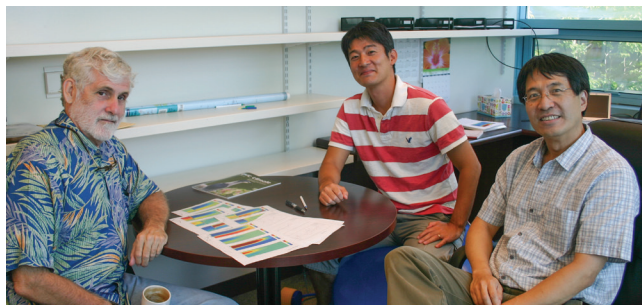


# V I S I T I N G   S C H O L A R S

## *Flow between Marginal Seas and Open Ocean*

Former IPRC Postdoctoral Fellow **Shin Kida**, now research scientist at JAMSTEC, visited the IPRC in August 2013 to discuss the dynamics of marginal sea–open ocean exchange flows with **Bo Qiu** (Oceanography Department, University of Hawai'i Mānoa) and IPRC's **Jay McCreary** and **Ryo Furue**. Although the theory known as "Island Rule" has greatly furthered knowledge of water mass exchange, it assumes that the straits are wide and deep. Since the marginal seas of the western Pacific are separated from the open ocean mostly by narrow or shallow straits, the Island Rule has limited applicability for these seas.

Kida and his colleagues are developing a theory that is more appropriate for estimating the transport of the water mass exchange of the marginal seas in the Western Pacific. Working with Qiu, Kida found that the exchange flow between the Okhotsk Sea and North Pacific is driven mainly by the East Kamchatka Current, a study published in 2013. The magnitude of the water exchange can be estimated by using Kelvin's Circulation Theorem for the region around the Kuril Island Chain. Currently Kida is focusing on the Japan Sea and water exchange with the open ocean.



Shin Kida (center) with Jay McCreary and Bo Qiu.

## *Paleoclimate Group Advances Ice-Sheet Modeling*

Following the Ice-sheet Workshop organized by IPRC's Paleoclimate Group from September 10<sup>th</sup> to 14<sup>th</sup>, 2013, in Puna on Hawai'i Island, **David Pollard** (Pennsylvania State University) and **Fuyuki Saito** (JAMSTEC) visited the IPRC to work further with **Axel Timmermann** and **Malte Heinemann** on disentangling details of ice-sheet modeling. The workshop had dealt mostly with recording peak ice-sheet-model-densities and forging plans for more research. Aside from the scientist pictured here, **Ayako Abe-Ouchi**

from the University of Tokyo and **Michelle Tigchelaar** from the University of Hawai'i participated in the Puna workshop; **Oliver Elison Timm** joined the workshop by skype from the State University of New York at Albany.



From left, Malte Heinemann, Axel Timmermann, David Pollard and Fuyuki Saito posing for the IPRC Climate.

## *Cyber Infrastructure and Environmental Modeling*

**Dilawar Grewal**, special advisor and information computing technology consultant at the University of the South Pacific visited IPRC on January 23 to discuss possible collaborations with UH in cyber infrastructure and environmental modeling. He met with **Gwen Jacobs**, UH's Director of Cyber Infrastructure, IPRC's Computer System Manager **Ron Merrill** and IPRC Director **Kevin Hamilton**.



From left, Kevin Hamilton, Gwen Jacobs, Ron Merrill, and Dilawar Grewal.

### *Lake Suigetsu Tells about past Climate Change in East Asia*

**Kana Nagashima**, a paleoclimate scientist with the Environmental Biogeochemical Cycle Research Program, Research Institute for Global Change at JAMSTEC, visited the IPRC from January 15 to March 14. She is a specialist in reconstructing past Asian monsoon and westerly jet variations based on marine and lake sediment cores.

Interested in past rapid climate change, Nagashima is exploring the changes in the wind system over East Asia and in the annual precipitation as recorded in a sediment core (SG06) recovered from Lake Suigetsu in Japan. The core, which even reflects seasonal variations and goes back at least 70 thousand years, shows several changes in precipitation during the 10–20 thousand years before the present. These changes diverge from trends seen in proxy-precipitation records from China.

Trying to solve this mystery, Nagashima is working with **Axel Timmermann's** paleoclimate group to see whether the paleoclimate models have clues about the nature and mechanisms that could have caused these precipitation changes and their regional differences.

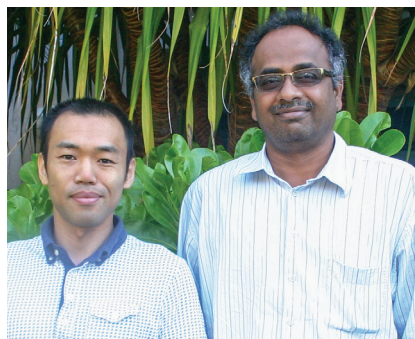


**Axel Timmermann with Kana Nagashima.**

### *JAMSTEC CFES Model Used for Indian Ocean Climate Study*

**Motoki Nagura**, scientist with the JAMSTEC Tropical Climate Variability Research Program, specializes in Indo-Pacific Ocean climate variations. He visited the IPRC in November – December 2013 to study with IPRC's Senior Scientist **H. Annamalai** the Indian Ocean monsoon climate systems in coupled models. In most of the cutting-edge CMIP3 and 5 models rainfall is weaker than observed over southern Asia and the eastern equatorial Indian Ocean, but stronger over the western equatorial Indian Ocean.

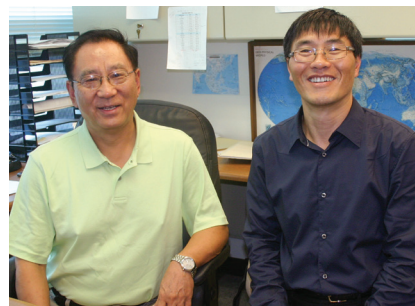
The coupled general circulation model (GCM) for the Earth Simulator (CFES), however, simulates the Indian Ocean monsoon climate systems well, they have found and are partnering with other scientists at JAMSTEC to investigate whether a realistic simulation of the equatorial Indian Ocean sea surface temperature (SST) and rainfall in CFES improves the subsequent simulation of the monsoon. They have conducted a series of coupled model sensitivity experiments, whose model solutions Nagura examined during his visit.



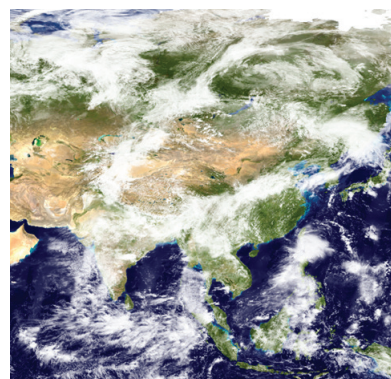
**Motoki Nagura (left) with H. Annamalai.**

### *Partnership in Operational Climate Model Development*

**Shaoqing Zhang**, a research scientist at GFDL Princeton, visited IPRC October 14-21 2013. During his week-long stay, he gave an IPRC seminar and 4 lectures to IPRC postdoctoral fellows: two lectures on data assimilation fundamentals and the other two on advanced topics in climate estimation and prediction. He was invited by IPRC's faculty **Bin Wang** who has led a modeling team to develop an operational climate prediction model for the APEC Climate Center in Busan. Zhang's visit established a close partnership with Wang's team working on coupled climate model initialization and data assimilation with ensemble Kalman filter technique. His visit was supported by GFDL director's special funds.



**Bin Wang (left) with Shaoqing Zhang.**



### *Scholars on Sabbatical at the IPRC*

The IPRC is fortunate to have several distinguished scholars visiting for their sabbatical during the spring semester.

**Emanuele Di Lorenzo**, professor of ocean and climate dynamics, School of Earth and Atmospheric Sciences, Georgia Institute of Technology, specializes in regional and coastal oceanography, climate and ecosystem dynamics, and coupled ocean and atmosphere variability. Di Lorenzo has also established a new international study group on social-ecological-environmental systems in the coastal ocean, an initiative he is conducting under the North Pacific Marine Science Organization (PICES) to foster trans-disciplinary work between climate, marine ecosystem and social scientists.

During his sabbatical at the IPRC, Di Lorenzo is continuing his work with **Niklas Schneider** on studying the factors that underlie the decadal variability of the North Pacific circulation and the impact of this variability on climate. They are using at present the high-resolution Regional Ocean Modeling System (ROMS) to determine how ocean eddies could mediate the decadal variations in the climate system. As part of the new JAMSTEC-IPRC Collaborative Studies initiative, they will also study these decadal climate variations in a new integration of the Ocean Model for the Earth Simulator (OFES).



From left, Axel Timmermann, Kim Cobb, Emanuele Di Lorenzo, and Niklas Schneider.

**Kim Cobb**, who joins her husband at the IPRC, is associate professor in the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology. She specializes in tropical Pacific climate variability and change, stable

isotope geochemistry, water isotopes and global hydrology, as well as paleoclimate modeling. During her sabbatical, Cobb is working with **Axel Timmermann** and his paleoclimate group on comparing her long coral records of past tropical Pacific climate with the group's modeling simulations of the same period. Kobb and Timmermann also share an interest in using paleoclimate data to improve the understanding of past El Niño – Southern Oscillation activity.

**Per Knudsen**, Professor and Head of the Geodesy Unit at the National Space Institute of the Technical University of Denmark in Lyngby, Denmark, specializes in the use of satellite altimetry for modeling ocean general circulation. He has contributed to using satellite altimetry to derive mean sea surface, marine gravity field, ocean tides and sea level rise. As part of the global monitoring of the geodetic reference systems, his unit operates the permanent GPS station and tide gauges in Greenland, which are used to detect changes in, for example, sea level and ice caps, and crustal deformations. The launch of the geodetic gravity field satellite missions – the latest being the European Gravity field and steady-state Ocean Circulation Explorer (GOCE) – has reestablished the use of geodetic techniques in estimating the ocean general circulation.

During his sabbatical at the IPRC, Knudsen is working with **Nikolai Maximenko** on modeling the mean dynamic ocean topography and ocean currents using drifter data and on integrating drifter velocities with geodetic estimates based on satellite altimetry and GOCE geoid models.



Per Knudsen (left) with Nikolai Maximenko.