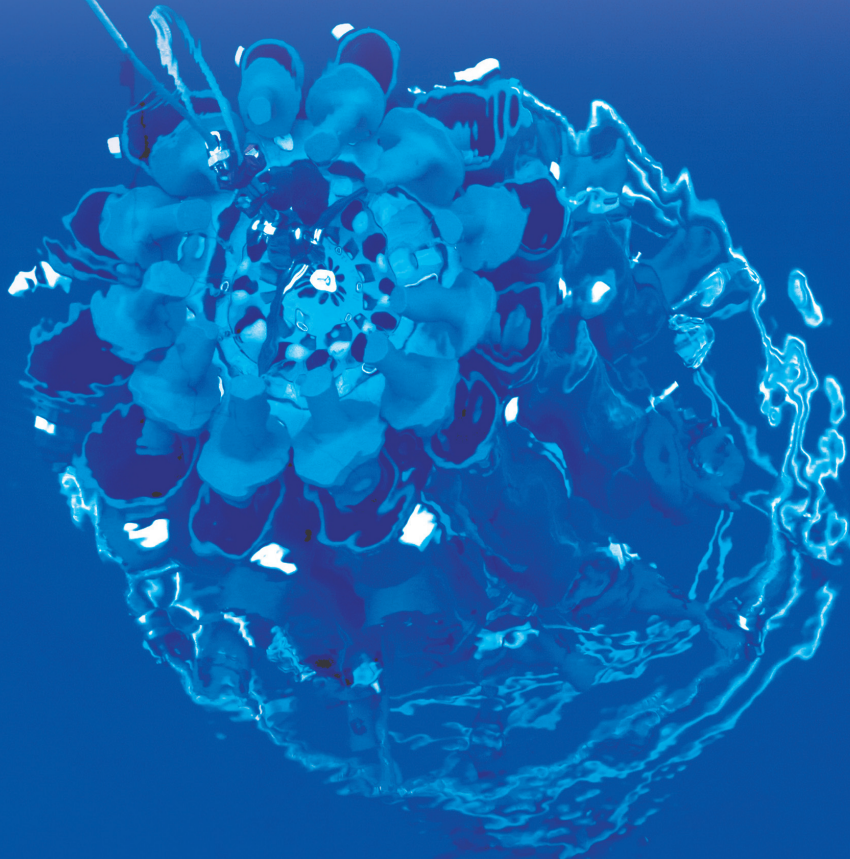


WESTPAC **9th** INTERNATIONAL SCIENTIFIC SYMPOSIUM



A Healthy Ocean for Prosperity in the Western Pacific

Scientific Challenges and Possible Solutions

22-25 April 2014, Nha Trang, Vietnam

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The IOC Sub-Commission for the Western Pacific is particularly grateful to the Government of Vietnam, through its Vietnam Academy of Science and Technology (VAST) for hosting this Symposium, the Institute of Oceanography, VAST; National IOC Committee for Vietnam for co-organizing this Symposium.

Special thanks to all invited keynote speakers for preparing and delivering thought-provoking presentations out of their extremely busy schedule. Our sincere appreciation shall be extended to Session and Workshop Conveners for their valuable time spent in chairing and screening the best candidate from their respective sessions and workshops for the "WESTPAC Best Young Scientist Award 2014", and all members of the International Scientific Steering Committee for their guidance on the symposium programs and final selection of the "WESTPAC Best Young Scientist Award 2014."

Last but not the least, the IOC Sub-Commission for the Western Pacific would like to express its sincere gratitude to the Local Organizing Committee, particularly Dr Vo Si Tuan, Ms Do Minh Thu, and Dr Dao Viet Ha of the Institute of Oceanography, Vietnam for their long-term hard work and efficient coordination with relevant individuals and institutions.

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General Description

The ocean, our common heritage, is key to sustaining all humankind on the planet. It shapes Earth's climate and influences the distribution of ecosystems, biodiversity, and thus food availability.

The Western Pacific and its adjacent regions are of vast social and economic importance with over 70% of its population living in and relying economically on coastal areas, and more than half of the world's annual merchant tonnage traversing this area. Meanwhile, the ocean in the region is among the richest and most productive marine areas in the world as the epicenter of the world marine biodiversity, spawning and nursery grounds for diverse marine species, and is universally recognized as one major influence on the global and regional climate system.

Humans, however, have put the ocean at risk of irreversible damage by unregulated exploration and development, increasing pollution, climate change and ocean acidification. As such, it is imperative to strengthen sound scientific research and systematic observations to underpin the sustainable governance of the ocean.

It is within this context that the IOC¹ Sub-Commission for the Western Pacific (WESTPAC) has been committed to its mission to promote international cooperation in marine research, observations, services, and capacity development in the Western Pacific and its adjacent regions, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development and the protection of the marine environment.

Since its establishment in 1989, WESTPAC has organized a series of WESTPAC international scientific symposia as a unique regional platform to advance marine scientific knowledge, and catalyze multi- and cross-disciplinary collaborations among its Member States with a view to addressing challenges this particular region is facing for sharing the wealth of the ocean to benefit all.

Upon the kind offer of the Government of Vietnam, the WESTPAC 9th International Scientific Symposium entitled "A Healthy Ocean for Prosperity in the Western Pacific: Scientific Challenges and Possible Solutions" took place in Nha Trang, Vietnam, 22-25 April 2014 in commemoration of the 25th Anniversary of WESTPAC.



¹ Intergovernmental Oceanographic Commission (IOC) of UNESCO, the competent agency within UN system for marine research, observations, services and capacity building

Symposium OVERVIEW

HIGHLIGHTS

The four day WESTPAC 9th International Scientific Symposium received great interests with an overwhelming number of participants registering either online or on site. A total of 607 participants from 24 countries had registered online prior to the event with 550 scientists and governmental officials from 21 countries, within and outside WESTPAC region, finally taking part in the Symposium.



The Symposium features: **1** Research Directors Forum, **6** keynote speeches, **14** sessions, and **9** workshops, which are structured around four themes: (1) Understanding Ocean Processes in the Indo-Pacific Region; (2) Ensuring Marine Biodiversity, Food Safety and Security; (3) Maintenance of Ocean Health; and (4) Cross-Cutting and Emerging Issues.

KEYNOTE SPEECHES



- a. *Achievements and Perspectives of WESTPAC towards Peace and Sustainability in the Region*
Dr Somkiat Khokiattiwong, Chairman of WESTPAC
- b. *Impacts of the 2011 Mega-Earthquake and Tsunami on Marine Coastal Ecosystems on Pacific Coast of Northeast Japan* Prof Tomohiko Kawamura, University of Tokyo, Japan
- c. *Anthropogenic Impacts to and Resilience of Regional Ecosystems*
Dr Christopher L. Sabine, NOAA's Pacific Marine Environmental Laboratory, USA
- d. *Sustaining Marine Biodiversity and Food Security in the southern Western Pacific: From Marine Process to Management Challenges* Prof Jamaluddin Jompa, Hasanuddin University, Indonesia
- e. *Understanding the Abrupt Monsoon Onset and its Impacts on Climate Disasters*
Dr Weidong Yu, First Institute of Oceanography, State Oceanic Administration of China
- f. *Climate Variability, Climate Change and Related Disasters in Viet Nam*
Prof Tran Thuc, Vietnam Institute of Hydro-Meteorology and Environment, Vietnam



14 SESSIONS

Understanding Ocean Processes in the Indo-Pacific Region

- Role of the Indo-Pacific Ocean in regional climate change and variability
- Status, trends and effects of climate, natural disturbances and anthropogenic stressors on ocean ecosystems
- Risk/vulnerability assessment on coastal sea-level related hazards focusing on sea level rise, storm surges and coastal erosion
- Sediment source-to-sink process in the Western Pacific

Ensuring Marine Biodiversity, Food, Safety and Security

- Status, trends of marine biodiversity and productivity (including marine endangered species, invasive species, etc.)
- Sustainable fisheries and aquaculture
- Toxic marine organisms and seafood safety

Maintenance of Ocean Health

- Changing ocean biogeochemistry and its ecosystem impact (particularly nutrient supply and cycles, hypoxia, POPs and heavy metals)
- Ocean acidification and its effects on marine ecosystems
- Harmful algal blooms
- Restoration and conservation of marine ecosystems
- Remote sensing in integrated coastal and marine management

Cross-cutting and Emerging Issues

- Development and demonstration of ocean forecasting system
- New technology and data management



9 WORKSHOPS

Workshop 1 Coral Reef under Climate and Anthropogenic Perturbation (WESTPAC-CorReCAP)

Workshop 2 Ocean Remote Sensing for Coastal Habitat Mapping (WESTPAC-ORSP)

Workshop 3 Recruitment Monitoring of Coral Reef Organisms (WESTPAC-DRMREEF)

Workshop 4 Harmful Algal Blooms (WESTPAC-HAB)

Workshop 5 Asian CORE

Workshop 6 Coastal & Marine Biodiversity and Conservation (WESTPAC-CMBC)

Workshop 7 Toxic Marine Organisms (WESTPAC-TMO)

Workshop 8 Ocean Acidification

Workshop 9 Expedition of Widya-Nusantara (EWIN)-2013

RESEARCH DIRECTORS FORUM

The Forum serves as one integral part of this Symposium, to provide one open-ended platform for directors from marine scientific institutes, academic faculties and/or operational agencies in the Indo-Pacific region.



WESTPAC Research Directors Forum

WESTPAC organized its first-ever Research Directors Forum, as one integral part of this Symposium, to provide one open-ended platform for directors from marine scientific institutes, academic faculties and/or operational agencies in the Indo-Pacific region, to build and enhance networks; exchange strategic directions of their institutions; identify scientific and technical challenges; and spark regional actions for future collaboration by exploring any opportunity of synergizing existing and planned observations, and furthering operational oceanography in the Indo-Pacific region.

This Forum culminated in the signing of a Joint Statement of Research Directors towards the attainment of the future we want: "A Healthy and Safe Ocean for Prosperity in the Indo-Pacific region." It called for the following:

- urgent action to establish the Indo-Pacific Ocean Observations and Services Network (IPON);
- creation of the Scientific Steering Committee for Indo-Pacific Ocean Observations and Services Network (SC-IPON) as an arm to guide the development of IPON;
- heightened recognition from IOC/UNESCO Member States, regional leadership and policy decision makers on the need to establish IPON;
- marine scientific communities to undertake further research on, and sustained observations of, the ocean processes and climate, earth dynamics, and the impacts of climate change and anthropogenic activities on vulnerable marine biodiversity and ecosystems;
- continued support for GOOS and other IOC Subsidiary Bodies, and active engagement in the development of sustained, integrated and multi-purpose observation and information system on ocean processes, earth dynamics and marine ecosystems for improved services to the Indo-Pacific societies through the development of IPON;
- increased assistance to developing nations in the Indo-Pacific region, including Small Island Developing States (SIDS);
- enhanced efforts in capacity building in developing nations in the Indo-Pacific region, in particular through the development of technical assistance programs and materialization of the "IOC Regional Network of Training and Research Centers on Marine Science."



WESTPAC Outstanding Scientist Award

WESTPAC established the “WESTPAC Outstanding Scientist Award” at this Symposium in recognition and appreciation of those marine scientists for their long term dedication to regional marine science development and cooperation.

Five scientists, Dr Fangli Qiao (China), Dr Suchana Chavanich (Thailand), Dr Yutaka Michida (Japan), Dr Nguyen Tac An (Vietnam), and Dr Yasuwo Fukuyo (Japan) were finally selected and received “WESTPAC Outstanding Scientist Award 2014” on 22 April 2014.

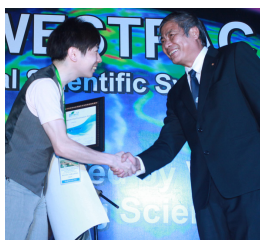


Left to right: Dr Yasuwo Fukuyo (Japan), Dr Yutaka Michida (Japan), Dr Suchana Chavanich (Thailand), Dr Nguyen Tac An (Vietnam) and Dr Fangli Qiao (China)

WESTPAC Best Young Scientist Award

WESTPAC awarded its Best Young Scientist Award 2014, on 24 April 2014, to five outstanding young scientists from the region in order to encourage young marine scientists to devote themselves to marine science, sustained observations and services.

After three days' evaluation and selection, Mr Ryota Nakajima (Japan), Ms Intan Suci Nurhati (Indonesia) and Ms Ngoc Tuyen Nguyen (Vietnam) won the Best Young Scientist Oral Presentation Award, while Mr Toh Hii Tan (Malaysia) and Mr Kazuya Takahashi (Japan) obtained the Best Young Scientist Poster Award.



Mr Ryota Nakajima (Japan)



Ms Intan Suci Nurhati (Indonesia)



Ms Ngoc Tuyen Nguyen (Vietnam)



Mr Toh Hii Tan (Malaysia)



Mr Kazuya Takahashi (Japan)

WESTPAC Young Scientist Travel Grant

WESTPAC Young Scientist Travel Grant was continuously established to nurture young science leaders and facilitate international exposures of young scientists. With financial support of the Government of Vietnam, Korea Institute of Ocean Science and Technology, and State Oceanic Administration of China, fifty young scientists were provided with partial or full financial support for their participation in this Symposium.

Conclusions and Recommendations

The WESTPAC 9th International Scientific Symposium sets new records in its history in terms of the number of participants, and the number of sessions and workshops. All statistics demonstrated the ever-increasing interests of scientists and countries in WESTPAC, and the ever-growing leadership of WESTPAC in the promotion of marine science development and cooperation in the region.

This Symposium continued to engage world's leading scientists/research institutes working on global hotspot issues into the regional context, with a view to providing a clearer global picture, such as climate change and ocean acidification, and enabling scientists in the region to better tune up their research in the global context.

WESTPAC's first-ever Research Directors Forum proved to be a success with close to fifty research directors, representatives and regional experts in the Indo-Pacific gathered and a Joint Statement of Research Directors adopted at the Forum. The number of participating institutes and the adopted Joint Statement reflected the willingness of the directors and their institutes to engage in regional collaborations, and contribute to the common undertakings towards the attainment of the Future We Want.

On the occasion of its 25th Anniversary, WESTPAC established the "WESTPAC Outstanding Scientist Award" at this Symposium in recognition and appreciation of those marine scientists for their long term dedication to regional marine science development and cooperation. With positive impacts generated, this award will continuously encourage more scientists to actively engage in regional marine science development and cooperation.

Meanwhile, WESTPAC continued to select young scientists for the "WESTPAC Best Young Scientist Award", and established the "WESTPAC Young Scientist Travel Grant" with financial support of the Government of Vietnam, Korea Institute of Ocean Science and Technology, and State Oceanic Administration of China. Great appreciation was received from many young scientists, their supervisors, and senior scientists at this Symposium. It is evident that capacity development will continuously be one key area for WESTPAC to strengthen its efforts in.

A NUMBER OF RECOMMENDATIONS WERE PUT FORWARD FROM THE SYMPOSIUM, WHICH ARE LISTED BELOW.

Participants recognized the critical role and socio-economic importance of the Western Pacific and its adjacent regions which constitutes one major influence on regional & global climate system, the epicenter of the world marine biodiversity, spawning and nursery grounds for diverse marine species, a potential reservoir of non-living resources, and a treasure sustaining over one-third of the world's population.

Rocky shore and sandy beach assessment for marine alien species



Participants expressed concerns over the pressures and threats to the health of marine ecosystems and prosperity in the region, such as depletion of resources, escalating pollution, degradation of coastal habitats, climate change and ocean acidification, as well as climate disasters regarding monsoons, droughts, typhoons or extreme weather events.

Given that our knowledge on ocean remains too limited for us to be able to understand and predict global and regional ocean conditions and their interactions with the atmosphere, biosphere and land, **participants therefore called for a renewed commitment** to marine scientific research, sustained ocean observations, capacity development and transfer of technology, and related education and training.

As such, **participants emphasized** the importance of the WESTPAC International Scientific Symposium as an essential regional platform for marine scientific communities, competent government agencies within and outside the region to advance ocean knowledge, catalyze inter and multi-disciplinary collaborations with a view to addressing those challenges towards the attainment of “A Healthy Ocean for Prosperity”, and **further underlined** the need for WESTPAC to continuously organize the event on a regular basis by bringing together scientists from within and outside the region.

Participants expressed their appreciation to WESTPAC for its tremendous efforts made in the past, and **further underscored** the essential role of WESTPAC in the coordination, development and implementation of marine scientific programs, sustained observations and services in the Western Pacific and its adjacent region (or Indo-Pacific region) through its well established intergovernmental mechanism and operational framework.

Participants recommended WESTPAC to develop closer links among scientists, institutes and countries in the region, and intensify its efforts to continue cultivating marine science talent, developing sustained observations and relevant infrastructure, and sharing the knowledge and data through capacity development activities in the region, in particular through the development of technical assistance programs and materialization of the “IOC Regional Network of Training and Research Centers on Marine Science”.

Bearing in mind the spirit of south-south, and south-north cooperation, **participants strongly encouraged** the transfer of technology between scientifically advanced institutes and developing institutes, and **appealed** to their national competent authority for increased investment on marine science, observations and capacity building to underpin the sustainability of their marine and coastal biodiversity and resources for sharing the wealth to benefit all.



Participants further suggested the following inexhaustive subjects concerning the future research and development in the Western Pacific and its adjacent regions:

- Sustained ocean observations and services, particularly the emerging Indo-Pacific Ocean Observations and Services Network (IPON);
- Ocean forecasting system, particularly the second phase of SEAGOOS Ocean Forecasting Demonstration System;
- Ocean acidification and its impact on marine ecosystems;
- Atmosphere and ocean circulation, and sea-air interaction;
- Coastal erosion and coastal hazards, such as storm surge;
- Ecosystem restoration techniques/methods;
- Vulnerability assessment methodology and tools.

Massive campaigns should be launched to prepare the general public, particularly policy makers to understand critical issues such as ocean acidification and its consequences, and the role of ocean in climate change and variability and humans' lives. This requires combined efforts of the government and non-governmental organizations, and especially the media of mass communication.

Participants highly appreciated the establishment of "WESTPAC Outstanding Scientist Award" as an effective motivation for scientists in the region to dedicate themselves to regional marine science development and cooperation, and **further called upon** more capable scientists to demonstrate their leadership in addressing scientific challenges the region is particularly facing.

Meanwhile, the "WESTPAC Best Young Scientist Award" has proven to be a valuable means to encourage young scientists to engage in international scientific collaborations. **Participants therefore strongly recommended WESTPAC** to continuously selecting the best young scientists for this award in the future symposia.

MOMSEI buoy deployment in the Eastern Indian Ocean

