

Highlights of  
**WESTPAC'S**  
**25th**  
Anniversary

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# General Description

Without science there can be little progress towards the Sustainable Development Goals that are conducive to the safeguarding of our planet and its finite resources.

The ocean is our planet's life support system and a healthier ocean means a healthier Earth. It is an essential part of the water cycle that brings rainwater to our land and drinking water that we need to survive. The ocean also produces much of the oxygen upon which most living organisms depend.

Keeping our ocean healthy keeps humankind healthy. A healthy and productive ocean requires the best science and technology for better efficiency, competitiveness and ecosystem-based management.

Despite the fact that the ocean is vital to sustaining all humankind on Earth, we know very little about this essential lifeblood, especially compared to our

knowledge of Earth's land spaces – or that of distant planets such as Mars and Venus.

Given the vast environmental, social and economic importance of the Western Pacific and its adjacent regions, the IOC<sup>1</sup> Sub-Commission for the Western Pacific (WESTPAC) was founded in 1989. For over a quarter of a century, this organisation has been committed to promoting significant international cooperation in marine research, observations, services and capacity development in order to develop and advance knowledge about the ocean and its resources, and to apply this specialist expertise to management, sustainable development and marine environmental protection.

As WESTPAC entered its milestone 25th year in 2014, countries in the region, inspired by the spirit of cooperation,

decided to conduct a series of commemorative events with the following objectives: (i) take stock of advances in marine science, observations, capacity building and related international cooperation in the Western Pacific and adjacent regions; (ii) promote and demonstrate, to governments and to the public, the value and importance of the Sub-Commission's achievements in meeting societal needs; and (iii) plan the Sub-Commission's future direction in marine scientific research, observations, services and capacity building.



## Overview

A wealth of experts – comprising of marine scientists, resource managers and senior government officials – took part in a wide range of commemorative activities to mark this 25th year, which included the 9th WESTPAC International Scientific Symposium, regional science development workshops, trainings and summer school, and joint cruises.

These events are critical to the expansion of knowledge sharing and bridge building among stakeholders so that stronger partnerships can be built to increase our collective understanding of ocean processes and climate in the Indo-Pacific, ensure marine biodiversity and seafood security, and maintain the health of ocean ecosystems on which all life depends. Highlights from these commemorative events are provided as follows.

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

# 'The Future We Want'

## "A Healthy Ocean for Prosperity in the Western Pacific: Scientific Challenges and Possible Solutions"

### 9th WESTPAC International Scientific Symposium

Prominent among these events was the 9th WESTPAC International Scientific Symposium – a regional science conference with associated training and specialist seminars. The symposium was held on 22-25 April 2014, in Nha Trang, Vietnam and it attracted immense global interest with around 600 scientists and government officials from 21 countries within and outside the WESTPAC region.

The symposium featured a prestigious **Research Directors' Forum, six keynote speeches, fourteen specialist sessions** that focused on areas of critical regional significance regarding our present and future marine environment, and **nine workshops**. The event was structured around the following 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.**

Feedback from the overall event demonstrated an increasing interest of scientists, specialists and government officials in countries in the WESTPAC region. The symposium highlighted WESTPAC's growing leadership in the promotion of marine science development and cooperation across a region that has a rich biological diversity and differing climatic conditions. This requires a solid and unified body to coordinate efforts among interested parties.

The first-ever **Research Directors' Forum** provided a unique open-ended platform for directors from marine scientific

institutes, academic faculties and operational agencies in the region to build and enhance networks, exchange the strategic directions of respective institutions, identify scientific and technical challenges, and inspire regional action for future collaboration. The Forum culminated in the signing of the Joint Statement of Research Directors. This leadership initiative will help strengthen efforts to safeguard our seas through greater management that will guide research, monitoring and development work – an approach that will protect the ocean and its resources for future generations. The number of participating institutes from across the region also reflected the willingness of directors and their institutes to engage in regional collaboration and contribute to common undertakings towards the attainment of the collective goal identified as **"The Future We Want"**.



**WESTPAC Outstanding Scientist Award**



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)

The symposium also witnessed the establishment of the inaugural **"WESTPAC Outstanding Scientist Award"** to honour marine scientists for their long-term dedication to regional marine science development and cooperation.

WESTPAC awarded its **"Best Young Scientist Award"** to five outstanding young scientists from the region in order to encourage young scientists to devote themselves to marine science.

To nurture young science leaders and heighten international exposure of young scientists under the age of thirty-five, the **"WESTPAC Young Scientist Travel Grant"** was established with generous financial support from the Government of Vietnam, the Korea Institute of Ocean Science and Technology, and the State Oceanic Administration of China. Fifty young scientists were provided with partial or full financial support to enable their participation in the symposium.

**WESTPAC Best Young Scientist Award**



Mr Ryota Nakajima (Japan)



Ms Ngoc Tuyen Nguyen (Vietnam)



Mr Toh Hii Tan (Malaysia)



Ms Intan Suci Nurhati (Indonesia)



Mr Kazuya Takahashi (Japan)



# Exploring the Indo-Pacific with joint cruises flagged for the 25th Anniversary

During late 2013-2014, several joint research cruises were flagged for the WESTPAC 25th Anniversary to explore the Indo-Pacific, with scientists on-board from WESTPAC Member States. Those include:

1 The expedition of *Widya Nusantara* (E-Win) in June 2013, organised by the Indonesian Institute of Sciences (LIPI) to explore benthic and pelagic marine bio-resources and biogeochemical processes in the Makassar Strait;

2 A research cruise of the research vessel *Hakuho Maru* (KH-13-4 Leg 3 and Leg 4) off Thailand and Malaysia, Andaman Sea and Bay of Bengal in July-August 2013, organised by the Atmosphere and Ocean Research Institute of the University of Tokyo to reconstruct the paleo-environment over the last 3,000 years and understand the relationship between human activity and environmental change;

3 A research cruise of the research vessel *Yokosuka* (YK13-11) and the manned research submersible *Shinkai 6500* off New Zealand in October 2013, organised by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) to investigate and understand the composition, structure and



functioning of the deep-sea ecosystems in the areas at the Kermadec Trench, northern Kermadec Arc, and the Louisville Seamount Chain;

4 A research cruise of the research vessel *Mirai* (MR14-01) in the eastern equatorial Indian Ocean in January 2014, organised by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), to conduct ocean climate observations and TRITON buoy operation in the Indian Ocean and the equatorial Pacific Ocean.



# Science demonstrating its power in addressing environmental, social and economic challenges

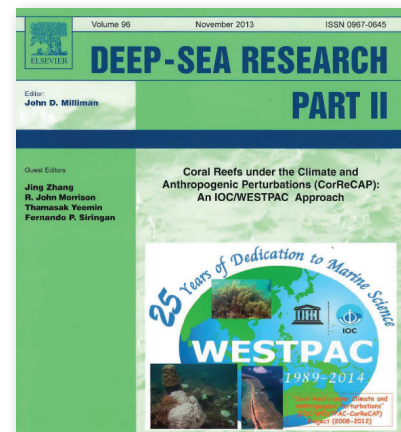
WESTPAC scientific communities are dedicated to conducting action research addressing a wide range of environmental, social and economic challenges.

## Harmful Algal Blooms and seafood security

To help formulate counter-measures to the increase of fish kill at aquacultural areas and shellfish poisonings in Malaysia and Singapore, WESTPAC offered technical assistance to both countries in 2014 by transferring technology on various sampling techniques in Harmful Algal Bloom (HAB) monitoring, species identification, and rapid molecular detection of HAB species.

## Coral reef conservation and restoration

Coral reefs in the WESTPAC region are of vital importance to the livelihood of over one-third of the world's population in the region. Given the increasing combined impacts of human activities and climatic perturbations on coral reefs, WESTPAC scientists strive to understand the biogeochemical and ecological nature of coral reefs in different geographic, physical and environmental settings; and attempt to evaluate the impacts of climate change and human activities on the health of coral reefs and their sustainable use.



A special issue in the Deep-Sea Research Part II: Tropical Oceanography

A special issue entitled "Coral reefs under the climate and anthropogenic perturbations (CorReCAP): An IOC/WESTPAC approach" was published by



Above: Briefing on systematic and advanced methodologies for harmful algae monitoring at the national training workshop in Bachok, Malaysia, 12-15 August 2014



Above and right: Field sampling and laboratory practice on species taxonomy of harmful algal bloom at the national training workshop in Singapore, 18-22 August 2014



Fish kills in Tanjung Kupang, Johor on 11 February 2014

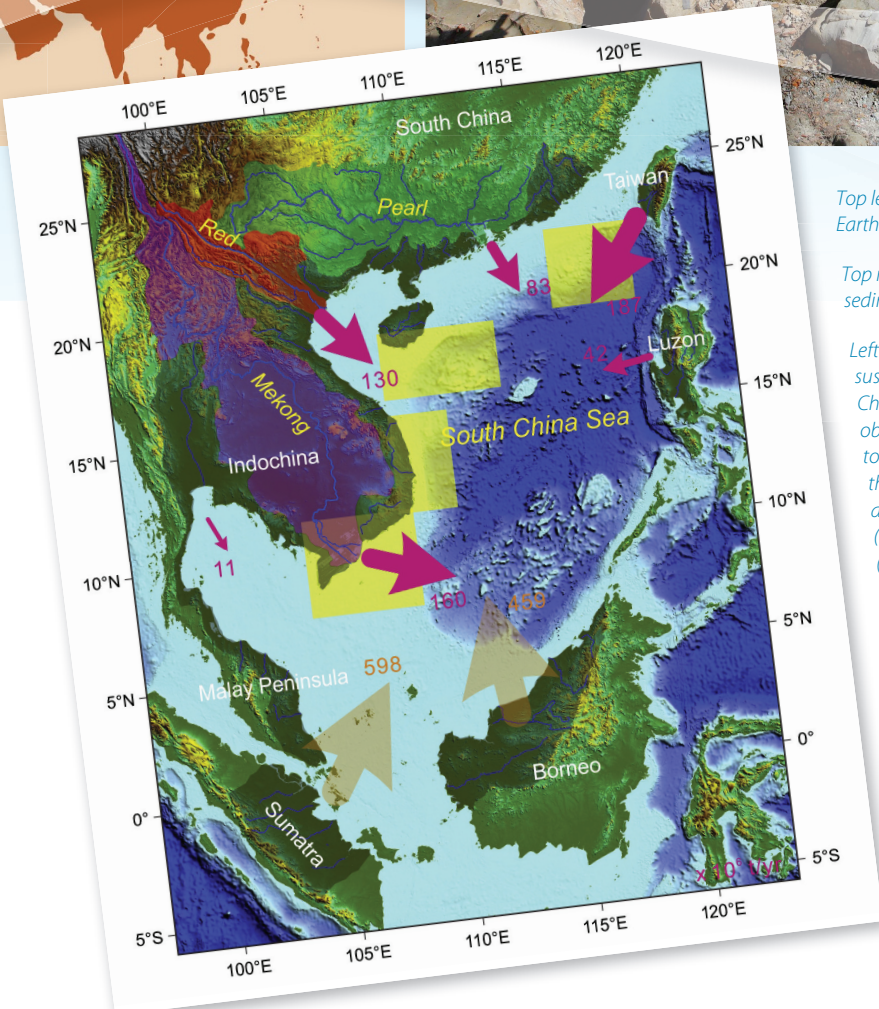


the Deep Sea Research Part II in late 2013. It provided snapshots of various aspects of the biogeochemistry, ecology and environmental sciences of coral reefs in the WESTPAC region, and examined the response of coral reef ecosystems to the external driving forces from climate change and human activities in various hydrodynamic as well as geographic situations

### South China Sea fluvial sediments and environmental change

As the largest marginal sea in the region, the South China Sea functions as a natural laboratory, due to its unique source-to-sink record of fluvial sediments, for study of land-sea interactions. This enables people to understand how human

activities have affected the sediment discharge over the geological past, and to predict future changes. A special issue on South China Sea Fluvial Sediments was published by the Journal of Asian Earth Sciences in 2014 with the latest knowledge contributed by WESTPAC scientists from all countries neighbouring the South China Sea.



Top left: A special issue in Journal of Asian Earth Sciences

Top right: Sampling Oligocene-Pliocene sedimentary rocks

Left: Fluvial drainage systems and their annual suspended sediment discharge to the South China Sea. Red arrows with numbers indicate observed fluvial sediment discharge (in million tons annually) from Indochina Peninsula in the west, South China in the north (Milliman and Syvitski, 1992), Taiwan in the northeast (Dadson et al., 2003), and Luzon in the east (Liu et al., 2009), respectively. Pink arrows with numbers show modal sediment discharge from Malay Peninsula, Sumatra, and Borneo in the south (Milliman et al., 1999). Yellow boxes highlight the studied areas of contributions in this special issue. (Liu and Stattegger, 2014. South China Sea fluvial sediments: An introduction, *Journal of Asian Earth Sciences*, 79, 507–508)

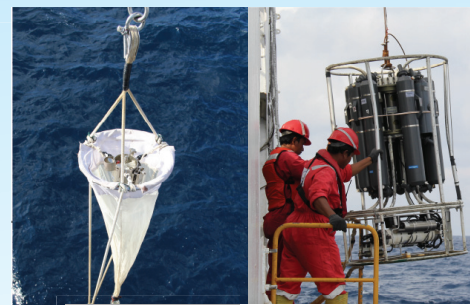
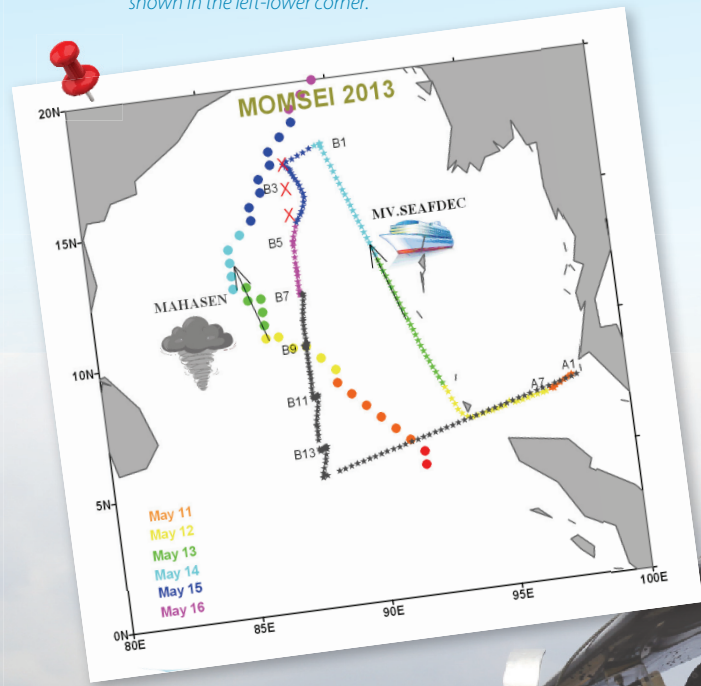
# Probing the Asian Monsoon onset mystery with a pioneering cruise in the Bay of Bengal

The Asian Monsoon plays a significant role in the agriculture and livelihood of the people in the wider Southeast Asian Basin and its neighbouring countries as it brings abundant rainfall to much of mainland Asia. When the monsoon deviates from its normal pattern, it may cause floods or droughts, which results in the disruption of agricultural production and the potential displacement of inhabitants.

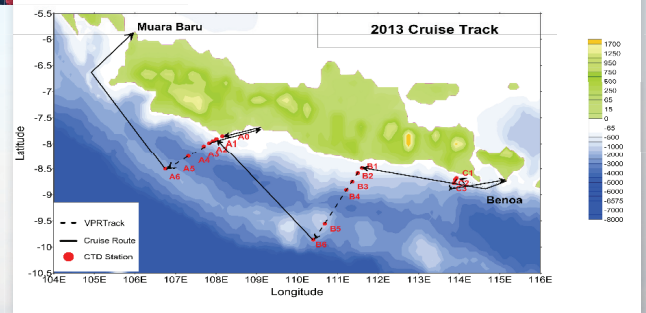
To decipher the rules governing the monsoon onset, WESTPAC young scientists launched a cruise traversing the Bay of Bengal from the north to the south on 11-23 May 2013. It is the first deep ocean endeavour in the Bay of Bengal flagged for WESTPAC's 25th anniversary as part of WESTPAC's SEAGOOS pilot project "**Monsoon Onset Monitoring and its**

**Social & Ecosystem Impacts (MOMSEI)**", which was initiated in 2009. Its aim is to enhance observing capability for monsoon onset and evolution with a focus on ocean-atmosphere interactions. The scientific outcomes from MOMSEI will help improve seasonal predictions of monsoons in the Southeast Asian region.

Below: Cruise track and CTD stations of the Bay of Bengal cruise  
The star represents the cruise track while the dot represents the cyclone route. The color corresponds to calendar days as shown in the left-lower corner.



Cruise Progress in 2013



Above: Cruise track and CTD stations of the South Java Upwelling cruise



Deploying the Video Plankton Recorder (VPR)

## Intensifying operational oceanography for improved services to the Indo-Pacific society

Despite tremendous efforts made over the last decades, our knowledge on the Indo-Pacific, its biodiversity and ecosystems, and its role in climate change and variability still remains low mainly due to the lack of adequate sustained observations.

Recognising the importance of sustained ocean observations and services to both developed and developing states, the Indo-Pacific Ocean Forum on "**Charting the Future of Sustained Ocean Observations and Services**" was held in Bangkok, Thailand on 25-28 November 2013. The Forum provided a platform for marine scientific institutes, academic faculties and/or operational agencies in the Indo-Pacific region to take stock of the major achievements of WESTPAC in ocean observations and services, build and enhance networks among participants, exchange

strategic directions of their institutions, identify scientific and technical challenges within the IOC mission and mandate, and to facilitate future collaboration with a view to furthering operational oceanography for improved services to the Indo-Pacific society.

The Forum concluded that the IOC needs to respond to underlying issues in a more substantive and practical manner. The Forum offered advice to move the IOC forward through the following strategic approaches: **i) become an advocate for operational oceanography at a global level; ii) enhance recognition by governmental decision makers in the value of operational oceanography; iii) rely upon the IOC regional subsidiary bodies as a viable vehicle to promote**

**operational oceanography regionally; and iv) take advantage of the opportunity to use operational oceanography to link global programmes to regions and enhance cooperation between Member States.**

The Forum suggested that WESTPAC, building on its past achievements and ongoing efforts, should continue and further strengthen its pivotal role in the development and implementation of ocean observations, services and associated capacity building activities in the Indo-Pacific region. The Forum also recommended that WESTPAC intensify its efforts to build and enhance the capacity of countries, particularly those in the Eastern Indian Ocean region, for ocean observation activities and services.

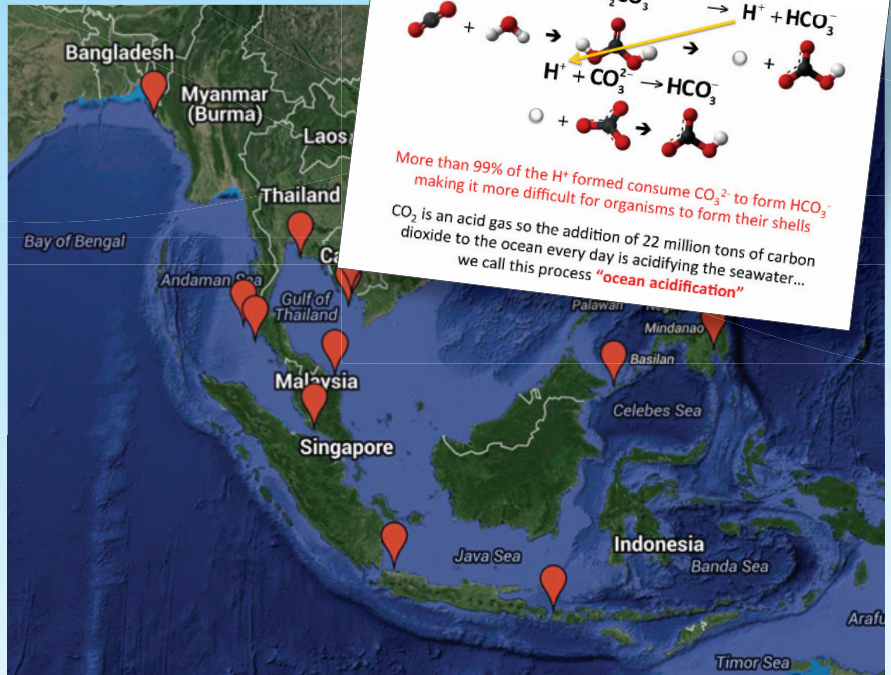
*Regional expert gathering in Bangkok, Thailand for the Indo-Pacific Ocean Forum, 25-28 November 2013*



# Determining the impact of ocean acidification on coral reefs via a regional ocean acidification monitoring network

The Western Pacific has the highest concentration of coastal marine biodiversity and endemism in the world. Given the limited understanding of ecosystem responses to ocean acidification, WESTPAC has initiated the development of a joint long-term monitoring programme/network on the impacts of ocean acidification on coral reefs across the region in collaboration with Global Ocean Acidification Observing Network (GOA-ON).

Since there is a critical need to develop meaningful projections on future impacts of ocean acidification on marine ecosystems, especially on coral reefs, WESTPAC organised a workshop on "Research and Monitoring of the Ecological Impacts of Ocean Acidification on Coral Reef Ecosystems" (Phuket, Thailand, 19-21 January 2015), providing an opportunity for all countries in the region to consolidate their research and monitoring efforts on ocean acidification in order to enable fisheries managers, and policy makers to develop effective long-term mitigation plans and adaptation strategies to benefit the region.



Pilot sites for developing the regional monitoring network of the ecological impacts of ocean acidification on coral reef ecosystems

Experts across the region stressed the need to build on existing coral reef monitoring initiatives and to develop a joint long-term monitoring programme/network on the impacts of ocean acidification on coral reefs across the region. To this end, the workshop selected several pilot sites as starting points for developing the regional monitoring programme/network.

A table for the monitoring capacity analysis will be developed to analyse the current monitoring capacity, identify common monitoring methods, and provide input into the development of a consistent, comparable and cost-effective "Standard Operating Procedure (SOP)" for all pilot sites.

*WESTPAC Workshop on Research and Monitoring of the Ecological Impacts of Ocean Acidification on Coral Reef Ecosystems, Phuket, Thailand, 19-21 January 2015*



# Increased support for the IOC Regional Network of Training and Research Centres

WESTPAC strives to develop the collaborative "UNESCO/IOC Regional Network of Training and Research Centres on Marine Science". The aim of this initiative is to improve regional capability and capacity on marine science in a sustainable and systematic manner through the establishment of IOC Regional Training and Research Centres (RTRCs) in national oceanographic institutes and universities based on their scientific specialisation and regional recognition. These centres will provide training and research opportunities on their respective domains of focus to young scientists mainly from developing countries within and outside the region.

Since the inauguration of the IOC Regional Training and Research Centre on Ocean Dynamics and Climate (RTRC-ODC) in 2011 at the First Institute of Oceanography, State Oceanic Administration of China, the centre has been organising regular trainings annually on ocean dynamics, air-sea interactions and



Group discussion

numerical modelling, with a total participating number of 204 young scientists from 28 countries. The regular training at the ODC centre attracts great interests of young researchers, which is demonstrated by the ever-increasing number of applicants from a growing geographical coverage.

Meanwhile, Indonesia, Japan, Malaysia, Thailand and Vietnam are taking efforts to establish RTRCs based on their own scientific specialisation and regional recognition. The level of this backing was indicated by the attendance of a wealth of delegates at the "International Feasibility Study Workshop

towards the establishment of an IOC Regional Training and Research centre (RTRC)", held in Kashiwa, Japan, 18-19 November 2014. Participants positively reacted to Japan's efforts to establish an RTRC that will help develop regional capacity and conduct research into coastal and marine sustainability science. They also stressed the need for WESTPAC to continuously develop this regional network, with guiding principles of fostering North-South, and South-South cooperation and developing training programmes to serve the goals of research that address critical challenges to sustainable development in the region.

4th training course of the UNESCO/IOC-ODC Center on Climate Models, Qingdao, China, 3-14 November 2014



## Establishing a partnership with ASEAN on marine science



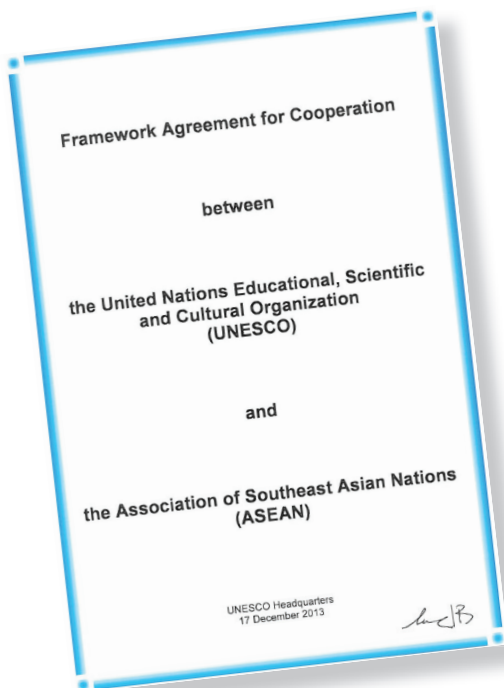
The health of coasts and the ocean was identified as a programme area in the ASEAN-UNESCO indicative Joint Programme of Action (2014-2018) when UNESCO and ASEAN signed the Framework Agreement for Cooperation on 17 December 2013. This Joint Programme of Action stated the objective to protect, restore and sustain the health and productivity of coasts and the ocean for prosperity in the ASEAN region.

### **Actions include:**

- 1) Promoting regional cooperation on marine scientific research, observations (the South East Asian-Global Ocean Observing System), data management and services and capacity building to underpin ASEAN's efforts in the protection, restoration and sustainability of the coasts and ocean;
- 2) Deploying efforts to better understand the effects of climate change, including ocean acidification, on vulnerable marine ecosystems, particularly coral reefs and mangroves;
- 3) Strengthening general science-based knowledge for ocean management, including marine spatial planning;
- 4) Promoting integrated and sustained monitoring and warning systems for natural hazards, particularly coastal and oceanic natural hazards in close coordination with other relevant organisations, using enhanced coastal and ocean networks, including education and training activities;
- 5) Supporting the development of the global integrated assessment of the state of the marine environment including socio-economic aspects by 2014;
- 6) Assisting in the capacity development of ASEAN Member States in marine science, observations and services, through the "UNESCO/IOC Regional Network of Training and Research Centres on Marine Science" and other available resources to empower ASEAN Member States in the protection and sustainable development of their coasts and ocean.

Through a long collaborative history, ASEAN has always attached great importance to cooperation with UNESCO.

**The conclusion of the Framework Agreement marked an important milestone in strengthening ongoing ASEAN-UNESCO cooperation in ocean.**







*Years of Dedication to Marine Science 1989-2014*

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