

Workshop on Marine Biodiversity Conservation and  
Marine Protected Areas in the Northwest Pacific  
(Toyama, Japan , 13-14 March 2013)



United Nations  
Educational, Scientific and  
Cultural Organization

Organisation  
des Nations Unies  
pour l'éducation  
la science et la culture

Organización  
de las Naciones Unidas  
para la Educación  
la Ciencia y la Cultura

Организация  
Объединенных Наций по  
вопросам образования  
науки и культуры

• Intergovernmental  
Oceanographic  
Commission

• Commission  
océanographique  
intergouvernementale

• Comisión  
Oceanográfica  
Intergubernamental

• Межправительственная  
океанографическая  
комиссия

# Activity on Marine Biodiversity Conservation in the WESTPAC/IOC/UNESCO

*Working together for a better future*

**Yasuwo Fukuyo**

**IOC Sub-Commission for the Western Pacific (WESTPAC)  
Intergovernmental Oceanographic Commission of UNESCO**

**Asian Natural Environmental Science Center, The University of Tokyo**

# WESTPAC/IOC region



	Australia		Philippines
	China		Russian Federation
	Fiji		Samoa
	France		Singapore
	Indonesia		Solomon Islands
	Japan		Thailand
	Korea, DPR		Tonga
	Rep. of Korea		United Kingdom
	Malaysia		United States of America
	New Zealand		Vietnam



# WESTPAC Session

WESTPAC Office, Bangkok

WESTPAC Advisory Group

## WESTPAC International Scientific Symposia

### Ocean Observations & Services

NEARGOOS

SEAGOOS

MOMSEI

Ocean Forecasting Demonstration

### Marine Science & Applications

Harmful Algae Bloom

Toxic Marine Organism

Ocean Remote Sensing

Coastal and Marine Biodiversity

Fluvial Sediment Supply to SCS

Response of Marine Hazard to CC

Coral Reef under Climate & Anthropogenic Perturb.

DNA Taxonomy of Coral reef

### Capacity Development

Training & Research Centers

Specific trainings under projects

IOC Regional T & R Center on ODC

Air-Sea Interaction in the Kuroshio Extension and its climate impact

### Working Groups

WG001: Impact of Asian Dust on Marine Ecosystem

WG002: Regular Process for GRAME

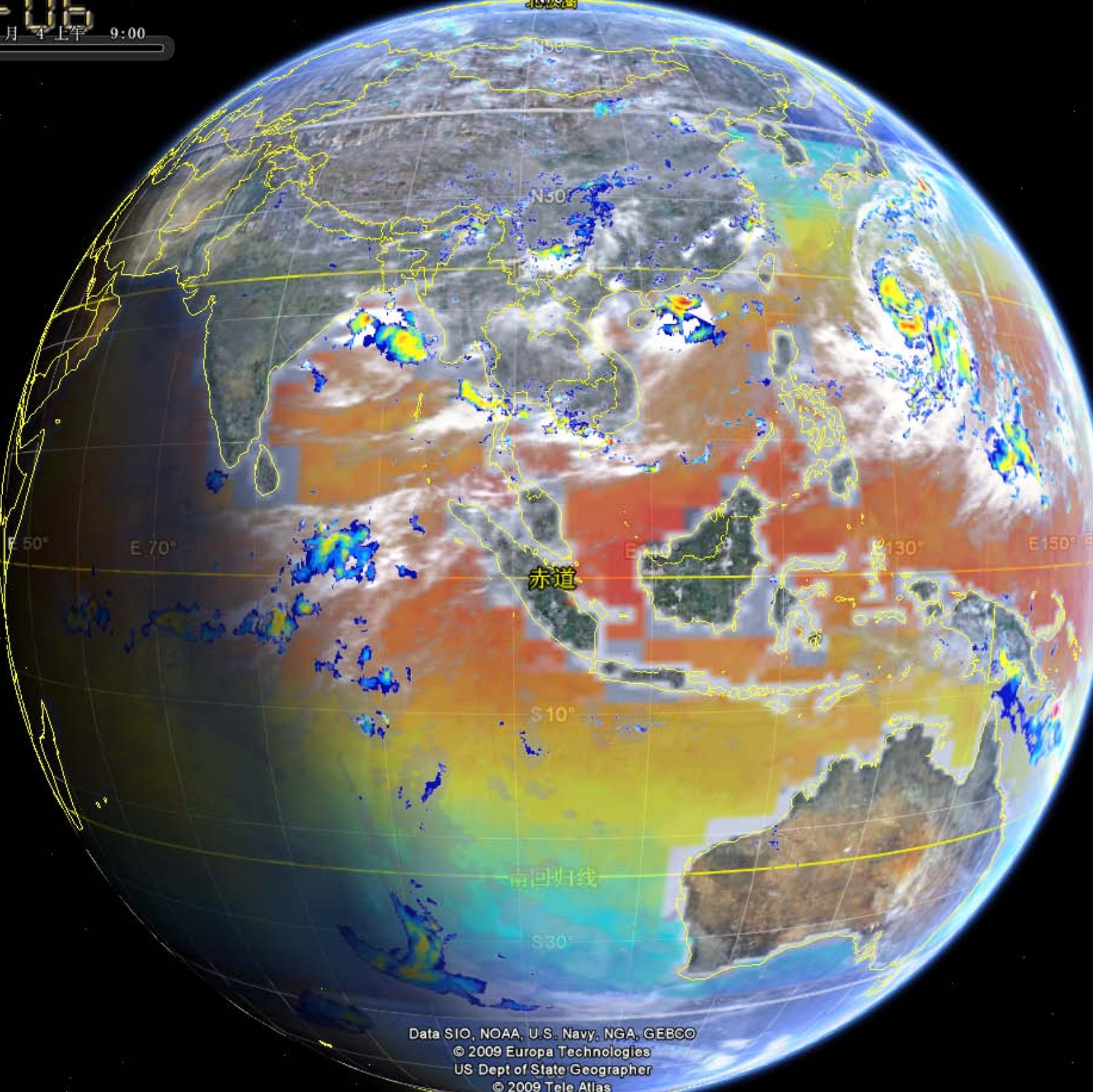
WG 003: Mapping the Harmful Jellyfishes

WG 004: Marine Renewable Energy Technology

Period of Mar. 2010- Feb. 2013

2002 participants,  
1 international symposium,  
6 joint cruises,  
12 regional trainings,  
30 regional workshops.





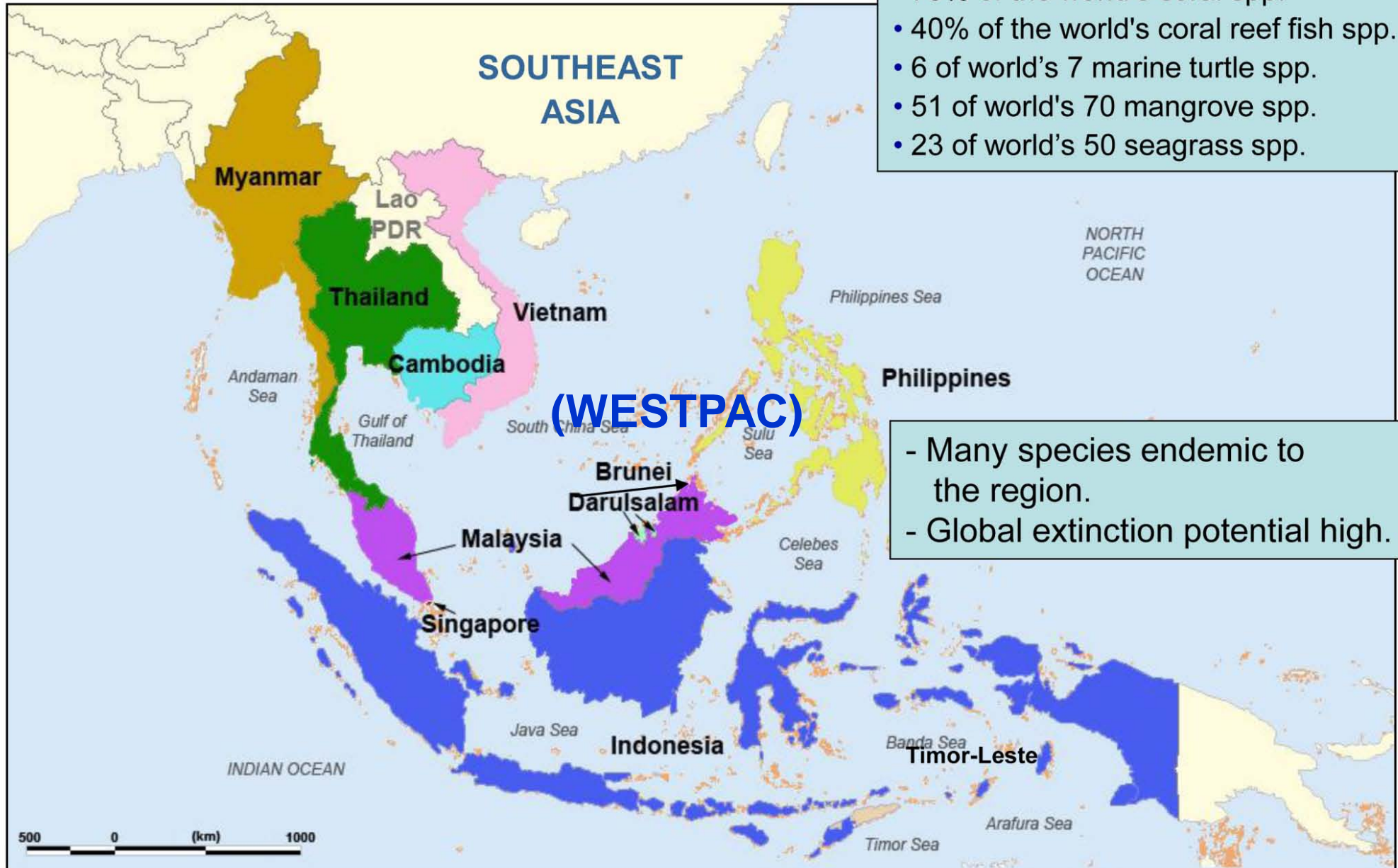
# **WESTPAC region**

Wide variety  
physical  
chemical  
biological  
condition

And

Quickly  
changing  
society and  
environment

# WESTPAC tropics; Global hotspot for marine biodiversity



- 75% of the world's coral spp.
- 40% of the world's coral reef fish spp.
- 6 of world's 7 marine turtle spp.
- 51 of world's 70 mangrove spp.
- 23 of world's 50 seagrass spp.

- Many species endemic to the region.
- Global extinction potential high.



Biodiversity related activity

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WG 003: Mapping the Harmful Jellyfishes

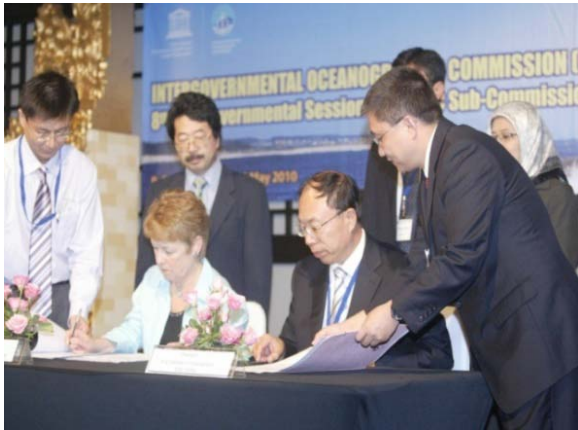
WG 004: Marine Renewable Energy Technology

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# Trainings and Workshops

## IOC Regional Network of Training & Research Centers on Marine Sciences



Signing on 11 May 2010



Inaugurating on 9 June 2011



First Regional Training on Ocean Models, 10-16 June 2011



Second Regional Training on Ocean Dynamics, Qingdao, 16-22 July 2012

**To be established:**

Regional T&R Center on Tropical Marine Biodiversity (Indonesia) ;

Regional T & R Center on Climate Change and Ocean Ecosystems (Thailand);

# Trainings and Workshops

A series of training courses/summer schools conducted on harmful algal bloom, toxic marine organisms, marine invasive species, operation of oceanographic equipments, tsunami model and risk assessment, integrated ocean assessment



Demonstration and practice on "Immunological method for detection of domoic acid in plankton and shellfish" at the WESTPAC Workshop, Nha Trang, Vietnam, 19-22 March 2012



2nd WESTPAC Summer School on Monsoon Onset Monitoring and its Social and Ecosystem Impact (MOMSEI), Qingdao, 6-10 August 2012





# Potential biodiversity related activities in WESTPAC

1. Species composition observation, especially on
  - Invasive species
  - Endangered species
  - Blooming species
2. Analyses of driving factors and mechanisms on biodiversity change
  - Driving natural and anthropogenic factors of the change
  - Invading mechanisms, including intentional and non-intentional transfer
  - Settlement mechanisms
3. Evaluation of quality of biodiversity
  - Evaluation of dispersion level, quality, and changing trend
  - Appropriate biodiversity level for a certain area
  - Environmental condition to keep the preferred level of biodiversity
4. Methodology and techniques for biodiversity research
  - Classification and identification methods of marine organisms
  - Morpho-taxonomy vs gene-molecular taxonomy
5. Capacity building (taxonomy, identification skill)
6. Information dissimulation to public



Biodiversity related activity

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WG 004: Marine Renewable Energy Technology

Each group has various types of contribution to biodiversity related scientific study.



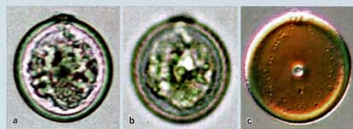
# Marine Phytoplankton of the Western Pacific

Takuo Omura, Mitsunori Iwataki, Valeriano M. Borja, Haruyoshi Takayama, Yasuwo Fukuyo

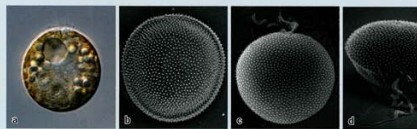


## 2-1 Procoentrales

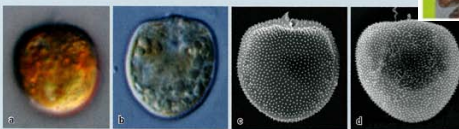
### 2-1-1 Planktonic species



*Mesoporus perforatus* (a-c: H Inoue)



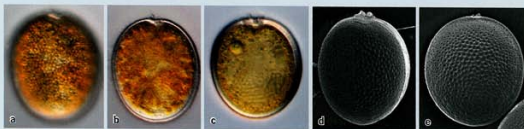
*Procoentrum balticum* (a: K Takahashi, b: M Iwataki, c,d: H Takayama)



*Procoentrum minimum* (a: K Takahashi, b,c: M Iwataki, d: H Takayama)



*Procoentrum shikokuense* (a: T Omura, b,c: K Takahashi, d,e: M Iwataki, f: H Takayama)



*Procoentrum compressum* (a-c: K Takahashi, d,e: M Iwataki)

Diatoms  
Others

Biodiversity related activity: 1  
WESTPAC-HAB project  
Phytoplankton monograph  
samples from Western Pacific  
ca.50 contributors (provision of  
sample and photographs)  
>600 unicellular microalgae  
to be used at capacity building  
activities such as training  
courses (distribute free of  
charge to young participants)



# **IOC/WESTPAC Project on Coastal Marine Biodiversity and Conservation in the Western Pacific**

Coordinated by  
Dr. Suchana Apple Chavanich  
Chulalongkorn University

# IOC/WESTPAC Project on Coastal Marine Biodiversity

## Project Objectives:

- To understand and provide the scientific basis for biodiversity management by articulating the state of the science with respect to current and emerging stressors
- To establish the effective management plan and monitoring programs for marine biodiversity among WESTPAC country members
- To encourage research collaboration and to exchange knowledge among WESTPAC countries

# Coastal Marine Biodiversity and Conservation in the Western Pacific

**Biodiversity and taxonomy of marine organisms**

organism list

**Effect of disturbance and current stressors on biodiversity**

impact analysis

**Restoration and rehabilitation of ecosystems**

restoration

# Project Leader and Project Steering Group

**Project Leader:** Dr. Suchana Apple Chavanich

**Project Coordinator:** Dr. Chareon Nitithamyong

## **Initial Project Steering Group:**

**China:** Dr. Put Ang

**Indonesia:** Dr. Mujizat Kawaroe

**Japan:** Dr. Toshio Furota, Dr. Makoto Omori

**Korea:** Dr. Yoon Lee, Dr. Heung-Sik Park

**Malaysia:** Dr. Zulfigar Yasin

**Philippines:** Dr. Edgardo D. Gomez, Dr. Arsenia G. Caguan

**Singapore:** Dr. Beverly Goh

**Thailand:** Mr. Niphon Phongsuwan, Dr. Anchana Prathep

**Vietnam:** Dr. Dan Ngoc Thanh, Dr. Nguyen Huy Yet

# Past Activities

**Activities carried out  
(during June 2009-December 2012)**



# Coastal Marine Biodiversity and Conservation in the Western Pacific

**Biodiversity and taxonomy of marine organisms**

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**Effect of disturbance and current stressors on biodiversity**

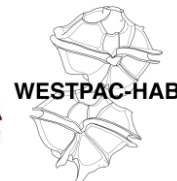
impact analysis

**Restoration and rehabilitation of ecosystems**

restoration

# Activities Carried Out: 1

- **IOC/WESTPAC Workshop on Marine Invasive Species and Management in the Western Pacific Region**
- Venue: Chulalongkorn University, Bangkok, Thailand
- Dates : June 4-5, 2009
- The workshop was co-organized with WESTPAC-HAB and sponsored by
  - IOC/WESTPAC
  - Japanese Funds in Trust
  - Asian Natural Environmental Science Center, University of Tokyo (Japan)
  - Department of Marine and Coastal Resources (Thailand)
  - Contribution of China to IOC/WESTPAC
  - Chulalongkorn University (Thailand)



# IOC/WESTPAC

## Workshop on Marine Invasive Species and Management in the Western Pacific Region

- Purposes:
  - **Review the regional status** on the marine invasive species in the Western Pacific region
  - **Share experience and knowledge** related to marine invasive species through establishment of research collaboration among scientists and organizations in the Western Pacific region and outside the region
  - **Establish research priorities and directions** in the Western Pacific region

## IOC/WESTPAC

# Workshop on Marine Invasive Species and Management in the Western Pacific Region

- A total of 63 participants from 11 countries were attended
- **Representatives from ICES and PICES** also shared their experiences and knowledge related to marine non-indigenous species issues



## Activities Carried Out: 2

- Collaborating with UNEP/COBSEA in a training and review “Workshop on the Management of Marine and Coastal Invasive Species in the COBSEA Region” held in Bangkok, Thailand during 31<sup>st</sup> August-4<sup>th</sup> September, 2009

# Activities Carried Out: 3

- Editing team meeting for the report on the current status of marine non-indigenous species in the Western Pacific region during 29<sup>th</sup>-31<sup>st</sup> March, 2010 in Bangkok, Thailand

### MARINE NON-INDIGENOUS SPECIES IN THE WESTERN PACIFIC REGION



**What are marine non-indigenous species (NIS) ?**  
 Any species intentionally or accidentally transported and released by humans into an environment that is outside of their native ranges

**Main pathways of the introduction of marine NIS in the Western Pacific region**  
 Most marine NIS are introduced through the following human activities.

Ships, ballast waters, and ship hulls

Recreational and commercial fishery enhancement

Aquarium trade

Aquaculture

Live bait

**Impacts of Marine NIS**

Ecosystem  
► Compete or prey on native species. They can also alter the ecosystem.

Genetic pollution  
► Possible hybridization with native species leading to the loss of genetic diversity.

Economic impacts  
► Lead to the decline in fishery and aquaculture productions, high cost of eradication and management.

Tourism and recreation  
► Reduce the aesthetic quality of the environment for tourism.

Health impact  
► Increase or transport diseases to new hosts, affecting human health.

**What can be done to minimize the introduction of marine NIS ?**

- Minimize the transport or exchange of marine NIS. • Do not allow any aquarium species to be released or to escape into any aquatic environment.
- Develop technologies for eradication of marine NIS and for treatments of ballast waters. • Monitoring of marine NIS in the region.
- Increase public awareness on marine NIS.


 Currently, IOC/WESTPAC Project on Coastal Marine Biodiversity and Conservation in the Western Pacific has initiated studies on the current status of marine NIS.

## Report on the Current Status of Marine Non-Indigenous Species in the Western Pacific Region



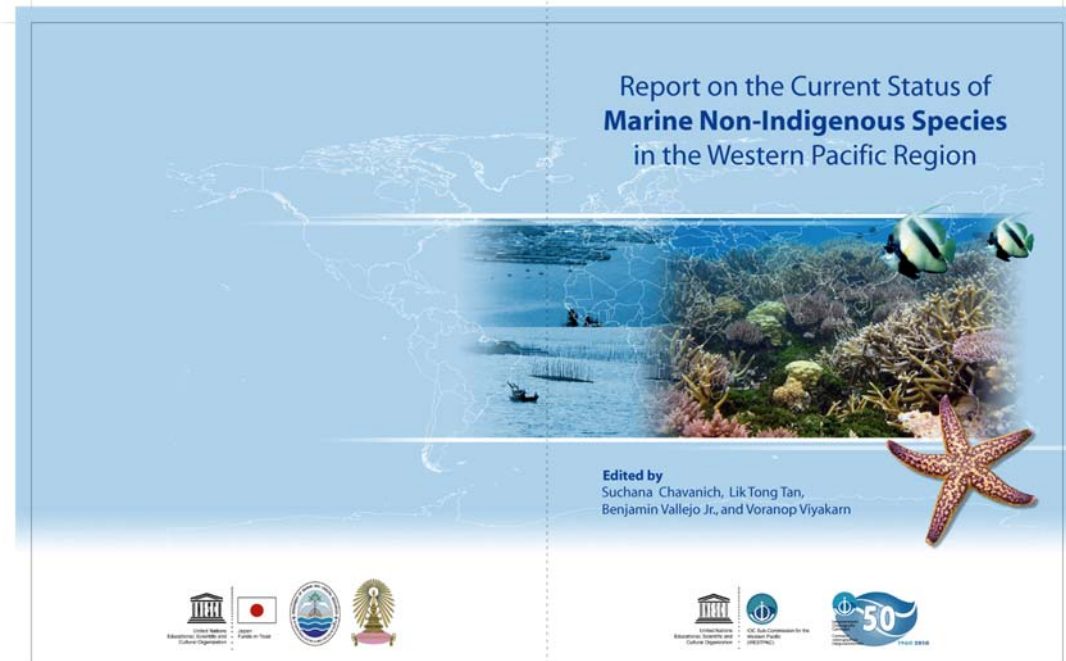
**Edited by**  
 Suchana Chavanich, Lik Tong Tan,  
 Benjamin Vallejo Jr., and Voranop Viyakarn





## Contributors

- China:** Li Zheng, Wei Gao, Zhisong Cui, Ping Han
- Indonesia:** Mujizat Kawaroe, Adriani Syamsul
- Japan:** Toshio Furota
- Korea:** Heung Sik Park, Jung Hoon Kang
- Malaysia:** Zulfigar Yasin, Muhammad Ali Syed Hussein
- Philippines:** Benjamin Vallejo Jr.
- Singapore:** Lik Tong Tan
- Thailand:** Somchai Bussarawit,  
Sumait Putcharkarn,  
Suwanna Panutrakul,  
Wansuk Senanan,  
Ukkrit Satapoomin
- Vietnam:** Vo Quang



## Activities Carried Out: 4

- **WESTPAC Workshop on Rapid Assessment Survey of Marine Biodiversity and Non-Indigenous Species in the Western Pacific Region (I)**
- Venue: Chulalongkorn University, Bangkok, Thailand
- Dates : September 20-21, 2010
- The workshop was co-organized with PICES WG-21 and sponsored by
  - Japanese Funds in Trust
  - Department of Marine and Coastal Resources (Thailand)
  - Chulalongkorn University (Thailand)



# WESTPAC Workshop on Rapid Assessment Survey of Marine Biodiversity and Non-Indigenous Species in the Western Pacific Region (I)

- A total of 22 participants from 7 countries: Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam attended the workshop
- It aimed to **provide a rapid assessment methodology to identify native, introduced, and cryptogenic species present as fouling communities at identified sites of great probability of containing non-indigenous species, such as port areas.**



## Activities Carried Out: 5

- **WESTPAC Workshop on Rapid Assessment Survey of Marine Biodiversity and Non-Indigenous Species in the Western Pacific Region (II)**
- Venue: Chulalongkorn University, Bangkok, Thailand
- Dates : December 6-9, 2010
- It aimed to help member countries on identification of marine organisms collected from collector plates
- The workshop was sponsored by
  - Korean Trust in Fund

# WESTPAC Workshop on Rapid Assessment Survey of Marine Biodiversity and Non-Indigenous Species in the Western Pacific Region (II)

- A total of 26 participants from 7 countries: Indonesia, Japan, Malaysia, Philippines, Singapore, and Thailand attended the workshop



## Activities Carried Out: 6

# IOC/WESTPAC- PICES Joint Workshop on Rapid Assessment Survey Methodologies for Detecting Marine Non-Indigenous Species

- Venue: Phuket Marine Biological Center, Phuket, Thailand
- Date: July 19-21, 2011
- Purposes:
  - Provide a contextual perspective on why monitoring for non-indigenous species is important;
  - Educate participants in RAS methodologies and demonstrate their application;
  - Provide participants of an overview of the PICES WG-21 database and show how all can benefit from such an application

# IOC/WESTPAC- PICES Joint Workshop on Rapid Assessment Survey Methodologies for Detecting Marine Non-Indigenous Species

- A total of 29 participants from 10 countries: Canada, China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Thailand, and Vietnam attended the workshop



## Activities Carried Out : 7

- **Conducting workshop: Introduction to Rapid Assessment Survey Methodologies for Detecting Marine Non-indigenous Species**
- Venue: Nagasaki, Japan
- Date: February 8-9, 2012
- It aimed to help scientists in the area on the studying marine non-indigenous species through the RAS methodologies.
- This workshop was organized in the collaborations between **IOC/WESTPAC, PICES, and NOWPAP**

# Introduction to Rapid Assessment Survey Methodologies for Detecting Marine Non-indigenous Species

- A total of 16 participants from 8 countries attended the workshop



# Coastal Marine Biodiversity and Conservation in the Western Pacific

**Biodiversity and taxonomy of marine organisms**

organism list

**Effect of disturbance and current stressors on biodiversity**

impact analysis

**Restoration and rehabilitation of ecosystems**

restoration



## Activities Carried Out: 8

- **IOC/WESTPAC Workshop on Coral Reef Restoration Techniques in the Western Pacific Region**
- Venue: Bangkok, Thailand
- Date: September 21-23, 2012
- It aimed to summarize the coral reef restoration techniques that have been used or experimented in each country in the WESTPAC region
- This workshop was organized in the collaborations between IOC/WESTPAC, Japan Fund in Trust, Department of Marine and Coastal Resources (Thailand), JSPS Acore-Comsea Program, and Chulalongkorn University

# IOC/WESTPAC Workshop on Coral Reef Restoration Techniques in the Western Pacific Region

- A total of 43 participants from 10 countries attended the workshop



## Future activities

- workshops in 2013-2014 related to:
  - coral reef restoration
  - taxonomy of marine organisms
  - ocean acidification and marine biodiversity
- 2013-2014 workshop: update the list of marine NIS in the WESTPAC region

## Why few studies of marine NIS in SE Asia region ?

- It has been ignored, since the impact is still invisible
- High diversity in tropical marine ecosystems
  - Database on existing species is not completed
  - Taxonomical identification is problematic
  - New recorded species VS introduced species
  - Some confusions between words:  
invasive, introduced, non-indigenous, alien



# Importance of biodiversity study becomes understood widely.



Importance of biodiversity study becomes understood widely.

## Marine Non-Indigenous Species

WESTPAC Countries	Number of marine non-indigenous species
China	60
Japan	33
Korea	12
Indonesia	4
Malaysia	4
Philippines	13
Singapore	2
Thailand	7
Vietnam	8

Importance of biodiversity study becomes understood widely.

**Southeast Asia :**  
**Examples of marine non-indigenous species**



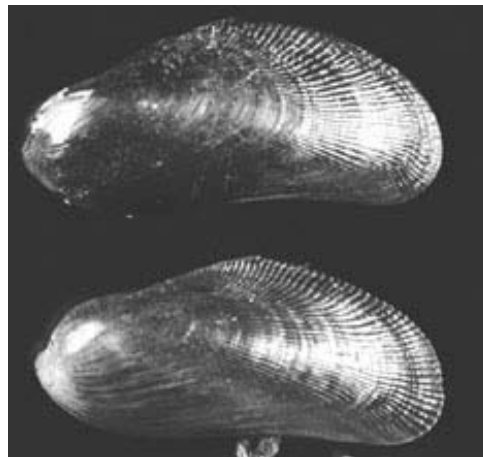
*Mytilopsis sallei*



*Litopenaeus vannamei*



*Ecteinascidia thurstoni*



*Brachidontes striatulus*



*Tetilla japonica*



IOC Sub-Commission for the Western Pacific (WESTPAC)  
9<sup>th</sup> International Scientific Symposium

***“A Healthy Ocean for Prosperity in the Western Pacific:  
scientific challenges and possible solutions”***



25-28 March 2014, Nha Trang, Vietnam

***Calling for Sessions, Workshops and Keynote Speeches***





IOC Sub-Commission for the Western Pacific (WESTPAC)  
9<sup>th</sup> International Scientific Symposium

***“A Healthy Ocean for Prosperity in the Western Pacific:  
scientific challenges and possible solutions”***



25-28 March 2014, Nha Trang, Vietnam

Thank you for audience and patience