

A vibrant photograph of a traditional Japanese garden. The scene is dominated by a large, gnarled tree with bright green leaves in the center. To the left, a stone lantern sits on a low platform. In the background, a traditional building with a tiled roof is partially visible. The garden is filled with various plants, including purple-flowered shrubs and a pine tree in the lower right. The overall atmosphere is peaceful and well-maintained.

# International Pacific Research Center

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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, 2014–March 31, 2015. 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 has a scientific staff of over 50 including faculty, researchers, postdoctoral fellows, and long-term scientific visitors. IPRC faculty also supervise graduate students in the Atmospheric Sciences 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 a number of 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.

A new Cooperative Agreement between the University of Hawai`i and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) started on April 1, 2014. The new agreement supports 5 research projects on ocean-atmosphere interactions ranging from intraseasonal variability through to the climate of the past and future.

The staff of the IPRC are grateful to JAMSTEC as well as to NOAA and other US and foreign science agencies for their continued support of our activities. We also acknowledge the State of Hawai`i for its sponsorship of the IPRC through the University of Hawai`i.

Finally, in July 2014 Kevin Hamilton retired from his faculty position at the University of Hawai`i and as Director of the IPRC. A brief summary of his contribution to the University and IPRC appears as a news item on our website. Here I would like to thank Kevin for his tremendous efforts in guiding the IPRC to the position of international recognition, making it well placed to tackle the challenges of climate science in the future.



Kelvin Richards

Director

# The Year's Publications

## Published

- Alessandri, A., A. Borrelli, A. Cherchi, S. Materia, A. Navarra, J.-Y. Lee, and B. Wang, 2015: Prediction of Indian summer monsoon onset using dynamical sub-seasonal forecasts: effects of realistic initialization of the atmosphere. *Mon. Wea. Rev.*, **143** (3), 778-793, doi:10.1175/MWR-D-14-00187.1. IPRC-1087.
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## In Press

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## The Year's Seminars

<b>Date</b>	<b>Speaker</b>	<b>Affiliation</b>	<b>Title of Talk</b>
* March 31, 2015	Kohei Takatama	IPRC	<i>Impact of interannually variable sea surface salinity to the Pacific Ocean in the OFES</i>
* March 17, 2015	Ryusuke Masunaga	University of Tokyo, Japan	<i>Separate Imprints of the Kuroshio Extension and Oyashio Fronts on the Wintertime Atmospheric Boundary Layer</i>
* March 10, 2015	Michiya Hayashi	University of Tokyo, Japan	<i>Importance of background seasonality in the coupled atmosphere-ocean response to westerly wind events</i>
** March 9, 2015	Mathew Stiller-Reeve	Uni Research Climate/Bjerknes Centre for Climate Research, Bergen, Norway	<i>The 'monsoon' onset in Bangladesh from a climate service perspective</i>
** March 4, 2015	Yuqing Wang	IPRC	<i>Dependence of tropical cyclone intensification rate on its intensity</i>
February 27, 2015	Rhys Parfitt	Imperial College, UK	<i>Interactions between atmospheric and oceanic fronts - the junction between weather and climate</i>
* February 24, 2015	Yoshimitsu Chikamoto,	IPRC	<i>Multi-year predictability in the tropical climate</i>
* February 10, 2015	Andrei Natarov	IPRC	<i>Enhanced kinetic energy dissipation in the equatorial thermocline. Part II: Inertial Instability</i>
* February 3, 2015	Kenneth R. Sperber	Lawrence Livermore National Laboratory, CA	<i>The Use of Fractional Accumulated Precipitation for the Evaluation of the Annual Cycle of Monsoons in CMIP5 Historical and RCP8.5 Simulations</i>
** January 28, 2015	Bin Wang	IPRC	<i>Predictable Mode Analysis of Asian Summer Monsoon Rainfall Predictability</i>
* January 27, 2015	Claude Frankignoul	Université Pierre et Marie Curie, Paris, France	<i>Atmospheric response to the variability of the North Atlantic oceanic circulation</i>
* January 27, 2015	Tobias Friedrich	IPRC	<i>Global temperature reconstruction for the last 800,000 years</i>

<b>Date</b>	<b>Speaker</b>	<b>Affiliation</b>	<b>Title of Talk</b>
* January 13, 2015	Andrei Natarov	IPRC	<i>Enhanced kinetic energy dissipation in the equatorial thermocline</i>
**** January 9, 2015	Alexander V. Babanin	Swinburne University of Technology, Melbourne Australia.	<i>Third Generation Wave Models Based on Observational Physics</i>
** December 10, 2014	Johannes Loschnigg	Former White House Staff and former IPRC Postdoctoral Fellow	<i>The Politics of Climate Change in Washington DC: 'Debates' about the science, confusion about the impacts, and ideological battles.</i>
* December 9, 2014	Gerald Meehl	National Center for Atmospheric Research, Boulder, Colorado	<i>The role of the tropical Pacific in interannual and decadal timescale climate variability</i>
* December 2, 2014	Kohei Okuhara	Tokyo Metropolitan University, Japan	<i>Westerly wind bursts and their relationship with ENSO, IDO</i>
* November 25, 2014	Kelvin Richards	IPRC	<i>Is there a connection between MJO activity and sea surface salinity?</i>
October 22, 2014	Young-Min Yang	IPRC	<i>GCMs with implicit and explicit representation of cloud microphysics for simulation of extreme precipitation frequency</i>
** October 10, 2014	Thomas Kilpatrick	Scripps Institution of Oceanography, CA	<i>Exploring the relationship between surface wind convergence and mesoscale convection in the tropics</i>
***** August 28, 2014	J. Shukla	George Mason University, MD	<i>Challenges in bridging the gap between potential predictability and prediction skill of the summer monsoon rainfall</i>
*** August 22, 2014	Adèle Révelard	Université Pierre et Marie Curie, Paris, France	<i>Influence of the decadal variability of the Kuroshio Extension on the atmospheric circulation in the cold season</i>
** July 21, 2014	Jessica Conroy	University of Illinois, Urbana-Champaign, Ill.	<i>Last millennium dust and temperature variability in southwestern Tibet</i>
July 15, 2014	Ali Belmadani	University of Concepcion, Chile	<i>Peru - Chile upwelling dynamics and global warming</i>

<b>Date</b>	<b>Speaker</b>	<b>Affiliation</b>	<b>Title of Talk</b>
July 14, 2014	Ken Furuya	The University of Tokyo, Japan	<i>Towards the Sustainable Use of the Ocean</i>
July 14, 2014	Hiroaki Saito	The University of Tokyo, Japann	<i>Kuroshio Paradox: What Mechanisms Support High Fisheries Production in Oligotrophic Kuroshio Water?</i>
*** April 7, 2014	Per Knudsen	Technical University of Denmark, Kongens Lyngby, Denmark	<i>Recovering the Global Mean Ocean Circulation using Satellite Altimetry and GOCE Gravity Models</i>

\* IPRC Symposium

\*\* Joint IPRC-Atmospheric Sciences Seminar

\*\*\* Joint IPRC-Oceanography Seminar

\*\*\*\* Joint CEE/ORE/IPRC Seminar

\*\*\*\*\* Joint IPRC-Atmospheric Sciences-Oceanography Seminar

## THE YEAR'S WORKSHOPS AND CONFERENCES

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DATE	TITLE
October 2 - 3, 2014	<i>Workshop on Perspectives in Computational Climate Science and 7th OFES International Workshop</i> Place: The University of Aizu, Aizuwakamatsu, Fukushima, Japan
July 22 - 23, 2014	<i>Workshop on Regional Climate Change and Environmental Response in Hawaii</i> Place: East-West Center, Asia Room, Hawaii Imin Conference Center, University of Hawaii, Honolulu, Hawaii
July 2 - 3, 2014	<i>Takio Murakami Memorial Symposium on Tropical Meteorology and Monsoon</i> Place: East-West Center, Asia Room, Hawaii Imin International Conference Center, University of Hawaii, Honolulu, Hawaii

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## Visiting Scholars

Last Name	Affiliation	Begin Date	End Date
Yoshio Kawatani	JAMSTEC	4/17/14	4/25/14
Chorong Lee	Seoul National University	5/12/14	5/26/14
Jun Shao	USC	5/12/14	5/24/14
Suchul Kang	APCC	5/27/14	6/3/14
Zhongda Lin	Chinese Academy of Sciences	5/30/14	8/27/14
Michae McPhaden	University of Washington	6/2/14	6/6/14
June-Yi Lee	Pusan National University	6/29/14	7/6/14
Yihui Ding	National Climate Center	7/1/14	7/5/14
Andrea Alessandri	ENEA, Energy & Environment Modeling Unit	7/1/14	8/11/14
Ali Bel Madani	University of Concepcion	7/8/14	7/25/14
Li Tao	Nanjing University of Information Science and Technology State University of New York at Albany	7/8/14	8/28/14
Oliver Elison Timm	Albany	7/9/14	8/15/14
Hee Kim Byeung	Korea	8/4/14	8/22/14
Hojin Kim	Korea	8/4/14	8/22/14
Shayne McGregor	UNSW Australia	8/28/14	9/20/14
Jagadish Shukla	Institute of Global Environment and Society	8/27/14	9/4/14
Sally Langford	University of Colorado	9/29/14	10/1/14
Matthew England	University of New South Wales	10/13/14	10/17/14
Ryo Furue	JAMSTEC	11/10/14	11/14/14
Ayah Lazar	California Institute of Technology	11/24/14	12/5/14
Bunmei Taguchi	JAMSTEC	12/8/14	12/22/14
Chun Zhou	Ocean University of China	12/13/14	2/12/15
Soon-Il An	Yonsei University	1/7/15	1/21/15
Matthew England	University of New South Wales	1/13/15	1/16/15
In-Sik Kang	Seoul National University	1/23/15	2/22/15
Ed Cook	Columbia University Woods Hole Oceanographic Institution	1/24/15	3/6/15
Michael Spall	Lawrence Livermore National Laboratory	1/29/15	2/25/15
Kenneth Sperber	National Space Institute	1/26/15	2/7/15
Kundsen	Imperial College	2/17/15	2/27/15
Rhys	Imperial College	2/25/15	3/3/15
MacFadyen	NOAA	3/16/15	3/20/15
Masunaga	University of Tokyo	3/16/15	3/23/15