# 2nd China-ASEAN Countries Marine Cooperation Forum Agenda


**Cape Panwa Hotel,Phuket, Thailand,**
**December15-17, 2014**

# Document contents

# 2nd China-ASEAN Countries Marine Cooperation Forum
# Agenda

Cape Panwa Hotel,Phuket, Thailand, December15-17, 2014

| Dec 15 (Mon.), 2014 | |
|---|---|
| 08:00 – 08:30 | Registration |
| | |
| **08:30 – 09:30** | **Opening Session (08:30 – 09:30)** |
| | - Welcome remarks by Deputy Permanent Secretary of MNRE, Thailand, Dr. Wijarn Simachaya<br>- Congratulation remark by Director General of Department of International Cooperation, SOA, China, Dr. Haiwen ZHANG<br>- Congratulation remark by IOC-WESTPAC, Dr.Somkiat Khokiattiwong<br>- Plenary presentation on Retrospect and Prospective for China-ASEAN Marine Cooperation by Dr Fangli QIAO |
| | |
| 09:30 – 10:00 | Group photo and coffee break |
| | |
| **10:00 – 12:40** | **Session 1: Ocean and Climate Change**<br>Co-Chairs: Dr. Somkiat Khokiattiwong and Dr. Weidong YU |
| 10:00 – 10:20 | CORDEX Southeast Asia: The new regional climate downscaling initiative for the Southeast Asia region, Dr. Fredion Tangang (UKM, Malaysia) |
| 10:20 – 10:40 | Monsoon climate study and its application: MOMSEI success and its future development, Dr. Weidong YU (FIO, China) |
| 10:40 – 11:00 | The needs of understanding the atmospheric convection over maritime continent of Indonesia to produce skillful seasonal prediction, Ms.Nurhayati (BMKG,Indonesia) |
| 11:00 – 11:20 | Primary research on the modern sedimentation in the Western Gulf of Thailand, Dr. Xuefa SHI (FIO, China) |
| 11:20 – 11:40 | Climate change and its impacts in the South China Sea: Uncertainties, Dr. Yue FANG (FIO, China) |
| 11:40 – 12:00 | The Impact of extreme climate on Southeast Asia and the associated disaster prevention and mitigation, Lin LIU(FIO, China) |
| 12:00 – 12.20 | Introduction of Chinese coastal GNSS continuous operational reference system(CORS) and absolute sea level change analysis, Dr. Huayi ZHANG (FIO, China) |
| 12.20 – 12.40 | Autonomous ocean-going robots for global marine monitoring, Dr. Xiujun SUN, National Ocean Technology Center |
| 12.40-14.00 | Lunch break |
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| **14:00 – 16:00** | **Session 2: Ocean Forecast System and Observation**<br>Co-Chairs: Dr. Fangli QIAO and Dr. Le Dinh Mau |
| 14.00: – 14:20 | Ocean environment forecasting and ocean disaster early-warning for Southeastern Seas, Dr. Fangli QIAO (FIO, China) |
| 14:20 – 14:40 | Marine meteorological services: Present and future plan, Mr. Kyaw Lwin Oo (Ministry of Transport, Myanmar) |
| 14.40 – 15.00 | OFS progress report, Dr. Guansuo WANG (FIO, China) |
| 15.00 – 15.20 | The Implementation of coastal inundation forecast demonstration project (CIFDP) Indonesia: Integrating wave and coastal models for better marine climate services, Dr.Andri Ramdhani, (BMKG, Indonesia) |
| 15:20 – 15:40 | Drift prediction of oil spill and its decision support for emergency response, Dr. Jiangling XU (NCSB, China) |
| 15:40 – 16:00 | Integrated fishery service system based on oceanic remote sensing satellite, Dr. Qian FENG (NSOAS, China) |
| 16:00 – 16:30 | Coffee break |
| | |
| **16:30 – 18:50** | **Session 3: Marine Environment and Biodiversity**<br>Co-Chairs:, Dr. Phang Siew Moi and Dr. Dongdavanh Shibounthong |
| 16:30 – 16:50 | Update the status of Irrawaddy dolphin conservation in Mekong River, Dr. Dongdavanh Shibounthong (Ministry of Agriculture and forestry, Laos) |
| 16:50 – 17:10 | The Drivers of primary Productivity in the South China Sea and its variability, Dr. Azizan Bin Abu Samah (UM, Malaysia) |
| 17:10 – 17:30 | Joint study on the marine endangers species between China and Southeastern Countries, Dr. Xuelei ZHANG (FIO, China) |
| 17:30 -17:50 | Influence of thermocline variation on nutrient supply and subsurface chlorophyll maximum in the upper Indian Ocean, Dr. Baodong WANG (FIO, China) |
| 17.50 – 18:10 | A multi-pronged approach to overcoming knowledge barriers on the ecology knowledge barriers on the ecology and conservation status of dugongs in Johor, Malaysia – Towards critical habitat protection, Dr. Louisa Shobhini Ponnampalam (UM, Malaysia) |
| 18.10 – 18.30 | Zooplankton research in the University of Malaya, Dr. Chiew Li-Lee (UM, Malaysia) |
| 18:30 – 18:50 | Diversity and ecology of Malaysian jelly fish, Dr. Mohd Rizman Idid (UM, Malaysia) |
| 18:30 – 18:50 | Marine mammal research and conservation in the Bay of Brunei, Dr. Sailfullah A. Jaaman (UMT, Malaysia) |
| 18:30 – 18:50 | Sea Turtle Research and conservation in South China Sea, Siti Norazliyana Ali (UMT, Malaysia) |
| 19:00 – 21:00 | Welcome dinner hosted by SOA, China |
| 21:00 - | Side meeting |

| Dec. 16 (Tues) 2014 | |
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| **08:30 – 11:10** | **Session 4: Coastal Zone Management and Coastal Erosion**<br>Co-Chairs: Mr. Vudhichai Janekarn and Dr. Jianhui LIU |
| 08:30 – 08:50 | Short half-life of natural radionuclides in coastal environments as indicator for marine productivity, Dr. Che Abd Rahim Mohamed (UKM, Malaysia) |
| 08:50 – 09:10 | Science and technology to prevent and solve the coastal erosion, Asst. Prof. Payom Rattanamanee (Prince of Songkhla University, Thailand) |
| 09:10 – 09:30 | Integrated coastal management, Assoc. Prof. Dr. Wichai Pantanahirun ( Project Director of Asian Coastal Resources Institute Foundation :CORIN-Asia Foundation, Thailand) |
| 09:30 – 09:50 | Coastal erosion features in Vietnam, Dr. Le Dinh Mau (VNIO, Vietnam) |
| 09:50 – 10:10 | Coastal erosion becomes serious in the delta area of Asia, Dr. Shuqing QIAO (FIO, China) |
| 10:10 – 10:30 | Beach erosion and management in China: lessons and experience, Dr. Jianhui LIU (IRC, China) |
| 10:30 – 10:50 | Study on evaluation of coastal ecosystem in the South China Sea and protection measures, Dr. Haifang GU (TIO, China) |
| 10:50 – 11:10 | Vulnerability assessment and adaptation programme for climate change within the coastal zone of Cambodia, Dr. Meas Rithy (NCCMD, Cambodia) |
| 11:10 – 11:40 | Coffee Break |
| | |
| **11:40 – 13:00** | **Session 5: Blue Economy and Marine Policy**<br>Co-Chairs: Dr. Tukul Rameyo Adi and Dr. Zhenghua LIU |
| 11:40 – 12:00 | Socio-Ecosystem approach to fishery in small scale tropical marine fisheries, Dr. Tukul Rameyo Adi (AFMRD, MMAF, Indonesia) |
| 12:00 – 12:20 | Coastal development for blue economy in Southern center regions of Vietnam: Planning and practices, Dr. BUI Hong Long (VNIO, Vietnam) |
| 12:20 – 12:40 | Construction and application of Island resource exploitation and ecological conservation system in ASEAN, Dr. Jiangning ZENG (SIO, China) |
| 12:40 – 13:00 | Study on the ecosystem services optimization of the coastal wetland park, Dr. Zhenghua LIU (TIO, China) |
| 13:00 – 14:20 | Lunch break |
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| 14:20 – 16:00 | Draft Recommendation |
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| 16:00 – 16:30 | Coffee break |

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| 16:30 – 18:00 | Recommendation settlement |
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| **18:00 – 18:30** | **Closing Session** |
| | - Closing speech by Mr.Vudhichai Janekarn, DMCR, Thailand<br>- Congratulation remark by DG, Fangli QIAO, FIO/SOA, China<br>- Congratulation remark by Dr.Somkiat Khokiattiwong, IOC-WESTPAC |
| | |
| 19:00 – 20:45 | Dinner hosted by China-Thailand Joint Lab. |
| | |
| 21:00 - | Side meeting |

Note: 1. There are several side meeting were planned by the participants: (1) Marine Endanger Species, (2) Southeastern Asian marine Forecasting, (3) Ocean and Climate change observation; (4) Sink-Sources

2. Site visiting at Racha Island on Dec. 17, 2014

3. Dinner on Dec 17, 2014 hosted by DMCR/ KU

# Session 1:

# Ocean and Climate Change

# The Southeast Asia Regional Climate Downscaling (SEACLID) / CORDEX Southeast Asia Project

Fredolin T. Tangang[1*], Liew Juneng[1],Thanh Ngo-Duc[2], Tan Phan-Van[2],Gemma Narisma[3,4], Faye Cruz[3], Jerasorn Santisirisomboon[5], Patama Singhruck[6],Dodo Gunawan[7], Ratna Satyaningsih[7] and Edvin Aldrian[8]

[1]*School of Environment and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Malaysia*
[2]*Department of Meteorology, VNU Hanoi University of Science*
[3]*Manila Observatory, Philippines*
[4]*Physics Department, Ateneo de Manila University, Philippines*
[5]*Division of Energy Engineering, Faculty of Engineering, Ramkhamhaeng University. Bangkok, Thailand*
[6]*Department of Marine Science, Faculty of Science, Chulalongkorn University, Bangkok, Thailand*
[7]*Research and Development Center, Agency for Meteorology Climatology and Geophysics (BMKG)*
[8]*Centre for Climate Change and Air Quality, Agency for Meteorology Climatology and Geophysics (BMKG)*
**Corresponding Author: ftangang@gmail.com*

## Abstract

The Southeast Asia Regional Climate Downscaling (SEACLID) project aims to develop multiple downscaled Climate Change Scenarios for the Southeast Asia region based on the latest IPCC Representative Concentration Pathway (RCP) Emissions. These downscaled data products are crucially important for climate change impact assessments at the local and regional scales. Due to requirements of multiple General Circulation Models (GCMs) and RCPs for such assessments, regional climate downscaling can be a very time consuming and resource-expensive exercise. In the spirit of regional collaboration, scientists from seven countries within the Southeast Asia region (i.e. Indonesia, Malaysia, Vietnam, Thailand, the Philippines, Cambodia and Lao PDR) have agreed to team up and implement this project on a sharing-task basis. The project secured its funding from the Asia Pacific Network (APN) for a during of three years commencing November 2013. Subsequently, SEACLID was incorporated into the regional CORDEX and the project has been renamed as SEACLID / CORDEX Southeast Asia (or CORDEX SEA). In addition to the original SEACLID country members, a number of countries have joined the project as collaborators. These include Australia, UK, South Korea, and Hong Kong SAR. The project has three main objectives: 1) On a sharing-task basis, carry out joint regional climate downscaling for a common SEA domain with RegCM4 and a number of CMIP5 GCMs and RCPs, 2) Collectively analyze model performances, create ensemble regional climate projection for the SEA region, and establish web portal and data center for efficient data dissemination freely to users in the region, and 3) Conduct a number of workshops and disseminate findings through peer-reviewed publications. So far we have conducted four related workshops for the first year of the project including the inception workshop was held from 18-19 November 2013 in Jakarta and hosted the Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG) and the second workshop held at Ramkhamhaeng University, Bangkok, from June 9-10, 2014. To date the team has completed the RegCM4 sensitivity experiments for selecting the best physics options. This project is open to other interested institutions including those from China. Further information about the project can be obtained from http://www.ukm.edu.my/seaclid-cordex.

# Monsoon climate study and its application: MOMSEI success and its future development

Weidong YU[1], Somkiat Khokiattiwong[2], S. Budi[3], T. Adi[4], F. Tangang[5] and HrinNei Thiam[6]

*[1]First Institute of Oceanography, SOA, China*
*[2]Phuket Marine Biological Center, Thailand*
*[3]Research and Development Center for Marine and Coastal Resources, AMFR, MMAF, Indonesia*
*[4]Research and Development Center for Fishery Economy, AMFR, MMAF, Indonesia*
*[5]National University of Malaysia, Malaysia*
*[6]Department of Meteorology and Hydrology, Ministry of Transport, Myanmar*

## Abstract

Monsoon is the dominant climate system that influences most Asian countries. Over Southeastern Asian Region (SAR), the most striking features includes several monsoon rainfall maximum centers along the coast of Bay of Bengal, Andaman Sea, Gulf of Thailand and Philippine. This unique geology and climate, particularly the strong seasonality and intensive rainfall, shapes the SAR society, culture and living hood, which unpins the rich and fantastic diversity. Due to its internal complex land-ocean-atmosphere interaction and forced by external processes like El Nino, Indian Ocean Dipole and even Northern Atlantic Oscillation, the monsoon climate varies tremendously, which brings severe disasters like flooding, drought and some ecosystem impacts.

The regional collaborative project Monsoon Onset Monitoring and its Social and Ecosystem Impact (MOMSEI) is then set up to address the above mentioned monsoon climate and its disaster mitigation, in response to IOC-WESTPAC's call for the improvement of Southeastern Asian Global Ocean Observing System (SEAGOOS). Its implementation progress, main scientific finding and potential application are summarized here with the emphasis on collaboration network, regional capacity building, in situ observation and process studies.

Monsoon means more than climate. Its social and cultural impacts will be explored further. For example, the fresher ocean features over Bay of Bengal, Andaman Sea, South China Sea, West Sumatra, which contributes significantly to the regional circulation process and coastal fishery. Upwelling is another process that links monsoon forcing to ocean process and fishing ground. Another interesting fact is that monsoon linked the different civilizations in the past, through the so-called marine silk road. The Islamic Civilization in the Middle East and the Chinese Civilization in the Far East is finally connected by this trade route, which is paved by the seasonally reversed monsoon wind. Its influence is further transported to Europe. To understand this mysterious role of monsoon in ironing our civilization evolution, the underwater archaeology over maritime archipelago is a fascinating topic to be explored. Its coral conservation, fish aggregation, coastal erosion and tourism promotion are the boundary benefits.

# The needs of understanding the atmospheric convection over maritime continent of Indonesia to produce skillful seasonal prediction

Nurhayati

*Climate Agroclimate and Marine Climate Center,*
*Meteorological Climatological and Geophysical Agency (BMKG), Indonesia*

## Abstract

It has been well known that the Maritime Continent (MC) plays a vital role in the global climate since it presents the west-east atmospheric (Walker) circulation phenomena and the climate driven by El Nino Southern Oscillation (ENSO), Indian Ocean dipole (IOD), inner Sea surface temperature (SST) and Asian-Australian monsoon. In addition, the Madden- Julian Oscillation (MJO) brings about positive rainfall anomalies impact into the region. However, local circulation and convection processes over the Maritime Continent interact with these phenomena is still understudied. Current GCMs and numerical weather prediction models fail to discover the local variation that reproduce the observed daily precipitation and suffer from averaged biases over the ocean and land in the region (Zhang C, et al, 2014). Hence, capacity building is urgently required to enhance the skill of forecasters and improve the resources for providing a better quality of seasonal and sub seasonal predictions over the region. Close collaboration between the national meteorological service, BMKG with FIO - SOA on knowledge transfer and sharing experience on the air-sea interaction and regional- local seasonal characteristics of the MC, would therefore be trivial.

# Primary research on the modern sedimentation in the Western Gulf of Thailand

Xuefa SHI[1*], Shengfa LIU[1], Shuqing QIAO[1], Somkiat Khokiattiwong[2] and Narumol Kornkanitnan[3]

*[1]Key Lab of Marine Sedimentology and Environmental Geology, First Institute of Oceanography, SOA, Qingdao, China*
*[2]Phuket Marine Biological Center, Phuket, Thailand*
*[3]Marine and Coastal Resource Research Center, Bangkok,, Thailand*
*[*]E-mail: xfshi@fio.org.cn*

## Abstract

Three joint cruises in the Gulf of Thailand (GoT) between FIO and PMBC have been carried out during 2010 and 2012, totally more than 250 stations have been completed. Based on the spatial distribution characteristics and statistical results, modern sedimentation was studied using mineralogy and geochemistry proxies. The results showed that modern sediment in the GoT can be classified into three provinces. Province I covered the northern regions of GoT, including the whole upper GoT, sediments in this province mainly from rivers around upper GoT, especially the Chao Phraya River and Mae Klong River. Sediments in Province II located in the middle GoT, where fine sediments are obvious influenced by the Mekong River and South China Sea. Province III locates in the coastal regions of southwestern GoT, close to Malaysia, mineralogy and geochemistry proxies in this area showed complex distribution patterns, may be from terrestrial materials from Mae Klong River combined with some sediments from remnant deposit. Results of integrative analysis also demonstrate that the hydrodynamic environment in the GoT, especially the seasonal various circumfluence and eddies, play an important role in the spatial distribution of modern sediments. In addition, the materials results from bedrocks erosion in the coastal regions may bring a few contributions in the GoT.

**Climate change and its impacts in the South China Sea: Uncertainties**

Yue FANG, Baochao LIU, Tana and Shuangwen SUN

*Center for Ocean and Climate Research, First Institute of Oceanography, State Oceanic Administration, China*

## Abstract

South China Sea (SCS) western boundary current (SCSwbc) is a southward current along the western boundary of the SCS driven by winter monsoon. It plays a critical role in the transport of heat, fresh water, momentum and nutrient, and also the regional climate in the SCS. Observational data show that the winter monsoon in the SCS has changed significantly during the past few decades. The patterns of the change in surface winds derived from NCEP/NCAR and ECMWF ERA40 reanalysis are generally consistent in the southern SCS but differ in the northern SCS. The observed trend of the wind variation in the northern SCS is better captured by NCEP/NCAR reanalysis. A two dimensional numerical model shows that the north segment of the SCSwbc of January was weaker in 1981~2000 than that in 1951~1970, while the south segment was strengthened instead. Consistency between the pattern of the change in current field and that of the vorticity calculated from anomalous wind field with water depth-effect considered indicates that the surface wind plays a key role in the change of the SCSwbc. Simulations of 18 models of CMIP5 are employed to further investigate the change in the SCSwbc, but the analysis shows no consistency on the change in winter monsoon or the SCSwbc, suggesting the existence of uncertainties of the impact of climate change on atmospheric and oceanic circulations.

# The impact of extreme climate on Southeast Asia and the associated disaster prevention and mitigation

lin LIU

*First Institute of Oceanography, China*

## Abstract

The extreme climate event is one of the major concerns for the climate research communities as well as societies, since the extreme climate events always take great economic and societal impact, bringing huge economic loss to the governments and threatening human's lives. Tropical oceans, particularly the warm pool area ranging from eastern Indian Ocean to western Pacific, is the dominant engine for the global climate variability and is also the origination of the dominant extreme climate and weather events affecting the South East Asian countries. For example, the tropical cyclones, anomalous severe flooding and drought, cold surge and heat waves always emerge from these regions. The multi time scale climate variability of the tropical ocean, such as ENSO, Indian Ocean Dipole event at interannual time scale, Intraseasonal Oscillation at intraseasonal time scale, Pacific Decadal Oscillation at interdecadal time scale, modulates and shapes the extreme climate events through kinds of dynamic and thermodynamic feedback processes.

The South East Asian countries suffered from extreme event. For example, Cyclone Nargis, also known as Very Severe Cyclonic Storm Nargis, was a rare, eastward moving at low- latitude strong tropical cyclone that caused the worst natural disaster in the recorded history ofMyanmar. There were around 55,000 people missing and many other deaths were found in other towns and areas. Another case, Typhoon Haiyan, known in the Philippines as, Typhoon Yolanda, on 2013, kills at least 6,300 people in that country alone.

Due to the limited knowledge of the trigger/evolution mechanism of the extreme climate events and the spars monitoring alert systems constructed, the adaptation to the extreme climate become an international topic rather than domestic activities. China-ASEAN framework provides the platform for the South East countries to work together for better understanding and predicting the extreme climate over the southeastern Asian regions. The project, titled as "The impact of extreme climate on Southeast Asia and the associated disaster prevention and mitigation", has been proposed for better understanding and adapting extreme climate events. The activities proposed are to:

1. Setup and maintain the joint ocean-climate observation network over the key areas for the real time monitoring and early alerting.
2. Conduct the joint research on the fundamental studies relevant to the mechanism and evolution of the extreme events and improve the short term prediction and predictability.
3. Perform the joint research on the influence of the global warming on extreme events, downscaling research and monitoring the sea level variability.
4. Host the capacity building for ASEAN members on extreme climate issues. Setup the young scientist cooperation network and forum.
5. Perform the research on extreme climate related disaster prevention and mitigation and disseminate the experience among ASEAN members.

# Introduction of Chinese Coastal GNSS Continuous Operational Reference System (CORS) and absolute sea level change analysis

Xinghua ZHOU* and Huayi ZHANG

Marine Engineering *Environment & Geomatic Center,*
*First Institute of Oceanography, SOA, Qingdao, China*
**E-mail: xhzhou@fio.org.cn*

**Abstract**

Global warming and sea level rise are the core issues in the current environmental change researches. Especially in China, there is a long and curve coastline which is up to 18000km. In 2009, SOA started Chinese Coastal GNSS Continuous Operational Reference System (CORS). 56 GNSS stations have been installed near by the tide gauge stations. The purpose of the project is to monitor the vertical movement of the tide gauge stations and get the absolute sea level change along china coast. Based on a long term observation of CORS and tide gauge stations, we get the absolute sea level change which is consistent with the results of satellite altimetry in Yellow Sea and East China Sea.

**Autonomous ocean-going robots for global marine monitoring**

Xiujun SUN

*National Ocean Technology Center, China*

## Abstract

There exist two kinds of autonomous underwater vehicles for deep and far marine environment survey in the world nowadays, one of them is autonomous underwater glider and the other is called wave glider. Underwater glider penetrates the water column in zigzag path by changing its buoyancy and attitude, and wave glider travels across the ocean surface by using its wave-energy absorbing two-part architecture. Underwater glider and wave glider take different operating mechanisms but perform the same attribute: the large distance covering and long duration persisting capability, meanwhile both vehicles can perform the interested marine data collecting by replacing their customized payloads, so they are very suitable for global ocean cruising survey. In my presentation, the state-of-art techniques of both kinds of vehicles and their development will be proposed firstly, the working principles and their essential difference will be interpreted in the next, after that their current application and promising roles they may play in the field of marine survey will be presented, and finally the recent research status of these two kinds of vehicle in National Ocean Technology Center of China will be displayed.

# Session 2:

# Ocean Forecast System and Observation

**Ocean environment forecasting and ocean disaster early-warning for Southeastern Seas,**

Fangli QIAO

*First Institute of Oceanography, China*

**Abstract**

# Myanmar's marine meteorological services: Present and future plan

Kyaw Lwin Oo

*Department of Meterology & Hydrology, Ministry of Transport, Myanmar*

## Abstract

Myanmar located in Southeast Asia with an area of (261228) square miles. It enjoys the Southwest Monsoon and most of the areas receive 90% of annual rainfall. As Myanmar also a country of Agricultural based Least Developing Country, changing Weather and Climate systems severely affected on rice and other food production, energy, irrigation and water resource, transportation and other weather and climate sensitive sectors.

Department of Meteorology and Hydrology (DMH), under the supervision of Ministry of Transport, as a member of WMO since (1947), is a Government Organization with specific objectives and missions. Main responsibility is to provide the timely, effective early warning of weather and Climate and other information to General Public, Decision makers, Policy makers, Disaster Management related agencies and Media. DMH's provide Public Weather Services, Aeronautical Meteorological services, Marine Meteorological services, Seasonal Climate, Agro Meteorology, Hydrology, Earthquake and Tsunami.

Present status of Marine Meteorological forecast products include weather condition, sea condition, visibility, surface wind direction wind speed. (2) Tide gauge stations at Sittwe and Mawlamyine, provided by IOC, and (1) tide gauge at Haigyi, provided by JICA. No observations and instruments for SST, Wave, Buoy weather. Coastal Weather forecast and bulletin issued (2) time per day during normal weather condition. Forecast products mainly rely on satellite, NWP products, information and warning from RSMC, New Delhi. These Services are not enough to coastal community such as fishery, coastal navigation, development of deep sea port and special coastal economic zones, etc. Abnormal behavior of southwest monsoon and severe cyclone in the Bay of Bengal are main challenges and high venerability to coastal community. Better understanding on interaction of ocean and atmosphere over Bay of Bengal and its monsoon character, Role of SST, character of meso- scale deep convection near coastal, marine meteorological modeling, capacity development and Human resources development are required and priorities of our future plan. So, Modernized Ocean Forecast Systems and observation instruments are required for the Coastal areas.

An agreement between State Oceanic Administration (SOA) China and Myanmar DMH will be new window for improvement of Myanmar's Marine Meteorological Services. Comprehensive Cooperation among Intergovernmental Oceanography Commission Sub-Commission for the Western Pacific (IOC-WESTPAC), State Oceanic Administration (SOA) China and Meteorological Services of ASEAN Members will benefit multi-lateral collaboration, better scientific communication, sharing information and technology transfer. And Myanmar DMH will participate actively in future cooperation between China and ASEAN Countries for the improvement of Marine Science and Meteorological Services.

# OFS Progress report

Fangli QIAO[1,2], Guansuo WANG[1,2*]

[1]*The key lab of Marine Science and Numerical modeling*
[2]*The First Institute of Oceanography, State Oceanic Administration, China*
**E-mail: wanggs@fio.org.cn*

## Abstract

The OFDS project is a SEAGOOS Pilot Project under the IOC-WESTPAC and was proposed by Prof. Dr Fredolin Tangang and formally established by the IOC-WESTPAC at the 8th Intergovernmental Session in Bali, Indonesia, May 10-13, 2010

Three countries involved initially: Malaysia (National University of Malaysia, Universiti Malaysia Terengganu), Thailand (PMBC, Chulalongkorn University, Burapha University), China (First Institute of Oceanography); Indonesia (AMFRD, LIPI, BMKG) has joined the project during the July 23, 2012 workshop in Qingdao. Vietnam and Cambodia indicated interest to participate in 2013.

Initial Steering committee members: Prof. Fredolin Tangang (Project Leader, Malaysia), Prof. Dr. Fangli Qiao (China) & Dr Somkiat Khokiattiwong (Thailand)

Project Durations: First phase (June 2010-May 2012), Second phase (June 2012-May 2015; Approved during 9th IOC-WESTPAC Intergovernmental Session, 9-12th May 2012, Busan, Korea)

**The Implementation of coastal Inundation Forecast Demonstration Project (CIFDP) Indonesia: "Integrating wave and coastal models for better marine climate services"**

Andri Ramdhani, Nurhayati and N.F. Riama

*Marine Meteorology Information Division, Agroclimate and Marine Climate Center*
*Meteorological Climatological and Geophysical Agency (BMKG), Indonesia*

## Abstract

CIFDP is one of the recent WMO programs in respond to the more frequent and severe hydrometeorological disasters, especially for countries with big populaton living in coastal areas like Indonesia, CIFDP Indonesia (CIFDP-I) was initiated as a carry-over of the series of FGDs meeting of strengthening the national marine information system. There was a national commitment among national agencies on the establishment of CIFDP-I with two pilot projects of Jakarta and Semarang. Both of location were selected considering that their were highly vulnerable to the impact of coastal inundation.

The previous study has known that coastal inundation in Jakarta and Semarang caused by high tide and waves. River flooding associated with heavy rainfall would also contributed for increasing the intensity of costal inundation, Accordingly, the CIFDP-I is resolved into two primary sources, the increase of sea level height due to high tide and waves and the increase of river level height due to heavy rainfall. The land subsidence also an aspect that will be considered, because Jakarta and Semarang having high subsidence rate.

FEWS (Flood Early Warning System) will be implementing as the platform for integrating the data, included observation and models data. The models include wave model, hydrodinamic model, river model and inundation model. FEWS expected can perform the coupling process of the models to produce coastal inundation forecasting.

The implementation of the project will be carried out in 5 phases. Phase 0 is the preparation phase (prepare national agreement to ensure the availability/ sharing of data and infrastructure), phase 1 is stakeholders workshop as media for experts from WMO to do assessment about readiness of Indonesia to implement CIFDP. Phase 2, 3 and 4 are the phase of implementation of CIFDP, pre-operational testing and evaluation of all activities CIFDP-I. All phases are planned to be completed within 3 years.

# Drift prediction of oil spill and its decision support for emergency response

Jiangling Xu[1, 2*], Huan Juan[1, 2] and Gao Song[1, 2]

[1]*North China Sea Marine Forecasting Center of State Oceanic Administration, Qingdao 266033, China*
[2]*Shandong Provincial Key Laboratory of Marine Ecological Environment and Disaster Prevention and Mitigation,Qingdao 266033, China*
**E-mail: xujiangling@bhfj.gov.cn*

## Abstract

The North Marine Forecasting Center of State Oceanic Administration (NMFC), affiliated with the North China Sea Branch of SOA, is responsible for delivering public service such as marine environmental monitoring, prediction, assessment, disaster warning and investigation for disaster prevention and mitigation, emergency management, marine economy, national defense and scientific research in north China sea waters. After more than 50 years development, NMFC has built a real-time marine environment observation network, including buoy, ocean station, satellite remote sensing, radar, movable monitoring platform, seabed-mounted monitoring platform and voluntary observation ships. An integrated marine observation system is developed to retrieve and share observation data by the marine observation network. Besides, through implementation and development of advanced numerical models, our center has built several operational forecast systems covered the north China Sea with high accuracy and multiple forecasting variables. Meanwhile, emergency prediction of trajectory of oil spill is started from 1999, both two- and three-dimensional oil spill models are developed based on "oil particle" model and used in operational emergency forecast. These models can simulate the distribution, concentration, area and amount of spilled oil. Many simulation experiments at sea were implemented to evaluate and improve oil spill models. Based on that, a marine oil spill forecast system in Bohai Sea was developed to meet the needs of emergency work. This system was awarded the second prize in the "Science and Technology Innovation Award of SOA" in 2008, for the achievement of automatic forecast and reduction time in oil spill emergency. Nowadays, the forecast system has been updated to an emergency decision-support system, which combines oil spill forecast, search and rescue, emergency treatment, resource management and deployment. The main functions of this system include: 3D Oil Spill forecast and dynamic presentation, search and rescue drift prediction and dynamic presentations, oil spill case analysis and planning management, emergency resource management and deployment, emergency aided decision document generation, fire emergency at sea disposal. This new system has been adopted and running operationally in China National Petroleum Corporation (CNPC).

**Integrated fishery service system based on oceanic remote sensing satellite**

Qian FENG

*National Satellite Ocean Application Service, China*

**Abstract**

# Session 3:

# Marine Environment and Biodiversity

**Update the status of Irrawaddy dolphin conservation in Mekong River**

Dongdavanh Shibounthong

*Ministry of Agriculture and forestry, Lao*

**Abstract**

# Variability of near-surface chlorophyll-a concentrations in the equatorial South China Sea during the northeast monsoon

S. H. Ooi[1,*], A. A. Samah[1,2] and P. Braesicke[3]

[1]*National Antarctic Research Center, University of Malaya, 50603 Kuala Lumpur, Malaysia*
[2]*Institute of Ocean and Earth Sciences (IOES), University of Malaya, 50603 Kuala Lumpur, Malaysia*
[3]*KIT, IMK-ASF, Karlsruhe, Germany*
[*]*E-mail: axl419@yahoo.com*

Abstract

Near coastal areas of the equatorial South China Sea (SCS) comprise regions with one of the world's highest primary productivity (phytoplankton growth). Here, we use satellite-retrieved near-surface chlorophyll-a concentrations as a proxy for phytoplankton amounts. We show that the northeast (winter) monsoon (November to March) intensity and directional variations are controlling factors for chlorophyll-a concentrations in the SCS. To characterize the physical processes involved, surface winds, surface waves, precipitation, surface wind stress, sea surface current and sea surface temperatures are analysed. We show how their interannual variability is affecting changes of surface chlorophyll-a concentrations, in particular during the late phase of the monsoon (February and March). The forced interannual variation of near-surface chlorophyll-a concentrations is strongly modulated by the El Nino-Southern Oscillation. In general, near-surface chlorophyll-a concentrations increase from the early to the late phase of the monsoon in the coastal waters of west Sabah and west Sarawak. The chlorophyll-a increase in coastal waters of west Sabah is enhanced during El Nino. However, in coastal waters of west Sarawak, enhancements occur both during El Nino and La Nina, compared to the neutral state.

# Joint Study for Conservation of Marine Endangered Species in the Southeast Asian Seas

Xuelei ZHANG

*First Institute of Oceanography, State Oceanic Administration,*
*6 Xianxialing Road, Qingdao 266061, China*
*E-mail: zhangxl@fio.org.cn*

The marine and coastal areas in the Southeast Asia are under dual impacts from the Indian and Pacific Oceans, hosting richest biodiversity in the world that support the social- economics in the region, such as fisheries and eco-tours. Just an example of such diversity, in the Indo-West Pacific area inhabit about forty species of the global total eighty six cetacean species, among which around 30 species live in the Southeast Asia and 9 species are endemic to the region such as the Irrawaddy dolphin and five out of seven species of sea turtles occur in this region among which the green sea turtle is most widely distributed. These marine animals are iconic species loved by the public, not only because of ecological and economic importance, but also because they easily tackle human's feeling and fascinate and intrigue people by charming elegant appearance and friendly behavior in general. Nonetheless, some of these important species/population(s) in the region have been endangered, e.g. the whales and sea turtles, largely due to anthropogenic pressure as they are migratory by nature and often come to or encounter habitats of intensive human disturbance, also due to lack of scientific capabilities to study and protect under economic/developmental deficiency especially short of regular regional efforts, and because of increasing impacts from climate change.

At the First China-ASEAN Forum for Marine Science Cooperation, partner experts supported to launch a regional study for better conservation of marine endangered species (MES). Traditionally, the region relies on labor intensive methods to observe/study/protect MES. These methods cannot meet increasing demand for higher efficiency, objectivity and repeatability, which can be empowered with modern science and technologies such as marine bioacoustics, unmanned aerial vehicles, molecular biology and advanced analysis. The proposed regional activities will take the dolphins such as the Irrawaddy dolphin and green sea turtle as focus as a first step, integrate the above traditional and modern methods, consider the situation in the Southeast Asia spanning from the Indian Ocean to the West Pacific Ocean, aim to establish a longterm and regular regional mechanism and improve the research capacity to provide expertise for effective protection of MES in the region.

# Influence of thermocline variation on nutrient supply and subsurface chlorophyll maximum in the upper Indian Ocean

Baodong WANG

*Marine Ecology Research Center, First Institute of Oceanography, SOA*
*No. 6 Xianxialing Road, Hi-Tech Industrial Park, Qingdao 266061, China*
*E-mail: wangbd@fio.org.cn*

## Abstract

The subsurface maximum of chlorophyll (SCM) in the oceans is a widespread and consistent feature of many hygrographic regions, but the mechanisms of formation and maintenance of chlorophyll maximum layers differ by geographical locations. Our field observation in the East Indian Ocean indicated that the SCM was always located at the upper part of nutricline/ pycnocline, and the variation in the depth of SCM was in accordence with that of nutricline/ pycnocline. This indicated that the depth of SCM was controlled by that of nutricline, while the latter was controlled by thermocline/ pycnocline; The magnitude of SCM was influenced by the intensity of thermocline/ pycnocline, and thus could be regarded as an indicating index of upward flux of nutrients to the upper ocean. Light intensity was not a controlling factor on the formation and depth of SCM in the Indian Ocean. Climate change would influence thermocline structure, vertical mixing as well as upward transportation of nutrients and subsequently primary production in the upper Indian Ocean.

# A multi-pronged approach for overcoming knowledge barriers on the ecology and status of Dugongs (Dugong dugon) in Johor, Malaysia – Towards critical habitat protection

Louisa S. Ponnampalam[1,2],J.H. Fairul Izmal[2,3], Kotaro Ichikawa[4],TomonariAkamatsu[5], A. A. Kee Alfian[6], Dana Wetzel[7], John Reynolds III[7]

[1]*Institute of Ocean & Earth Sciences, C308, IPS Building, Universiti Malaya, 50603 Kuala Lumpur*
[2]*The MareCet Research Organization, 40460 Shah Alam, Selangor*
[3]*Environmental Resources Management, 59000 Bukit Bandaraya, Kuala Lumpur*
[4]*Field Science Education and Research Center, Kyoto University, Japan*
[5]*National Research Institute of Fisheries Engineering, Fisheries Research Agency, Japan*
[6]*EKOMAR, UniversitiKebangsaan Malaysia, 43600 Bangi, Selangor*
[7]*Mote Marine Laboratory, Sarasota, FL, USA*

## Abstract

The dugong (Dugong dugon) is listed as Vulnerable by the IUCN Red List of Threatened Species, but certain populations of dugongs are critically endangered and could disappear in the near future due to a combination of small population size and the effects of one or more risk factors. Such is the case for the dugong population in Peninsular Malaysian waters which are mainly found in the southern state of Johor, particularly in the Johor Straits, along the Johor east coast, and around the Johor east coast islands. Dugongs and their seagrass habitats found along and off the Johor east coast are currently threatened with coastal development and land reclamation, and destructive commercial fishing techniques such as trawling. These activities present threats of loss and degradation of seagrass habitats critical to the dugong's survival. In Malaysia, while there have been a scattering of surveys on dugongs conducted by various groups since 1999, on the whole, our knowledge of these animals, in particular their movements, population sizes, and habitat use remain poor. Whilst dugongs are protected from trade and hunting under the Fisheries Act 1985, habitats critical to the dugong still remain outside any specific legislative protection unless they are contained within a particular Marine Park. An 8-day aerial survey was conducted in 2010 to rapidly assess the distribution of dugong populations in the Johor east coast islands. The survey found dugongs and their calves present in waters surrounding all islands within the area, with Pulau Sibu and Pulau Tinggi recording the highest density of individuals outside the two islands' Marine Park boundaries. Given the current paucity of sightings of dugongs in the Johor Straits, it is likely that the offshore Johor east coast islands are the last viable habitat for dugongs in Peninsular Malaysia. A current multi-pronged comprehensive study on dugongs in the Johor east coast serves to investigate and further understand the population's distribution patterns, to gain an estimation of the relative population size and to understand the use of their seagrass habitats in the area, building upon the findings of the 2010 aerial survey. To achieve those objectives, we are using a combination of visual survey, acoustic methods, feeding trail studies and contaminants analysis. Future methods include seagrass mapping, study on dugong feeding trails and a total economic valuation of the dugong's habitat. Using the information collected from the results of the study, areas that should be afforded special protection for dugongs and other marine organisms (e.g., turtles) would be identified and recommendations for amendments/additions to existing marine conservation laws and policies be provided.

# Zooplankton and other coastal research in the University of Malaya

Chong VingChing[1,2], Chew Li Lee[1,2], Loo Poh Leong[1,2],
LohKar Hoe[1,2] and co-workers

[1]*Laboratory of Mangrove & Environmental Studies, University of Malaya*
[2]*Institute of Ocean and Earth Sciences (IOES), University of Malaya, 50603*
*Kuala Lumpur, Malayasia*

## Abstract

Much of our group's work on zooplankton focusses on their assemblages in mangrove estuaries and adjacent coastal waters, and spatial and temporal abundance as mediated by salinity and phytoplankton food. These parameters are dictated by the monsoonal seasons and tidal circulation. We focus on copepods because they consume phytoplankton and are in turn consumed by juvenile and small fish. In other words, they play a very important role in regulating the estuarine and marine trophic web dynamics, and therefore sustaining our fisheries resources. The fisheries resources in our country totaled 1.5 billion tonnes annually, with an annual value of USD 3.32 billion. Currently, our research concerns zooplankton trophic ecology using stable isotope analysis, zooplankton response to power plant temperature effluents, copepod respiration due to temperature change, and the culture of copepods for aquaculture. We would be very interested to work with Chinese researchers on any research concerning the impacts of global climate change, such as sea temperature warming and acidification, on zooplankton diversity and behavior. Nevertheless, the laboratory where I come from includes many other scientists working in other aspects of mangrove ecology, mudflat trophodynamics, benthic ecology, fisheries ecology, fisheries science and modeling, biofouling, water quality, microbial resources and aquaculture.

**Diversity and ecology of Malaysian jelly fish**

Rizman-Idid, Mohammed

*Institute of Ocean and Earth Sciences, C308 IGS Building,*
*University of Malaya, 50603 Kuala Lumpur, Malaysia*

## Abstract

In Malaysia, there is a lack of documentation about jellyfish even though there are many reports on jellyfish envenomisation in the media. This presentation will provide an account of jellyfish species diversity found in Malaysian waters. Several morphological characteristics were used for jellyfish identification, including shape of umbrella, number of oral arms and size of oral arms. In this study, ten Scyphozoa (*Acromitus flagellatus*, *Cephea cephea*, *Catostylus townsendi*, *Chrysaora chinensis*, *Cyanea* sp, *Mastigia* sp, *Phyllorhiza punctata*, *Rhopilema hispidum*, *Rhopilema esculentum* and *Lobonemoides robustus*) and three Cubozoa (*Carybdea alata*, *Chiropsoides buitendijki* and *Tamoya haplonema*) jellyfish were successfully identified. Molecular identification of species was also employed using DNA sequences of COI gene, 16S and ITS regions. An ecological study to investigate the abundance, stomach content and stable isotope signatures of scyphomedusa found along the Klang Strait was also performed. Eight scyphozoan species showed monsoon seasonality and their abundance was also affected by moon phase (new moon, first quarter, full moon, and third quarter), diel effect (day, night) and tide (flood, ebb). *Phyllorhiza punctata* was the most commonly found species. All species showed greatest abundance during North East Monsoon (NEM), while the least occured during South West Monsoon (SWM). *Lobonemoides robustus*, occurred massively during SWM. Jellyfish maximum abundance was recorded at new moon of NEM and full moon of SWM. Abundance was significant during flood tide and influenced by diel effects. For example, during new and full moon of NEM, jellyfish were more abundant at ebb tide during day and at flood tide during night. Jellyfish move to the upper water during day and down to the sea bottom during night during neap tide of SWM. Preliminary trophic study showed that jellyfish mainly fed on fish, small crustaceans, and zooplankton. The isotopic signatures (δ13C, δ15N) varied significantly between 6 jellyfish species. Analysis of jellyfish δ13C values suggests assimilation of carbon from benthic diatoms and seston/phytoplankton, with no contribution from mangrove detritus. Meanwhile, preliminary δ15N analysis indicates jellyfish rank high in the trophic level of Klang Strait.

# Marine mammal research and conservation in the Bay of Brunei

Saifullah Arifin JAAMAN[1], Azzakirat ABDUL RAMAN[1], James BALI[2] and Azmi Marzuki MUDA[1]

[1]*Institute of Oceanography & Environment (INOS), Universiti Malaysia Terengganu (UMT), 21030 Kuala Terengganu, Malaysia. E-mail: saifullahaj@umt.edu.my*

[2]*Sarawak Forestry Corporation Sdn. Bhd., Lot 218, KCLD, Jalan Tapang, Kota Sentosa, 93250 Kuching, Malaysia*

## Abstract

The Bay of Brunei is a deeply indented bay with an area of about 250,000 ha, shared between Brunei Darussalam and the East Malaysian States of Sarawak, Sabah and Federal Territory of Labuan. Its coastal profile has a unique marine ecosystem, which consists of mangrove forests, seagrass beds, coral reefs, large estuaries, mudflats and continental slope. Research and monitoring of marine mammals and their habitats in the Malaysian side of Brunei Bay began in 2004. The methods used have included boat, aerial, interview, and questionnaire surveys, and site investigations on stranded or incidentally caught animals.

Recently, between April 2013 and October 2014, 46 days were spent conducting dedicated boat sighting surveys in the bay. The survey covered a total distance of 2,919.8 km in 219.5 hours, with a total daily survey effort of 15,152.6 km.hrs. A total of 39 marine mammal sightings were recorded with a rate of 2.6 sighting per 10 km.hrs. Species sighted were 19 (49%) Irrawaddy dolphin, 10 dugong (25%), two each for Indo-Pacific bottlenose dolphin (5%) and Indo-Pacific humpback dolphin (5%), one finless porpoise (3%), and five (13%) unidentified dolphin sightings. More than half of dolphin sightings were groups consist of adults, juveniles and calves, and two (5%) sightings were of mixed-species groups of Irrawaddy and Indo-Pacific humpback dolphins. Evidently, the Indo-Pacific bottlenose dolphin had the largest mean group size (21.5 ± 10.61SD, min = 14, max = 29) and followed by the Irrawaddy dolphin (8.1 ± 9.40SD, min = 1, max = 35) and Indo-Pacific humpback dolphin (2.0 ± 1.41SD, min = 1, max = 3).

Most importantly, the endangered dugong is known to feed and take refuge in the Bay of Brunei. During aerial sighting surveys conducted in 2001, 2007 and 2008, dugongs were observed feeding on seagrass beds located less than one nautical mile from shore in Lawas. The mean group size of dugongs is 2.4 ± 3.13SD (min = 1, max = 8) animals. This population is considered as a viable breeding population, due to present of at least a mother-calf pair. The increased in the number of sightings and individuals in subsequent aerial surveys may suggest the addition of new offspring or individual dugongs from other areas of the Bay of Brunei and/or Sabah, which migrated or moved to Lawas. The availability of the dugongs' preferred food; meadows of *Halophila* and *Halodule* seagrasses were found to be abundant and dugong feeding trails on seagrass beds were commonly found during seagrass monitoring conducted periodically in Lawas. Dugong population in the Bay of Brunei is perhaps residential and probably undergoes local movements within the bay.

All these evidences suggest that the Bay of Brunei is a very crucial nursery, feeding and transient ground for dugongs and small cetaceans. The species are facing threats from incidental catches in fisheries, declining fisheries resources, habitat loss and degradation, pollution, heavy vessel traffic and rapid urban and industrial development along the bay coastline. Currently, Universiti Malaysia Terengganu (UMT), and with collaboration from Sarawak Forestry Corporation (SFC), is actively conducting research and monitoring of the marine endangered species (dugong, dolphins and sea turtles), their seagrass habitat and the marine environmental processes (physicochemical properties) in the Malaysian waters of the bay. These studies have revealed the importance of this ecosystem to the marine endangered species. It is logical that these species utilize the habitats found within the Brunei side of the bay and the consideration of the system as a whole would be important for the understanding and future management.

**Keywords:** Brunei Bay, conservation, cetacean, dugong, ecotourism, incidental catches, Irrawaddy dolphin, Sarawak Forestry Corporation, seagrass, turtle, Universiti Malaysia Sabah.

**Sea Turtle Research and Conservation in South China Sea**

Juanita Joseph[1,*], Siti Norazliyana Ali[1] and Tonny Ganyai[1, 2]

*[1]Institute of Oceanography and Environment, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia*
*[2]Sarawak Forestry Corporation*
**E-mail: juanita@umt.edu.my*

We summarized the sea turtle research and conservation conducted in South China Sea (Malaysia). Long-term tagging and monitoring was initiated at Chagar Hutang, Redang Island Terengganu since 1993 by Universiti Malaysia Terengganu, and at Talang Satang National Park since the 1960s by the Sarawak Forestry Corporation. All nesters were double flipper tagged and all nests were protected to ensure high hatching success. After many years of conservation, there is a positive increment on the annual nesting density, with more new mothers were recorded in recent years. Long-term protection of sea turtles and their eggs at nesting beaches resulting in maintaining high hatchling output is shown to be an effective and essential conservation strategy. Besides conservation of sea turtles on the nesting beaches, we also conduct research on the biology, ecology, threats and restoration of sea turtles. The research includes hatching success of sea turtle nests, sex ratio of hatchlings produced in-situ and ex situ incubation, genetic studies of sea turtles in nesting and foraging grounds and biotelemetry studies of sea turtles. Information obtained from these researches is very important especially in formulating management strategies to conserve these marine reptiles from extinction.

# Session 4:

# Coastal Zone Management and Coastal Erosion

**Short half-life of natural radionuclides in coastal environments as indicator for marine productivity**

Che Abd Rahim Mohamed

*Faculty of Science & Technology, Univesiti Kebangsaan Malaysia*
*43600 Bangi, Selangor, MALAYSIA*
*E-mail: carmohd@gmail.com; carmohd@ukm.edu.my*

**Abstract**

Natural radionuclides from the decay series of uranium-thorium is most important in chemical oceanography studies especially related to the climate change and marine productivity. Long-half natural radionuclides such as 234U ($t_{1/2}$ = 2.5 X $10^5$ yrs), 238U ($t_{1/2}$ = 4.5 x $10^9$ yrs), 230Th ($t_{1/2}$ = 7.5 x $10^4$ yrs) and 231Pa ($t_{1/2}$ = 3.3 x $10^4$ yrs) are suitable for paleo-marine productivity study with a time scale more than 100 000 years. In the coastal environment with time scale less than 100 years, short half-life of natural radionuclides from uranium-thorium decays series e.g., 210Po($t_{1/2}$ = 138 days) , 228Th($t_{1/2}$ = 1.91 yrs) , 234Th ($t_{1/2}$ = 24 days), 210Bi ($t_{1/2}$ = 5 days) and 224Ra ($t_{1/2}$ = 3.7 days) are useful and as a potential tools for coastal productivity study. In this case study of coastal environment of Mersing, Peninsular Malaysia, about sixteen water samples were collected from nine stations on the 4th July 2010. The activity concentrations of 210Po and 210Pb varied between 0.76 to 2.24 mBq/L and 0.16 to 1.60 mBq/L respectively. The phosphorus concentrations, comprising total dissolved phosphorus (TDP), soluble reactive phosphorus (SRP) and dissolved organic phosphorus (DOP), were within the ranges of 6.06 to 23.31 μg/L, 2.24 to 13.42 μg/L and 0.47 to 16.10 μg/L, respectively. The concentration of TDP and salinity shows weak positive correlation (r = 0.39), perhaps due to the shallow depth of the Mersing River. There is a high positive correlation (r = 0.85) of 210Po activity with SPM concentration and a moderately positive correlation (r = 0.59) of 210Po and TDP in water. Other case is obtained at Pulau Redang, Terengganu where the activity ratio of 210Po/210Pb in zooplankton tissue ranging from 3.46 to 4.71. A large ratio value of 210Po/210Pb also indicating most of the aerosol deposited onto Malaysian waters containing much source of natural polonium caused by forest or biogenic burning (i.e., forest burning) and as well as slightly high statistical correlation between 210Po with 210Pb as shows by zooplankton. Further discussion with explain during the conference with a various sampling stations.

**Keywords:** Phosphorus, 210Po, 210Pb, water column, suspended particulate matter

**Science and technology to prevent and solve the coastal erosion**

Asst. Prof. Payom Rattanamanee
(Prince of Songkhla University, Thailand)

**Integrated coastal management**

Assoc. Prof. Dr. Wichai Pantanahirun

( Project Director of Asian Coastal Resources Institute

Foundation :CORIN-Asia Foundation, Thailand)

# Coastal erosion features in Vietnam

Le Dinh Mau

*Institute of Oceanography*
*No.1, Cauda Street, Nhatrang City, Vietnam*
*Email: ledinhmau.vnio@gmail.com*

## Abstract

The Vietnamese coastline is subjected to erosion during NE monsoon period, whereas, which is subjected to accretion during SW monsoon period, but the magnitude of erosion is larger than that of the accretion. Study results show three main features of coastline erosion in Vietnam that are:

- At present, almost of the serious eroded shoreline sections and changing tidal inlets and river mouths have been protected by hard structures; and the erosion/deposition processes occurred mainly due to the impact of shore protected structures.
- Almost of tourist beaches and resorts have been themselves constructed of protected structures to prevent coastline erosion. But, due to the mistake in designation steps hence these beaches were serious eroded mostly by undertow mechanic and many onshore structures were collapsed. To date, have not any measures to maintain the normal operation of protected structures and in mitigation the impact of shore protected structures to adjacent environment.
- Especially, a decade ago, the coastline in Camau Cap was impressed accreted at about 80 m per year. But nowadays, Camau Cap coastline is serious eroded. At present, this phenomenon becomes the most concern of oceanographer in Vietnam.

# Coastal erosion becomes serious in the delta area of Asia

Shuqing Qiao[1*], Xuefa Shi[1], Narumol Kornkanitnan[2], Guangbo Ren[1], Shengfa Liu[1], Somkiat Khokiattiwong[3]

*[1]Key Lab of Marine Sedimentology and Environmental Geology, First Institute of Oceanography, SOA, Qingdao, China*
*[2]Marine and Coastal Resource Research Center, Bangkok, Thailand*
*[3]Phuket Marine Biological Center, Phuket, Thailand*
*[*]E-mail: qiaoshuqing@fio.org.cn*

## Abstract

Coastal erosion becomes an important problem, and one kind of geohazards in the world, because more and more people, property and communities are exposed to the risk of injury, damage and economic hardship. It has been reported in China, Japan, India, Indonesia, Vietnam, Sri Lanka, Thailand, Bangladesh and Malaysia. Coastal erosion status is evaluated and controlling factors are discussed in the delta areas including the Yellow River (Huanghe) and Chao Phraya River in the past years. Also, a systematic survey and research techniques was built. Generally, the erosion in the above two areas is mainly attributable to less sediment supply to the coast from the rivers and sea level rise. Furthermore, clearing of mangrove forests, shift of river course and marine dynamic conditions make this problem complex.

**Beach erosion and management in China: lessons and experiences**

Jianhui LIU

*Island Research Center, 1# Tianmei Road, Tannan Bay, Pingtan, Fujian Province, China*

## Abstract

Before 1990s, beach in China was not well recognized as a precious resource and dynamic coastal system. Beach was developed and utilized as common land resources which were used for factory building, fishery harbors, reclamation, road construction, seawall building and so on. These activities not only occupied the beach space but also had significant negative impacts on the coast, and lasted for a long time. Beach erosion occurred very commonly in China, in this presentation different types of beach erosion were summarized through the main causes; different kinds of beach degradation examples are presented. According to the analysis of beach erosion characters and beach development status, the main means and methods using for beach management in China were described, especially the practice of beach nourishment. Finally, the current inadequacies of actual beach management are put forward.

# Study on evaluation of coastal ecosystem in the South China Sea and protection measures

Haifeng GU and Zhenghua LIU,

*Third Institute of Oceanography, State Oceanic Administration, Xiamen, 361005, China*

## Abstract

The South China Sea is one of the regions with the highest marine biodiversity, which boasts coral reefs, mangroves and sea grass ecosystems as well as numerous marine economic fish and rare creatures. However, most countries surrounding the South China Sea are still developing, thus the rapid growth of economic activity and the bearing capacity of marine environmental resources have formed a sharp contradiction. The main threat facing the South China Sea is coastal ecosystem degradation and loss of human induced habitat, eutrophication due to land-based pollution and deteriorating water quality by oil spill pollution. Management of individual species have neglected the complexity of marine ecosystems, therefore, management technology based on marine ecosystem attracts the attention worldwide. In order to achieve a scientific and effective management, we need to understand the relationship between ecosystem structure and function, the response of ecological system upon the environmental pressure. Then we can put forward countermeasures for protection and management measures. This project choose Bintan Island (Indonesia), Rayong (Thailand), Sabah (Malaysia), Beihai, Shenzhen and Xiamen (all China) as the demonstration zones, and aims to evaluate the health status of ecological system in these areas through history data and field investigation and finally put forward protection measures and management measures.

# Vulnerability assessment and adaptation programme for climate change within the coastal zone of Cambodia

Meas Rithy

*National Steering Committee for Marine and Coastal Management and Development, Cambodia*

## Abstract

The vulnerability assessment and adaptation programme for climate change within the coastal zone and shoreline management strategy for Cambodia details recommended policies, objectives and strategies for shoreline management in Cambodia. The recommendations are based on the findings of a rapid survey of Cambodia's shoreline, consultation with government stakeholders and to a limited extent, existing information on the status of the physical, ecological and socio- economic conditions of the coastal area and current and potential threats.

Natural ecosystems, infrastructure and agriculture within the Cambodia coastal zone are presently threatened by several natural hazards such as storm surges, cyclonic activity, beach erosion and saline intrusion. Additionally, successions and combinations of droughts and floods have already resulted in a significant number of fatalities and considerable economic losses. Climate change is likely to adversely affect the natural ecosystems, infrastructure, and agriculture and, indeed, community livelihoods within the coastal zone.

All these combined effects are likely to increase the impact of cyclonic activity and storm surges and result in greater incidences of saline intrusion. Agricultural activities are largely concentrated in low-lying areas of the coastal zone due to the fertility of such areas, rendering agriculture particularly vulnerable to climate change impacts and risks. Climate change is likely to further reduce agricultural productivity, hamper livelihoods and degrade productive and protective ecosystems.

The need for shoreline management in Cambodia is becoming critical with increasing economic development. Without reference to any planning controls, much of the development along the coast has involved reclamation of the sea and/or construction of seawalls, groins or other hard coastal protection structures. Efforts to stabilize shorelines have been substantial in the urban areas of Cambodia's coastline, primarily because development has often occurred too close to the shoreline. These coastal civil engineering works disrupt natural sediment movement, in many cases causing accelerated erosion along adjacent shorelines.

While coastal zone management is a government process which consists of the legal and institutional framework necessary to ensure that development and management plans for coastal zones integrate economic goals with environmental and social goals, the actual management planning of coastal areas is carried out through shoreline management planning. In the coastal zone management context, shoreline management covers the important zone where land meets the sea.

The aim of this present shoreline management investigation has been to identify the key shoreline management issues in Cambodia and to recommend management policies and objectives in response to these observed issues and which are in line with the overall development policies of Cambodia. These policies and objectives relate to the Cambodian shoreline in general rather than specific shoreline management options, which can only be formulated through a full shoreline management planning process. This process and the recommended components of a shoreline management plan for Cambodia have also been briefly summarized and a limited set of shoreline management strategies proposed.

# Session 5:

# Blue Economy and Marine Policy

**Socio-ecological system approach to fishery in small scale tropical fisheries in Indonesia**

Tukul Rameyo Adi

*Research Centre of Marine and Fisheries Socio-Economics (RCMFSE),*
*Agency for Marine and Fisheries Research and Development,*
*Ministry of Marine Affairs and Fisheries of the Republic of Indonesia*
*Balitbang I Building, floor 3-4, Jl. Pasir Uutih I Ancol Timur Jakarta 14430, Indonesia*
*Email: rameyo_adi@kkp.go.id; trameyoadi@gmail.com*

**Abstract**

Socio-Ecological approach in the frame work of Ecosystem Approach to Fisheries Management (EAFM) has been widely acknowledged as further suggested approach for ensuring sustainability of fisheries throughout the world (FAO, 2001). This approach is suggested and discussed as an answer for the long time questions on the sustainability of fisheries in the context of declining of fish stocks and the social-economic status of fishers especially in the tropical areas including Indonesia.

Fisheries management, by nature has three connected dimensions: (1) fishery resource dimension and its ecosystem; (2) utilization dimension in order to support socio-economy of community; and (3) fishery policy dimension (Charles, 2001). For many cases in Indonesia, the existing fisheries management practice has not put balance of the three related dimensions into consideration yet. The utilization of fishery resource to support people's needs always becomes the first priority over ecosystem health. In addition, the management policy based on partial approach and has not been integrated well into ecosystem limit. Therefore, a socio-ecological system approach to fisheries can be very crucial as a mainstream for Indonesia.

Driven by the Coral Triangle Initiative, Indonesia has been set up a National Working Group on EAFM with the main task to produce strategic plan and road map for mainstreaming EAFM in Indonesia. Following up the initiative, Worldfish Center in collaboration with the Research Center for Marine and Fisheries Socio-Economics of the Ministry of Marine Affairs and Fisheries, and Center for Coastal and Marine Resources Studies are conducting an implementation testing study of EAFM with the case of small scale fisheries.

This report presents the development process of EAFM in Indonesia as well as preliminary results of EAFM implementation study in two pilot area, Jor Bay, East Lombok and Gili Matra, North Lombok.

*Keywords: socio---ecological system, ecosystem approach to fisheries management, EAFM, small---scale fisherues*

# Coastal development for blue economy in Southern Center Regions of Vietnam: Planning and Practices

Bui Hong Long and Phan Minh Thu

*Institute of Oceanography, Vietnam Academy of Science and Technology*
*01 Cau Da, Nha Trang, Khanh Hoa, Vietnam*

## Abstract

The coastal regions of Vietnamese Southern Centre have several advantage characteristics for Coastal development for blue economy. They have long coastline (about 1424 km) and 25 bays (covered 2519.2 $km^2$) with the high biodiversity both in land and marine regions. However, these regions also faced the problems of environment, natural resources and management: pollution, decline of natural resources, law and regular systems. Therefore, according to master plans of Vietnamese marine toward 2020 and national strategy of blue economy toward 2030, these coastal regions was oriented toward a marine integrated economy. Based on the data set of environment, natural resources and socio-economics, these regions was zoned to eight ecological-economic zones with 142 sub-zones for economic development as well as the limitation of economic development, including forest and mountain regions of 6486 $km^2$, plain regions of 8388 $km^2$, inland water and wetland regions of 344 $km^2$, sand regions of 2005 $km^2$, estuarine and tidal flats of 6929 $km^2$, on-shore regions of 10290 $km^2$, off-shore regions of 32830 $km^2$ and island regions of 138 $km^2$. In addition, the paper also give suggestion the approaches based blue economy of environmental and natural resources management for regional and local stakeholders.

# Construction and application of island resource exploitation and ecological conservation system in ASEAN

Jiangning ZENG and Yulong ZHENG

*Second Institute of Oceanography, State Oceanic Administration, China*
*(36 Bao Chu North Road, Hangzhou 310012, China)*

## Abstract

Islands are naturally formed land areas that are surrounded by sea water and are above the sea level at high tide. They are unique ecosystems as a result of insularity, at a relatively small scale. These characteristics allow highly self-governed ecological processes and the formation of uniquely evolved habitats. Many islands are biodiversity ‘‘hot spots’’ in global terms. Attractive assemblages of land and sea landscape make more and more islands become popular tourism destinations. Moreover, many islands, especially in the Association of South East Asian Nations (ASEAN), have multiple ecological service functions to satisfy local social and economic development. Rapid bloom in social and economic development will further accelerate the exploitation and utilization of ASEAN islands. Conflicts between island resource exploitation and ecological conservation are inevitable during the process of island development. Sustainable development of islands becomes an increasing concern for island countries. ASEAN is a majority of islands in the world. Therefore, it is greatly urgent to construct an island resource exploitation and ecological conservation system adequate to ASEAN for future application.

Based on the eco-environmental risk and problem possibly arising from comprehensive archipelago exploitation in ASEAN, the project will 1) define a typical archipelago demonstration area; 2) conduct the investigation and assessment of capacity and comprehensive exploitation risk; 3) make a plan of comprehensive exploitation and ecological conservation; 4) establish the framework of monitoring and management; 5) form an island resource exploitation and ecological conservation system. The project will include the following sub-items:

(1) Study and case application of monitoring techniques for the resource and environment of typical archipelago. Process, mechanism and trend of environmental evolution in typical archipelago will be studied using a combination of remote sensing data collected by Chinese marine and land resource satellites and field data of comprehensive interdisciplinary investigations. As a result, observation platform of hydrology, meteorology and environment can be established, and it will be possible to monitor the long-term, dynamic resource and environment processes.

(2) Study and case application of comprehensive capacity assessment techniques for typical archipelago. Index system and evaluation model consisting of marine environment quality, ecological supply capacity and key resource limitation will be studies based on the data of resource, environment, society and economy, and landscape characteristics. Subsequently, the project will achieve a comprehensive assessment system for archipelago capacity in the view of collaborative optimization of multiple islands and archipelago ecological health. These results will facilitate the software exploitation of comprehensive archipelago capacity and the rapid assessment, in order to promote the management ability.

(3) Study and case application of risk assessment techniques for the comprehensive exploitation of typical archipelago. Through the investigation of comprehensive archipelago

utilization, the project will identify and analyze risk and pressure, and further identify risk types and causes, together with pressure states. Research on risk assessment technique will be conducted to include ecological vulnerability of island land, tidal waters, coastal erosion and deposition, coastal stability, storm surge process, sudden leakage incident, and so on. Information system of risk management will be developed to achieve visual analysis and management.

(4) Study and case application of exploitation and conservation techniques for typical archipelago. Based on the knowledge of resource and environment characteristics, exploitation and conservation status, the project emphasizes the top-level design of island conservation plan, function classifications, index system, guidelines of island exploitation and conservation plan. Technique guidelines and management framework will be proposed and be applied at a wider range.

(5) Study and case application of comprehensive management techniques for typical archipelago. Based on integrity and analyses of real-time data, a solid database of archipelago resource and environment will be structured, including basic geographic database, resource database, thematic database, business management database, real-time monitoring database. The dynamic management of archipelago resource and environment can be achieved by comprehensive management information platform and its effective application.

The project entitled "Construction and Application of Island Resource Exploitation and Ecological Conservation System in ASEAN" will be carried out from 2015 to 2020. The good experience of archipelago exploitation, conservation and management from China will benefit ASEAN via this project, for the sustainable development of ASEAN islands. Furthermore, the project will promote the marine cooperation level between China and ASEAN, and be helpful to strengthen the communication and mutual trust.

**Study on the ecosystem services optimization of the coastal wetland**

Zhenghua LIU

*APEC Marine Sustainable Development Center, Third Institute of Oceanography, SOA*
*E-mail: Liuzhenghua@tio.org.cn*

## Abstract

Coastal area has been one of the areas where the contradiction between global socio- economic development and ecological conservation is most serious. Marine Wetland Park, as the window of marine conservation and sustainable use of marine resources, plays an important role in raising the public awareness of marine conservation, enhancing protection of main wetland resources and advancing the development of the coastal ecotourism and marine culture industry.

The study mainly focused on ecological conservation and construction of urban wetland park of coastal cities. Through the investigation and analysis of coastal environment protection and ecological restoration, construction and management of marine wetland park, the optimization approach for urban coastal wetland was proposed, which including wetland park planning and design, demonstration of conservation and restoration practice, raising public awareness, strengthening the management capacity building of wetland park, and etc. It also includes the proposal for building up the China - ASEAN Urban Wetland Park Network, sharing the practice and experience of China-ASEAN wetland conservation and restoration, promoting the ecosystem services of urban wetland park, and etc.

# List of participants

# 2nd China-ASEAN Marine Cooperation Forum

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# Phuket, Thailand

## List of Participants

### Negara Brunei Darussalam

1. Desima Wati Metali

   Director, Marine Biodiversity Centre, Ministry of Industry & Primary Resources
   Negara Brunei Darussalam

2. Mahmud Yussof
   Chief Executive Officer, Heart of Borneo Centre, Ministry of Industry & Primary Resources
   Negara Brunei Darussalam

### Kingdom of Cambodia

3. MEAS Rithy
   Deputy Director, National Steering Committee for Marine & Coastal Management and Development (NCCMD), Ministry of Environment
   meas.rithy@yahoo.com

### People's Republic of China

4. CHEN Shang
   Researcher, First Institute of Oceanography
   schen@fio.org.cn

5. FANG Yue
   Researcher, First Institute of Oceanography
   yfang@fio.org.cn

6. FENG Qian
   Researcher, National Satellite Ocean Application Service
   fengqian@mail.nsoas.gov

7. GU Haifeng
   Researcher, Third Institute of Oceanography
   guhaifeng@tio.org.cn

8. LIU Jianhui
   Deputy Division Director, Island Research Center
   liujianhuiirc@126.com

9. LIU Juanjuan
   Program Officer, Department of International Cooperation

10. LIU Lin
    Associate Researcher, First Institute of Oceanography

11. LIU Qiuxing
    Assistant Researcher, National Marine Environment Forecasting Center
    lqx@nmefc.gov.cn

12. LIU Zhenghua
    Researcher, Third Institute of Oceanography
    liuzhenhua@tio.org.cn

13. QIAO Fangli
    Director General, First Institute of Oceanography
    qiaofl@fio.org.cn

14. QIAO Shuqing
    Associate Researcher, First Institute of Oceanography
    qiaoshuqing@fio.org.cn

15. SHI Xuefa
    Researcher, First Institute of Oceanography
    xfshi@fio.org.cn

16. SUN Xiujun
    Associate Researcher, National Ocean Technology Center
    sunxiujun@yahoo.com

17. TAN Gongke
    Associate Researcher, First Institute of Oceanography
    Gongke_tan@fio.org.cn

18. WANG Antao
    Deputy Division Director, State Oceanic Administration
    wangantao@msn.com

19. WANG Baodong
    Researcher, First Institute of Oceanography
    wangbd@fio.org.cn

20. WANG Guansuo
    Assistant Researcher, First Institute of Oceanography
    wanggs@fio.org.cn

21. WANG Hua
    Deputy Director General, Department of Forecasting and Hazards Prevention

22. XIA Changshui
    Associate Researcher, First Institute of Oceanography
    xiacs@fio.org.cn

23. XIN Hongmei
    Deputy Director General, Department of Science and Technology

24. XU Jiangling
    Senior Engineer, North China Sea Branch
    xujiangling@bhfj.gov.cn

25. YU Xingguang
    Director General, Third Institute of Oceanography

26. YU Weidong
    Director, China-Thailand Joint Laboratory for Climate and Marine Ecosystem
    Director, Center for Ocean and Climate, First Institute of Oceanography
    wdyu@fio.org.cn

27. ZENG Jiangning
    Researcher, Second Institute of Oceanography
    jiangningz@126.com

28. ZHANG Haiwen
    Director General, Department of International Cooperation

29. ZHANG Huayi
    Researcher, First Institute of Oceanography

30. ZHANG Xuelei
    Researcher, First Institute of Oceanography
    zhangxl@fio.org.cn

31. ZHENG Yulong
    Deputy Director General, The Second Institute of Oceanography
    siosoa@sio.org.cn

32. ZHU Wenxi
    IOC Sub-Commission for the Western Pacific
    w.zhu@unesco.org

**Republic of Indonesia**

33. Andri Ram Dhani
    Marine Meteorology Information Division, Agroclimate and Marine Climate Center
    Meteorological Climatological and Geophysical Agency (BMKG)

34. Diah Ariefianty
    Agroclimate and Marine Climate Information Division
    Meteorological Climatological and Geophysical Agency (BMKG)

35. Nurhayati
    Director, Climate, Agroclimate and Marine Climate Center
    Meteorological Climatological and Geophysical Agency (BMKG)
    nurhayati@bmkg.go.id , noerha_04@yahoo.co.uk

36. Rita Tisiana Dwi Kuswardani
    Researcher, Center for Marine and Coastal Resources, AMFRD, MMAF
    Anastasia.tisiana@gmail.com

37. Tukul Rameyo Adi
    Director, Center for Marine Fishery Economy
    Agency for Marine and Fishery Research and Development, MMAF
    Trameyo_adi@yahoo.com , rameyo_adi@kkp.go.id , trameyoadi@gmail.com

**Lao People's Democratic Republic**

38. Dongdavanh Shibounthong
    Head, Fisheries Resources Management Section, Dept Fisheries
    Ministry of Agriculture and Forestry
    Apone53@gmail.com

**Malaysia**

39. Azmi Marzuki Muda
    azmimarzukimuda@gmail.com

40. Azizan Bin Abu Samah
    Deputy Director / Professor, Institute of Ocean and Earth Sciences (IOES)
    University of Malaya
    azizans@um.edu.my

41. Che Abd Rahim Mohamed
    Professor, UKM
    carmohd@gmail.com , carmohd@ukm.edu.my

42. Chiew Li-Lee
    Poc Doc. IOES, University of Malaya
    lileechew@um.edu.my

43. Fredion Tangang
    Professor, UKM
    ftangang@gmail.com

44. James Anak BALI
    Protected Areas and Biodiversity Conservation, Sarawak Forestry Corporation

45. Juanita Joseph
    Lecture,Inst Oceangor. & Environment, University Malaysia Terengganu
    Juanita@umt.edu.my

46. Juneng Liew
    UKM
    jinliew@gmail.com

47. Louisa Shobhini Ponnampalam
    Research Fellow, IOES, University of Malaya
    Louisa.ponnampalam@gmail.com

48. Mohammad Rizman Idid
    Unit Head, IOES, University of Malaya

49. Mohd Fadzil bin Mohd Akhir
    Lecture,Department of Marine Science
    Faculty of Maritime Studies and Marine Science, University Malaysia Terengganu
    mfadzil@umt.edu.my

50. Mohd Lokman Husain
    Professor, UKM
    mlokmn@gmail.com

51. Phang Siew Moi
    Director/Professor, IOES, University of Malaya
    phang@um.edu.my

52. Saifullah Arifin Jaaman
    Deputy Director, INOS, University Malaysia Terengganu
    saifullahaj@umt.edu.my

53. Siti Norazliyana Ali
    Outreach Officer, Sea Turtle Research Unit (SEATRU), Institute of Oceanography and Environment (INOS), Universiti Malaysia Terengganu
    Miz.yana.ali@gmail.com

54. Tonny Anak Ganyai
    Protected Areas and Biodiversity Conservation, Sarawak Forestry Corporation
    tonnyg@sarawakforestry.com

**Union of Myanmar**

55. Kyaw Lwin Oo
    Director, Department of Meteorology & Hydrology, Ministry of Transport
    Uchitkyaw.dmh@gmail.com

**Republic of Singapore**

56. CHAN Heng Lum
    Manager on Port Marine Projects, Maritime and Port Authority of Singapore
    Heng_lum_chan@mpa.gov.sg

57. Kevin WONG Kar Weng
    Deputy Port Master, Asst. Director (Port Security), Maritime and Port Authority of Singapore
    Kelvin_k_w_wong@mpa.gov.sg

**Kingdom of Thailand**

58. Anuntachai Kongphol
    Project Coordinator, Department of Marine and Coastal Resources

59. Apichai Ekvanakul
    Forestry Technical Officer, Senior Professional Level
    Department of Marine and Coastal Resources

60. Amnat Chidthaisong
    Program Manager for Climate Change Research
    The Joint Graduate School of Energy and Environment
    King Mongkut's University of Technology Thonburi
    Amnat_c@jgsee.kmutt.ac.th

61. Capt.Komsan Thipaksorn
    Third Naval Area Command

62. Capt.Sanit Gansungnoen
    Operations Officer Attached to Naval Personal Department
    Hydrographic Department
    Sanit.gan@navy.mi.th

63. CDR.Likhit Iamyen
    Royal Thai Navy
    likhitiamyen@hotmail.com

64. Chalathip Janchompoo
    Marine and Coastal Resources Research Development Institute

65. Chanathip Pharino
    Deputy Director for Public Well-Being Division, Thailand Research Fund
    chanathip@trf.or.th

66. Det Wattanachaiyingchareon
    Associate Professor, Naresuan University
    detw@nu.ac.th

67. Dhana Yingcharoen
    Department of Marine and Coastal Resources

68. Harit Intakanok
Lecturer, Khon Kaen University
hariin@kku.ac.th

69. Kasidi Vichitugsornpong
Assistant Executive Director, Panya Consultants Company Limited
Kasidi_v@panyaconsult.co.th

70. Kamonwan Manyagase
Marine and Coastal Resources Research Development Institute

71. Kittipot Permpul
Teacher of Botany, Faculty of Liberal Arts and Science, Kasetsart University
permpul@hotmail.com

72. Mahasaksakon Somsopap
Project Researchers, Kasetsart University

73. Mingkwan Thornsirikul
Environmentalist, Senior Professional, Office of Natural Resources and Environment Policy and Planning
mthornsirikul@gmail.com

74. Mitila Pransilpa
Marine Biologist, Marine and Coastal Resources Research Center, Eastern Gulf of Thailand

75. Nararat Chantarawat
Marine Biologist, Marine and Coastal Resources Research Development Institute

76. Naret Joyum
Environmentalist, Visuddhi Consultants Company Limited
narettongia@gmail.com

77. Narumol Kornkanitnan
Senior Marine Biologist, Department of Marine and Coastal Resources
Trigerfish007@yahoo.com

78. Natthawadee Bantiwiwatkul
Marine Biologist, Marine and Coastal Resources Research Center, Center Gulf of Thailand

79. Niphon Thongyoo
Fishery Biologist, Professional level, Department of Marine and Coastal Resources
Barracuda_15@hotmail.com

80. Niphon Phongsuwan
Marine and Coastal Resources Research Development Institute

81. Nittakarn Chomworakul
Second Secretary, Department of ASEAN affairs, Ministry of Foreign Affairs

82. Ornanong Bundit
Marine Biologist, Marine and Coastal Resources Research Center, Center Gulf of Thailand

83. Ornuma Janyapiyaphong
Foreign Relations Officer, Marine and Coastal Resources Research Development Institute
jornuma@hotmail.com

84. Oru-uma Supasri
    Project Researchers, Kasetsart University

85. Pairoat Nakragsa
    Director of Division of Mangrove Administration, Department of Marine and Coastal Resources
    Pairotf12@hotmail.com

86. Patchara Chaiyarungyos
    Project Coordinator, Kasetsart University
    Mylovely_ja@hotmail.com

87. Patama Singhruck
    Chulalongkorn University

88. Payom Rattanamanee
    Assistant Professor, Prince of Songkhla University
    Payomr42@gmail.com

89. Peeraphat Chukamnerd
    Plan and Policy Analyst, Professional Level, Ministry of Natural Resources and Environment
    chukamnerd@gmail.com

90. Phaothep Cherdsukjai
    Fisheries Biologist, Department of Marine and Coastal Resources
    Phaothep1313@hotmail.com

91. Pimwhalan Chuepudee
    Marine Biologist, Marine and Coastal Resources Research Development Institute

92. Pinsak Suraswadi
    Director, Marine and Coastal Resources Research Development Institute
    pinsak@gmail.com

93. Pitul Panchaiyaphum
    Director of Marine and Coastal Conservation and Rehabilitation
    Department of Marine and Coastal Resources
    Pitul.p@hotmail.com

94. Piya Wanpen
    Secretariat, Asian Coastal Resource Institute Foundation
    Piya1@yahoo.com

95. Pornnapa Sutawong
    Senior Environmental Engineer, Naresuan University
    Mickmanu1894@gmail.com

96. Prakit Wannutas
    Forestry Officer, Professional Level, Department of Marine and Coastal Resources
    pakit@hotmail.com

97. Pramot Sojisuporn
    Assistant Professor, Chulalongkorn University
    Pramot.s@chula.ac.th

98. Pran Dilokekunakul
Director of Organizational Communication Division, Department of Marine and Coastal Resources
Pran_dil@hotmail.com

99. Prasertsak Ekthisutsuntron
Executive Board Member, Visuddhi Consultants Company Limited
Actwater7@hotmail.com

100. Preecha Wanachotikul
Forestry Officer, Senior Level, Department of Marine and Coastal Resources

101. Ratchanee Puttapreecha
Marine Biologist, Marine and Coastal Resources Research Center, Lower Gulf of Thailand

102. Saranyapatch Leewiwattanaporn
General Administration Officer, Marine and Coastal Resources Research Development Institute
Saranyapatch.l@gmail.com

103. Sasikamol Kumyod
Project Researchers, Kasetsart University

104. Satika Boonkaewwan
Project Coordinator, Kasetsart University

105. Siraprapha Premcharoen
Teacher of Zoology, Kasetsart University

106. Sombat Poovachiranon
Marine Biodiversity Specialist, Department of Marine and Coastal Resources
poovachiranon@hotmail.com

107. Somkiat Khokiattiwong
Phuket Marine Biological Center,
Chairman, IOC/WESTPAC
skhokiattiwong@gmail.com

108. Sompratana Ritphring
Lecturer, Kasetsart University
fengstr@ku.ac.th

109. Somsak Piriyayota
Expert Coastal and Mangrove Resources Management, Department of Marine and Coastal Resources
sakptt@gmail.com

110. Somsak Watthanaprida
Senior Geologist, Department of Mineral Resources
somsakdmr@gmail.com

111. Somsri Awakiat
Department of Marine and Coastal Resources

112. Sumana Kajonwattanakul
Senior Marine Biologist, Marine and Coastal Resources Research Development Institute

113. Supachai Janyasawad
Forestry Officer, Senior Level, Department of Marine and Coastal Resources

114. Supawat Karnadireklarp
Marine and Coastal Resources Research Center, Center Gulf of Thailand

115. Supaporn Aongsara
Marine and Coastal Resources Research Center, Lower Gulf of Thailand

116. Suree Satapoomin
Researcher, Phuket Marine Biological Center
Sure.ss@gmail.com

117. Suriyan Saramul
Department of Aquatic Science, Faculty of Science, Chulalongkorn University
Suriyan.s@chula.ac.th

118. Suthep Jualaong
Senior Biologist, Department of Marine and Coastal Resources
Sutep.emcor@hotmail.com

119. Suthiluck Raviwan
Inspector General, Ministry of Natural Resources and Environment
Suthiluck.ra@hotmail.com

120. Sutisa Thongkum
Project Researchers, Kasetsart University
mammyz@hotmail.com

121. Thidasawas Sawettaman
Plan and Policy Analyst, Professional Level, Department of Marine and Coastal Resources

122. Ukkrit Satapoomin
Director, Phuket Marine Biological Center
ukkrit@yahoo.com

123. Vudhichai Janekarn
Specialist in Marine Resource Management, Department of Marine and Coastal Resources
vudhichaijk@hotmail.com

124. Wanchai Bootthongdee
Director of Engineering Bureau, Marine Department
bootthongdee@yahoo.com

125. Wannakiat Thubthimsang
Advisor, Department of Marine and Coastal Resources
wannakiat@yahoo.com

126. Wantanee Pethampai
Environmentalist, Senior Professional Level, Ministry of Natural Resources and Environment

127. Wichai Pantanahirun
Associate Professor, Asian Coastal Resource Institute Foundation
pwichai@yahoo.com

128. Wijarn Simachaya
Deputy Permanent Secretary, Ministry of Natural Resources and Environment

129. Worawut Tantivanij
Department of Mineral Resources

**Socialist Republic of Vietnam**

130. BUI Hong Long
Senior Researcher, Chairman of Vietnam National Committee for IOC
Institute of Oceanography
buihonglonggion@gmail.com

131. Le Dinh Mau
Vice Director, Institute of Ocean and Earth Sciences (IOES)
Institute of Oceanography
Ledinhmau.vnio@gmail.com

# Recommendations of the 2nd China-ASEAN Countries Marine Cooperation Forum

Following the recommendations from the 1st ASEAN-China Workshop on Marine Science and Technology Cooperation in Bali, Indonesia, during 21–22 November 2013, the 2nd China-ASEAN Countries Marine Cooperation Forum was held in Phuket, Thailand, during 15–17 December 2014, sponsored by the Ministry of Natural Resources and Environment, Thailand, the State Oceanic Administration, China, and the UNESCO/IOC Sub-Commission for the Western Pacific, and organized by the Department of Marine and Coastal Resources, Thailand, the First Institute of Oceanography, China, and the Thailand-China Joint Laboratory for Climate and Marine Ecosystem. There are 124 participants from Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Vietnam, Thailand, and China, including invited speakers, scientists and scholars. The list of the participants is attached as Annex I.

The Forum featured the theme, "Strengthen the Southeast Asia – China Marine Science and Technology Cooperation, Promote the Sustainable Development of Southeast Asia", with five sessions conducted, namely: 1) ocean and climate change, 2) ocean forecasting systems and observations, 3) marine environment and biodiversity, 4) coastal zone management and coastal erosion, and 5) blue economy and marine policy. The abstracts of the presentations are attached as Annex II.

The Forum underscored the importance of promoting collaborative research and development in marine science and technology among ASEAN countries and China. The Forum highlighted the essential role of marine scientific knowledge in addressing aforementioned challenges to sustainable development, and further stressed the need to develop collaboration among ASEAN countries and China, especially in ocean related issues including blue economy in the Southeast Asia region and China.

To further promote the ASEAN-China Strategic Partnership for Peace and Prosperity, to contribute to the development of the Maritime Silk Road of the 21st Century, and to enhance the implementation of the Declaration on the Conduct of Parties in the South China Sea (DOC) for peace, stability, and prosperity in the region, the Forum made the recommendations below:

(1) The cooperation should be enhanced and strengthened in the implementation of the two projects, namely: 1) Joint Study on Marine Endangered Species among China and ASEAN Countries, and 2) the Development of Marine Environmental Forecasting and Disaster Early Warning System for Southeast Asia, both of which are financially supported by the China-ASEAN Maritime Cooperation Fund;

(2) The Action Plan for China-ASEAN Countries Marine Cooperation should be developed, serving as one key building block for future cooperation;

(3) Priority should be accorded to capacity building in the development and

implementation of collaborative programs with a view to building knowledge-base, sharing experiences and promoting the transfer of technology for sustainable development of marine and coastal resources;

(4) Partnershipsshould be strengthened with the UNESCO/IOC Sub-commission for the Western Pacific, the competent international organization for marine science in the region;

(5) The relevant information on the mechanism for calling for proposals be further disseminated, as far as possible, in order to engage wider scientific communities in ASEAN countries into the Cooperation;

(6) The China-ASEAN Countries Marine Cooperation Forum should be continuously organized on a regular basis;

The Forum noted with great appreciation the kind offer by the Malaysian delegates to host the 3rd China-ASEAN Countries Marine Cooperation Forum in 2015, with logistic support provided by relevant institutions, including the University of Malaya (UM), the National University of Malaysia (UKM), and University Malaysia Terengganu (UMT). It will be subject to the final decision of relevant authorities. The Forum welcomes the ocean related Ministers and senior level officers to join in the 3rd China-ASEAN Countries Marine Cooperation Forum in 2015.