as well to acknowledge the State of Hawai'i for its sponsorship of the IPRC through the University of Hawai'i. We look forward to many more years of fruitful international collaboration as we address critically important challenges in climate science.



Kevin P. Hamilton  
Director

## PUBLICATIONS

### Published Papers

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- Sperber, K.R., and H. Annamalai: The use of fractional accumulated precipitation for the evaluation of the annual cycle of monsoons *Clim. Dyn.*, IPRC-1050.

- Stein, K., A. Timmermann, N. Schneider, F.-F. Jin, and M. Stuecker: ENSO seasonal synchronization theory. *J. Climate*, IPRC-1051.
- Wei, W., R. Zhang, M. Wen, X. Rong, and T. Li: Impact of Indian Summer Monsoon on the South Asian High and its Influence on Summer Rainfall over China. *Clim. Dyn.*, IPRC-1011.
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- Yim, S.-Y., B. Wang, and W. Xing: Prediction of early summer rainfall over South China by a physical-empirical model. *Clim. Dyn.*, IPRC-1029.
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- Zhang, L., and T. Qu, 2014: Low Frequency Variability of South Pacific Tropical Water from Argo. *Geophys. Res. Lett.*, IPRC-1048.



## THE YEAR'S WORKSHOPS AND CONFERENCES

DATE	TITLE
May 31, 2013	Mini-Workshop on Climate Variability, Predictability, and Change
August 29 – 30, 2013	2013 NICAM Workshop
October 9 – 11, 2013	Tropical Weather and Climate Dynamics (TWCD) Workshop
December 2, 2013	13 <sup>th</sup> IPRC Annual Symposium
December 3 – 4, 2013	6 <sup>th</sup> OFES International Workshop and 3rd ESC-IPRC Joint Workshop on Computationally Intensive Modeling of the Climate System
January 14 – 16, 2014	Workshop on Tropical Dynamics and the MJO

## THE YEAR'S SEMINARS

DATE	SPEAKER	AFFILIATION	TITLE
March 19, 2014	Ying-Jun Chen	Centre for Australian Weather and Climate Research, Australia	<i>How does ACCESS-TC Perform on Australian TC Rainfall Forecasts?</i>
*** March 6, 2014	Emanuele di Lorenzo	School of Earth & Atmospheric Sciences, Georgia Tech, Atlanta, Georgia	<i>How is Pacific Climate Impacting Coastal Ocean Ecosystems?</i>
February 26, 2014	Shan Sun	NOAA/Earth System Research Laboratory, Boulder, Colorado	<i>Global Coupled Atmosphere/Ocean Model for Seasonal and Climate Forecast Applications at NOAA/ESRL</i>
February 19, 2014	Dunxin Hu	Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China	<i>NPOCE Progress and Highlights</i>
February 10, 2014	Yakov Afanasyev	Memorial Univ. of Newfoundland, St. John's, Canada	<i>Turbulence, Jets, and Beta-plumes Studied with Laboratory Altimetry</i>
** January 23, 2014	Kim Cobb	School of Earth & Atmospheric Sciences, Georgia Tech, Atlanta, Georgia	<i>Internal Versus Forced Variations in Paleo-ENSO: Implications for 21st Century ENSO</i>
* January 22, 2014	Bin Wang	IPRC and Dept. of Meteorology, UHM	<i>Understanding of Essential Dynamics of the Madden-Julian Oscillation</i>
* January 15, 2014	Kevin Hamilton	IPRC and Dept. of Meteorology, UHM	<i>Give Me But a Place to Stand and I Will Observe the Whole World: The Remarkable Information in a Simple Barometric Record</i>
November 21, 2013	Shaoqing Zhang	Geophysical Fluid Dynamics Laboratory, Princeton University, Princeton, New Jersey	<i>Coupled Model Data Assimilation for Climate Estimation and Prediction: Opportunities and Challenges</i>
* November 20, 2013	Axel Lauer	Institute for Advanced Sustainability Studies, Potsdam, Germany	<i>Simulating Clouds with Global Climate Models</i>
** November 14, 2013	Pedro DiNezio	IPRC- SOEST Young Investigator, UHM	<i>Dynamics and Impacts of 2-year La Niña Events</i>
November 14, 2013	Young Ho Kim	Korea Institute of Ocean Science and Technology, Ansan, Korea	<i>New Climate Reanalysis of KIOST</i>
*** November 6, 2013	Axel Timmermann	IPRC and Dept. of Oceanography, UHM	<i>The Origins of Abrupt Climate Change During the Last Glacial Period</i>
* August 28, 2013	Kevin Hamilton	IPRC and Dept. of Meteorology, UHM	<i>Long-Term Changes in the Stratospheric QBO – Part of the Global Warming Fingerprint?</i>

DATE	SPEAKER	AFFILIATION	TITLE
August 6, 2013	Vincenzo Armenio	University of Trieste, Trieste, Italy	<i>Large Eddy Simulation of Environmental Flows: From the Laboratory Scale Toward Full Scale Applications</i>
* May 31, 2013	Robert Dickinson	University of Texas at Austin	<i>Diurnal and Spatial Variability of Great Plains Summer Precipitation – Relationship to Dynamics of the Low-Level Jet</i>
* May 30, 2013	Rong Fu	University of Texas at Austin	<i>Land-Atmosphere-Ocean Interaction over the Pacific-America-Atlantic Sector</i>
** May 2, 2013	Kelvin Richards	IPRC and Department of Oceanography, UHM	<i>Stirring and Mixing of the Marine Ecosystem: From the Sunlit Upper Waters to the Twilight Zone"</i>
* April 17, 2013	Joshua Fu	IPRC	<i>Does Atmosphere – Ocean Coupling Matter to the MJO?</i>
* April 10, 2013	Toshio Yamagata	The University of Tokyo and JAMSTEC, Yokohama, Japan	<i>Predictability of the Subtropical Dipole Modes in the Atlantic and Indian Oceans</i>

\* IPRC – Meteorology Joint Seminar

\*\* IPRC – Oceanography Joint Seminar

\*\*\* IPRC – JIMAR – Oceanography Joint Seminar



## VISITING SCHOLARS

SCHOLAR	AFFILIATION	DATE
Robert Dickinson	University of Texas at Austin, Austin, Texas	5/29/13–6/3/13
Rong Fu	University of Texas at Austin, Austin Texas	5/29/13–6/3/13
Ja Yeon Moon	Climate Institute, Konkuk University, Seoul, Korea	7/15/13–8/28/13
Shinichiro Kida	ESC, JAMSTEC, Yokohama, Japan	7/18/13–8/20/13
Yoshio Kawatani	RIGC, JAMSTEC, Yokohama, Japan	7/22/13–8/20/13
Vincenzo Armenio	Universite di Trieste, Trieste, Italy	7/29/13–8/20/13
Pang-Chi Hsu	Nanjing University of Information Science and Technology, Nanjing, China	8/4/13–8/20/13
Jung-Eun Chu	Pusan National University, Busan, Korea	8/24/13–10/23/13
Kenneth Sperber	Lawrence Livermore National Laboratory, Livermore, California	9/9/13–9/20/13
Jian Liu	Nanjing Normal University, Nanjing, China	9/15/13–12/14/13
David Pollard	Pennsylvania State University, State College, Pennsylvania	9/11/13–9/20/13
June-Yi Lee	Pusan National University, Busan, Korea	10/3/13–10/14/13
Edwin Schneider	George Mason University, Fairfax, Virginia	10/8/13–10/12/13
Tiruvalam Krishnamurti	Florida State University, Tallahassee, Florida	10/8/13–10/11/13
Ruby Krishnamurti	Florida State University, Tallahassee, Florida	10/8/13–10/11/13
Shayne McGregor	University of New South Wales, Sydney, Australia	10/21/13–11/8/13
Chun Zhou	Ocean University of China, Qingdao, China	10/20/13–2/19/14
Young Ho Kim	Korea Institute of Ocean Science & Technology, Ansan, Korea	11/11/13–11/21/13
Shaoqing Zhang	NOAA/Princeton University, Princeton, New Jersey	11/17/13–11/24/13
Axel Lauer	Institute for Advanced Sustainability Studies Potsdam, Potsdam, Germany	11/18/13–11/22/13
Jessica Tierney	Woods Hole Oceanographic Institution, Woods Hole, Massachusetts.	11/21/13–11/27/13
Annalisa Cherchi	Istituto Nazionale di Geofisica e Vulcanologia, Centro Nazionale Terremoti, Italy	11/21/11–2/21/133
Motoki Nagura	RIGC, JAMSTEC, Yokohama, Japan	11/25/13–12/6/13
Masami Nonaka	RIGC, JAMSTEC, Yokohama, Japan	12/3/13–12/6/13
Tomoe Nasuno	RIGC, JAMSTEC, Yokohama, Japan	12/3/13–12/8/13
Bunmei Taguchi	ESC, JAMSTEC, Yokokama, Japan	12/2/13–12/6/13
Wei Zhao	Ocean University of China, Qingdao, China	12/6/13–3/10/14
Zhiwei Zhang	Ocean University of China, Qingdao, China	12/6/13–3/10/14
Mona Stockhecke	Swiss Federal Institute of Aquatic Science & Technology, Dübendorf, Switzerland	12/3/13–1/30/14
Oliver Elison Timm	State University of New York at Albany,	12/16/13–12/20/13

SCHOLAR	AFFILIATION	DATE
	Albany, New York	
Emanuele di Lorenzo	School of Earth & Atmospheric Sciences, Georgia Tech., Atlanta, Georgia	1/7/14–7/27/14
Kim Cobb	School of Earth & Atmospheric Sciences, Georgia Tech., Atlanta, Georgia	1/7/14–7/27/14
Pang-Chi Hsu	Nanjing University of Information Science and Technology, Nanjing, China	12/25/13–1/26/14
Tomoe Nasuno	RIGC, JAMSTEC	1/13/14–1/17/14
In-Sik Kang	Seoul National University, Seoul, Korea	1/13/14–2/12/14
Per Kundsén	National Space Institute, Seoul, Korea	1/15/14–4/15/14
Kana Nagashima	RIGC, JAMSTEC	1/15/14–3/14/14
Chaoxia Yuan	JAMSTEC	1/18/14–1/22/14
Iakov Afanassiev	Memorial University of Newfoundland, St. John's, Canada	2/1/14–2/28/14
Mario Krapp	Potsdam Institute for Climate Impact Research, Potsdam, Germany	2/2/14–5/1/14
Dunxin Hu	Chinese Academy of Sciences, Beijing, China	2/12/14–2/22/14
Fabian Schloesser	University of Rhode Island, Narragansett, Rhode Island	2/9/14–3/2/14
Yumi Choi	Pusan National University, Busan, Korea	2/18/14–2/21/14
Tommy Jensen	Naval Research Laboratory, Stennis Space Center, Mississippi	2/24/14–2/28/14
Bunmei Taguchi	ESC, JAMSTEC	3/3/14–3/7/14
Helen Phillips	University of Tasmania, Hobart, Australia	3/3/14–3/7/14
Viviane Vasconcellos de Menezes	University of Tasmania, Hobart, Australia	3/3/14–3/7/14
Thomas Rackow	Alfred Wegener Institute, Bremerhaven, Germany	3/1/14–3/15/14