MoE-UPM-JSPS (ACORE-COMSEA)
International Workshop on Integrative Research on Seagrass Ecosystems (IER) in Southeast Asia

16th – 18th December 2014

Marine Science Centre (COMAS), Universiti Putra Malaysia, Port Dickson, Negeri Sembilan, Malaysia

Introduction
The Integrative Ecosystem Research of the Asian CORE Program aims at elucidating the current status of the seagrass ecosystems in tropical marine waters and understanding their ecological functions. In this unique ecosystem, there is an urgent need for intensifying our knowledge in relation to critical issues as biodiversity, ecosystem functioning, and impacts of human activities such as pollution, habitat disturbance and climate change.

In this 5-year program, we focus on the seagrass ecosystems in Merambong area, Johor Strait, and the Tinggi and Sibu Islands in the South China Sea. These two areas are subjected to contrast stressors in that the former is located in front of a large mangrove area with serious impacts of human activities, while the latter is in a protected marine park, with minimal human impacts. The results of scientific investigation in these two areas will be compared to detect major factors controlling the seagrass ecosystems subjected to different environmental pressure.

Objectives
This workshop provides a platform to present the results of various studies in the seagrass ecosystems in Malaysia and other Southeast Asian waters for 2012 to date. All Groups from physical oceanography, biodiversity, pollution, marine natural products to socio-economy will be able to share their findings to illustrate status and trends in a threatened environment such as the Merambong shoal vs protected marine area in Pulau Tinggi and Pulau Sibu. Our counterparts from Japan will also be able to share their experiences in seagrass ecosystems in Thailand, Philippines and other collaborating countries. Our data collection and observation from field samplings, aerial mapping and laboratory analyses could provide useful information to further define our strategies to protect the marine resources. Data from food-web research, biodiversity and pollution studies could be used to establish useful indices for ecosystem health. In addition to taking stocks on our accomplishments, further research plans for the period beyond 2016 will also be discussed during the workshop.
Agenda

First Day: 16th December 2014 (Tuesday)

09:00–09:10 Welcoming Address by JSPS ACORE Program National Coordinator, Malaysian Network Prof. Dr. Fatimah Md Yusoff Universiti Putra Malaysia (UPM)

09:10–09:20 Opening Address by Deputy Vice Chancellor, Research and Innovation, Universiti Putra Malaysia YBhg. Prof. Dato’ Dr. Mohd Azmi Mohd Lila

09:20–09:30 Introductory Remarks by JSPS ACORE Program Coordinator, Prof. Dr. Shuhei Nishida AORI, University of Tokyo, Japan

09:30–10:00 Refreshment

Session-IA IER Malaysia - Merambong and Tinggi Island (Chair: Prof. Dr. Othman bin Haji Ross)

10:00–10:15 Overview of the JSPS (ACORE-COMSEA) Programme on Integrative Research on Seagrass Ecosystems (IER) in Southeast Asia with Emphasis on Malaysia Shuhei Nishida and Fatimah Md Yusoff

10:15–10:45 Satellite-Based Seagrass Habitat Mapping at Two Different Coastal Waters Clarity with Input from SONAR Observation and Analysis Mazlan Hashim, Syarifudin Misbari, Nurul Nadiah Yahya, Samsudin Ahmad and Teruhisa Komatsu

10:45-11:15 Mapping of Seagrass Beds around Tinggi Island in South China Sea under IER Project Teruhisa Komatsu, Shingo Sakamoto, Shuhei Sawayama, Nurul Nadiah Yahya, Samsudin Ahmad and Mazlan Hashim

11:15–11:45 Internal Transcribed Spacer (ITS) Analyses of Seagrass Species from Sungai Pulai Estuary, Johor, Malaysia Japar Sidik Bujang, Muta Harah Zakaria, Shiamala Devi Ramaiya and Ken-ichi Hayashizaki
11:45–12:15  Antioxidant Activity of Seaweeds from Merambong Shoal, Johore
  *Natrah Fatin Mohd Ikhsan, Muta Harah Zakaria, Japar Sidik Bujang and Mariah Mamood*

12:15–12:45  Diversity and Abundance of Molluscs in the Seagrass Bed of Merambong Shoal, South Coast of Peninsular Malaysia
  *Aileen Tan Shau Hwai, Teh Chiew Peng, P.F. Amelia Ng, Nithiyaa Nilamani, K.Y. Poi, G.O.J.L. Chang, H. Muhammad Lutfi, Nor Syahida Amir, Norhanis Mohammad Razali, Woo Sau Pinn, Zulfigar Yasin and Toshihiko Fujita*

12:45–14:00  Lunch

**Session-IB  IER Malaysia - Merambong and Tinggi Island**
  *(Chair: Prof. Dr. Zulfigar Yasin)*

14:00–14:25  Phytoplankton Composition on the West Johor Strait with Emphasis on Occurrence of Harmful Algal Blooms Event
  *Lim Po Teen, Lim Hong Chang, Teng Sing Tung, T.H. Tan, K.S. Hii, N.F. Kon, L.H. Yek, Roziawati Mohd Razali, Gires Usup, Mitsunori Iwataki and Leaw Chui Pin*

14:25–14:50  Community Structure of Zooplankton from Different Nearshore Substrates off Tinggi and Sibu Islands, Malaysia
  *E. B. Metillo, Jun Nishikawa, Othman bin Haji Ross, Teruaki Yoshida, Fatimah Md Yusoff, Perumal Kuppan, Susumu Ohtsuka, Mulyadi, Hideo Sekiguchi, Tatsuki Toda and Shuhei Nishida*

14:50–15:10  Distribution and Composition of Plankton in the Marine Industrial Area of Sungai Pulai, the Straits of Johor, Malaysia
  *Zaleha Kassim, Kamaruzzaman Yunus, Ahmed Jalal Khan Chowdury, Ili Nabilah Jaafar, Nur Suhaila Nordin, Ahmad Ismail and Akbar B. John*

15:10–15:35  Seasonal Variation of Zooplankton in Two Seagrass Habitats of Malaysia
  *Afiq Auji Azmi, Teruaki Yoshida, Fatimah Md Yusoff and Othman bin Haji Ross*

15:35–16:00  Interconnectivity of Ichthyofaunal Communities in the JSPS-ACORE-COMSEA Study Site along Sg. Pulai Mangrove, Seagrass Bed and Pulau Merambong Reef Ecosystems
  *Mazlan Abdul Ghafar, Lokman Hakim Rezali, Aziz Arshad and Zaidi Che Cob*
International Workshop on Integrative Research on Seagrass Ecosystems (IER) in Southeast Asia

16:00–16:20 Refreshment

Session-IC IER Malaysia - Merambong and Tinggi Island (Chair: Prof. Dr. Ahmad Ismail)

16:20–16:40 Metagenomic Analysis of Meiobenthic Communities
Masayoshi Sano, Shuhei Nishida and Fatimah Md Yusoff

16:40–17:10 Biomining Marine Invertebrates and Microbes for Novel Natural Products
Khozirah Shaari, Faridah Abas, Intan Safinar Ismail, Nor Ainy Mahyudin, Natasha Lee, Muhammad Farhan Nazarudin and Lee Kah Nyan

17:10–17:40 An Economic Analysis of the Development of Merambong Shoals and the Gazettement of Marine Park of Pulau Tinggi and Pulau Sibu and its Implications on the Local Community
Nitty Hirawaty Kamaruzaman, Ismail Abd Latif, Fatimah Md Yusoff, Nur Amalina Hamzah and Nur Nazurah Mohd Azaman

17:40–18:00 Current Status of Reclamation Work in Sungai Pulai Estuary: A Case Study of the Merambong Seagrass Shoal
Muta Harah Zakaria, Japar Sidik Bujang, Mohammad Shawkat Hossain, Wan Hazma Wan Nawi and Emmclan Lau Sheng Hann

19:30 Workshop Dinner

Second Day: 17th December 2014 (Wednesday)

Session-II Pollutants and Food-Web (Chair: Prof. Dr. Aziz Arshad)

09:00–09:30 Food Web Analysis on Seagrass Bed Ecosystems in Malaysia Using Stable Isotopes
Ken-ichi Hayashizaki, Takashi Tsunoda, Shuhei Nishida, Masayoshi Sano, Fatimah Md. Yusoff, Muta Harah Zakaria, Japar Sidik Bujang and Anchana Prathep

09:30–10:00 Contamination by Organotin Compounds in Tinggi Island and Merambong, Malaysia
Hiroya Harino, Madoka Ohji, Takashi Tsunoda, Ken-ichi Hayashizaki, Koji Inoue, Fatimah Md Yusoff and Shuhei Nishida
10:00–10:30  Distribution of Polycyclic Aromatic Hydrocarbons (PAHs) in Sediments from Merambong Shoal, Peninsular Malaysia
Vahab Vaezzadeh, Mohamad Pauzi Zakaria, Aileen Tan Shau Hwai, Zelina Zaiton Ibrahim and Shuhaimi Mustafa

10:30–11:00  Refreshment

11:00–11:30  Integrated Monitoring and Assessment of Selected Hazardous Chemicals in Merambong Seagrass and Coastal Areas of the Straits of Johor
Ahmad Ismail, Syazwan Zahmir Zulkifli, Ferdaus Mohamat Yusuff, Ahmad Zaharin Aris, Khairul Nizam Mohamed, Che Abd Rahim Mohamed, Shahrizad Yusof, Wan Lufti Wan Johari and Asnor Azrin Sabuti

11:30–12:00  Activity Levels of Natural Radionuclides at the Western Strait of Johor, Malaysia
Abdul Hafidz Yusoff, Mei Peng Lim, Noorfaizah Noorulhudha, Asnor Azrin Sabuti, Khairul Nizam Mohamed, Syaizwan Zahmir Zulkifli, Ahmad Ismail and Che Abd Rahim Mohamed

12:00–13:30  Lunch

Session-III A  Seagrass Ecosystems in other Areas and Collaborating Countries
(Chair: Prof. Dr. Mazlan Hashim)

13:30–13:45  Mapping of Seagrass Beds in Thailand under COMSEA Project
Teruhisa Komatsu, Shuhei Sawayama, Takayoshi Otaki, Shingo Sakamoto, Hiroomi Miyamoto, Shuhei Nishida, Anukul Buranapratheprat, Thidarat Noiraksar, Anchana Prathep and Ken-ichi Hayashizaki

13:45-14:00  Mapping of Seagrass Beds in Indonesia under COMSEA Project
Teruhisa Komatsu, Shuhei Sawayama, Takayoshi Otaki, Shingo Sakamoto, Mahatma Lanuru, Nurjannah Nurdin and Ken-ichi Hayashizaki

14:00–14:30  Preliminary Study of δ¹³C(‰) and δ¹⁵N(‰) Content in Seaweed and Seagrass Community along Southern Peninsular Thailand: A Work in Progress
Anchana Prathep, Piyalap Tantriprapas, Takashi Tsunoda and Ken-ichi Hayashizaki
14:30–15:00  Phylogeny and Morphology of the Benthic Dinoflagellate *Amphidinium* spp. Collected from Sediments of Southeast Asia and Adjacent Area  
*Mitsunori Iwataki, Rimi Sasai, Kazuya Takahashi, Dao Viet Ha, Lim Po Teen, Hikmah Thoha, Thaithaworn Lirdwitayaprasit and Yasuwo Fukuyo*

15:00–15:30  Refreshment

**Session-III B** Seagrass Ecosystems in other Areas and Collaborating Countries  
*(Chair: Prof. Dr. Japar Sidik Bujang)*

15:30–16:00  Composition of Demersal Zooplankton in Non-Pristine Seagrass Beds in Iligan Bay, Philippines  
*Ephrime B. Metillo and Mac Euan D. Malugao*

16:00–16:30  Inventory Study on Marine Fishes of Vietnam  
*Keiichi Matsuura*

16:30–17:00  Biodiversity, Dynamics and Structure of Zooplankton Community in Seagrass Habitats in Lawas, Sarawak, Malaysia: A Work In Progress  
*Johan Ismail, Abu Hena Mustafa Kamal, Mohd Hanafi Idris, Fatimah Md Yusoff, Teruaki Yoshida, Othman bin Haji Ross, B. Monica Bermas, A.R. Siti Haslinda, A.R. Aiman Najmi and Shuhei Nishida*

**Third Day: 18th December 2014 (Thursday)**

**Session-IV** General Discussion

08:30–10:30  Parallel Discussion (by Groups) for Synthesis and Future Prospects – Breakout Sessions

10:30–11:00  Refreshment

11:00–12:30  Parallel Discussion and Preparation of JSPS ACORE - MOE Annual Research Reports – Breakout Sessions

12:30–14:00  Lunch
14:00–16:15 Presentation by Groups on ‘Present Status and Future Plans’; G1, G2 (5 Gs), G3, G4 and G5 – 9 Groups for 15 mins each  
(Chair: Assoc. Prof. Dr. Teruhisa Komatsu)

16:15–17:00 General Discussion and Publication of a Book on Merambong Shoal  
(Chair: Prof. Dr. Shuhei Nishida)

17:00-17:15 Closing Speech by Prof. Dr. Aziz Arshad  
Director, Marine Science Centre (COMAS)

17:15 Adjourn
Overview of the JSPS (ACORE-COMSEA) Programme on Integrative Research on Seagrass Ecosystems (IER) in Southeast Asia with Emphasis on Malaysia

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Abstract

With 4,675 km of coastline, the Malaysian coastal environment is endowed with rich marine ecosystems such as mangroves, mudflats, sea-grasses, coral reefs, lagoons and estuaries. The sea-grass area is one of these highly productive ecosystems and contributes immensely to the sustainability of marine resources, particularly fisheries. In spite of its important role in the marine food web, scientific information on tropical sea-grass ecology is still limited. The Integrative Ecosystem Research (IER) of the JSPS (Japan Society for the Promotion of Science) Asian CORE Program 2011-2015 aims at assessing current status of the seagrass ecosystems in Southeast Asia, focusing on such aspects as biodiversity, natural products and impacts of human activities such as pollution, habitat disturbance and climate change. In this 4-year program, the focus is on the seagrass ecosystems in Merambong area, Johor Strait, and the Tinggi/Sibu islands in the South China Sea. Merambong shoal is subjected to various environmental stressors, as it is located in an area with rapid economic development. On the other hand, the sea-grass bed in Tinggi is located in a protected marine park, with minimal human impacts. Five projects involving habitat mapping by remote sensing (G1), biodiversity (G2), pollution (G3), natural products (G4) and socio-economics (G5) were carried out in these two sites from 2012-2014. In the present session, the results of these researches will be presented and discussed for their integration to establish current status of the seagrass habitats in these areas. In addition, as a matter of urgent concern, reclamation near Merambong Shoal is ongoing, which is considered to have serious impacts to the seagrass habitats. These issues will also be reported and discussed in this session.
Satellite-Based Seagrass Habitat Mapping at Two Different Coastal Waters Clarity with Input from SONAR Observation and Analysis

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Abstract

Remote sensing technique has been used to detect and map seagrass habitat over large areal coverage. Nevertheless, the existing remote sensing techniques that have been developed to estimate seagrass spatial distribution over the years only reported the seagrass area of excellent water clarity or namely type-1 water. This study emphasizes on the capability of bottom reflectance index (BRI) used in clear and turbid tropical coastal water which has low light transparency at Johor Straits and Tinggi Island to detect and map spatial distribution of seagrass using moderate spatial resolution of satellite imagery called Landsat 8 OLI. The Landsat 8 satellite data dated on 2009 and 2013 were used in order to extract the distribution of the seagrass coverage to a certain extent. With 30 meter of spatial resolution, 11 spectral bands and 16-bits quantization level, it has capability in estimating the submerged seagrass along the coastal region in tropical area with acceptable accuracy. For field verification, handheld GPS and diving skills were required to document the accurate seagrass position and other sea bottom features. Concurrently, close-range remote sensing tool namely Sound Detection and Ranging (SONAR) was towed to calibrate and improve the spatially distributed seagrass map by deep analysis of SONAR data and interpretation skills of its sounding record. The results indicated that the total areal coverage of seagrass on both study cases, especially Merambong shoal has shown declining trend between 2009 and 2013 with 50.2km² and 7.8km² changes at Merambong area and seagrass habitat around Tinggi Island respectively indicated the loss of seagrass occurrence compared to year 2013 (before development). It is shown that the place of hectic human disturbance and coastal development has contributed seagrass loss at such coastal environment. This study showed that optical satellite image through the implementation of appropriate algorithm is able to integrate with close-range remote sensing data to detect seagrass habitat changes over both clear and turbid coastal waters.
Mapping of Seagrass Beds around Tinggi Island in South China Sea under IER Project

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Abstract

North coast of Johor State facing the South China Sea has been developed less than southeast end of the Peninsular Malaysia. Thus, human pressure on the coastal waters along the north coast of the state is weaker than that in Johor Straight. Tinggi Island is a continental island located 12 km off the southeast coast of Johor State. Its seagrass meadows are predominantly subtidal and occur in the forereef zone, i.e. on the seaward side of the coral platforms. The Tinggi Island was gazetted as a Marine Park in 1994 under the Fisheries Act 1985. Thus, environments around the island including waters are preserved by the Department of Marine Parks, Malaysia. It is very interesting to compare a seagrass ecosystem around the Tinggi Island under weak human pressures with that in Merambong facing the Johor Straight under strong human pressures. Physical group of IER project focuses on mapping seagrass beds around the island with satellite remote sensing. The Landsat 8 OLI consists of 11 spectral bands with 30 meter of spatial resolution that can estimate submerged seagrass areas along the coastal region in a tropical area. We used Landsat 8 OLI multiband data acquired on 13 May 2014. Decision tree classifier was applied to map coastal habitats. Seagrass beds were distributed south to southwest of the Tinggi Island. Although some misclassification of coral and seagrass is observed, an area of the seagrass beds is roughly estimated to be ~2.7 km² which is equivalent to ~20% of land area of the Tinggi Island.
Internal Transcribed Spacer (ITS) Analyses of Seagrass Species from Sungai Pulai Estuary, Johor, Malaysia

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Abstract

There are 16 species of seagrasses in Malaysia comprises \textit{Halophila beccarii}, \textit{H. decipiens}, \textit{H. minor}, \textit{H. major}, \textit{H. ovalis}, \textit{H. spinulosa}, \textit{Halophila} sp., \textit{Cymodocea serrulata}, \textit{C. rotundata}, \textit{Halodule uninervis}, \textit{H. pinifolia}, \textit{Thalassia hemprichii}, \textit{Syringodium isoetifolium}, \textit{Ruppia maritima}, \textit{Enhalus acoroides} and \textit{Thalassodendron ciliatum}. In the southern region of Peninsular Malaysia, the mudflat of Seluyong and calcareous sandy-mud subtidal shoals of Merambong and Tanjung Adang Laut of Sungai Pulai estuary, Johor at depths of 2 to 2.7 m support a total of ten species of seagrasses, the highest species number for any locality in Peninsular Malaysia or Malaysia. In the Sungai Pulai estuary, Johor, in particular \textit{Halophila} and \textit{Halodule} species exhibited an array of morphological variations with respect to leaf dimensions, shapes and colours, number of cross-vein and, leaf dimension and leaf tips respectively. Previous studies have revealed high phenotypic variability in \textit{Halophila} and \textit{Halodule} populations from several seagrass beds in Malaysia including those of Sungai Pulai estuary, Johor. Morphological variations and overlapping characters have led to the difficulty with the taxonomy and species delineation especially for the two genera \textit{Halophila} and \textit{Halodule}. Here we reported and discussed the combination of morphological variations and molecular approach through the rDNA ITS region (ITS1-ITS4) sequence analyses to assess the taxonomic uncertainties in \textit{Halophila} and \textit{Halodule} species complexes populations of Sungai Pulai estuary, Johor.
Antioxidant Activity of Seaweeds from Merambong Shoal, Johore

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Abstract

Eight seaweed species from Merambong shoal were screened for antioxidant activities using 2, 2-diphenyl-1-pricrylhydrazyl (DPPH) and trolox equivalent antioxidant capacity (TEAC) assays. Of the eight species, the red seaweed \textit{Acanthophora spicifera} methanolic extracts showed the highest antioxidant activity of more than 45% and the green seaweed \textit{Halimeda opuntia} had low antioxidant activity with less than 15% in DPPH assay. With respect to TEAC assay, there was no significant differences between seaweeds screened although the red seaweed \textit{Amphiroa fragilissima} had high antioxidant activities of 0.53±0.11 mM.mg\(^{-1}\) dry extract. The antioxidant activities of the two assays for the screened seaweeds varied according to the different sampling site with lower antioxidant activities in the sub-tidal zone of Merambong shoal compared to samples in the inter-tidal zone of Teluk Kemang.
Diversity and Abundance of Molluscs in the Seagrass Bed of Merambong Shoal, South Coast of Peninsular Malaysia

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Abstract

The diversity and abundance of molluscs were studied in the Merambong Shoal, south coast of Peninsular Malaysia in year 2013 and 2014, using 1m x 1m quadrat along a 25m transect line. In year 2013, a total of 2.6 individuals/m² from 11 species of gastropods were recorded. The most common gastropods found was Nassarius sp. (0.8 individuals/m²) followed by Strombus canarium and Nassarius lynesence (0.4 individuals/m²). For the bivalves, a total of 1.7 individuals/m² from 10 species of bivalves were recorded and Gafarrarium dispar was the common species found in seagrass bed in year 2013 (0.7 individuals/m²). However, in year 2014, 11 individuals/m² from 10 species of gastropods were recorded, which was dominated by Pyrene vesicolor (3.2 individuals/m²). As for the bivalves in the seagrass bed, 1.1 individuals/m² of bivalves from six species which dominated by both Mactra sp. and Garfarium dispar (0.4 individuals/m²) were recorded. Although the abundance of the gastropods had increased in year 2014, but the diversity of bivalves and gastropods had decreased. The decline in the diversity of molluscs compared to previous years was not only due to the natural causes but more of the human activities such as overfishing, land reclamation and transportation avenues. In general, the diversity of molluscs in 2013 and 2014 had totally changed whereby more commercial species were reported in year 2013 compared to 2014. The species found in year 2014 are mainly species of non-commercial value and smaller in sizes. This may be an indication of the over-exploitation of the commercial species molluscs over the year. The smaller molluscs have no commercial value and therefore they are not harvested. In addition, the smaller molluscs have the ability to hide under the seagrass leaves, preventing it from predators.
Phytoplankton Composition on the West Johor Strait with Emphasis on Occurrence of Harmful Algal Blooms Event


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Abstract

Merambong Shoal of the western Johor Straits is an important seagrass bed and feeding ground to the marine mammals. The strait is exposed to greater environmental pressures due to the coastal development, with newly established finfish mariculture industries and the recent reclamation projects. In the first part of this presentation, the phytoplankton composition of Merambong Shoal will be presented based on the samples collected during the JSPS-Malaysia Joint Expedition in July 2012. In the later part, a phenomenal fishkill event will be reported, and the causative organism of HABs responsible for the incidence will be presented. In this study, a total of 30 genera of micro-phytoplankton were documented, with diatom (83.33%) as the dominant taxa. Station SD1 (sandy area) showed the highest diversity, followed by ST1 near the port of Tanjung Pelepas. The diversity was low at ST4 (Iskandar Marine Park) and ST5 (reclamation area), with only ten and eleven genera of dinoflagellates and diatoms found. Potentially harmful species were identified at all stations, of which six were known as bloom-forming species that responsible for fish kills (i.e., Chaetoceros affinis, Chaetoceros decipiens, Chaetoceros lorenzianus, Ceratium furca, Ceratium fusus and Ceratium tripos); four were associated with Diarrhetic Shellfish Poisoning (DSP) (i.e., Dinophysis acuta, Dinophysis caudata, Dinophysis miles, and Prorocentrum micans); and two were potentially associated with Amnesic Shellfish Poisoning (ASP) (Pseudo-nitzschia brasiliiana and P. pungens). In February 2014, a mass mortality of fishes...
was observed in the cage-farming region of the West Johor Strait of Malaysia, involving over four different species of cultured fishes, numbering 50,000 fish. A field investigation at six stations along the West Johor Strait collected water samples and examined for the presence of harmful species. The phytoplankton composition was dominated by a species of *Karlodinium*, at a considerably high cell concentration ($0.31–2.34 \times 10^6$ cells L$^{-1}$), and constituting 68.8–98.6% of the phytoplankton relative abundance at all stations. Detailed morphological assessment by light and scanning electron microscopy revealed that the species was *Karlodinium australe*. This was supported by molecular evidence of the nuclear encoded large subunit ribosomal gene (LSU rDNA). The sequences of LSU rDNA yielded 3.6–4.0% divergence when compared to the sister taxon, *K. armiger*, and >6.5% when compared to other *Karlodinium* species. Fish necropsy showed symptoms similar to those affected by karlotoxin ichthyotoxins. This is the first report of a mass mortality of cage-cultured and wild fishes attributed to the unarmored dinoflagellate *K. australe*. The finding of this study has provided a baseline reference for future phytoplankton monitoring in the area. *Karlodinium* blooms in 2014 clearly indicated the alteration of environmental conditions that favour the occurrence of harmful blooms.
Malaysia is one of the mega-biodiverse countries of the world, but it has limited detailed studies on marine zooplankton. Zooplankton community structure was investigated in the water columns overlying coral and sand sites off Sibu Island and a seagrass site off Tinggi Island, both in Johor, Malaysia. Univariate and multivariate analyses were carried out to compare zooplankton communities between sizes of plankton (small: 100–335 µm vs. large: > 335 µm), onshore vs. offshore, and daytime vs. nighttime. A total of 129 taxa were identified, 60 non-copepod and 69 copepod species in all samples. We found distinct coral, sand, seagrass zooplankton assemblages with distinguishable indicator species and attributes of their size fractions. Small fraction samples contained few rare species and are densest at onshore depths, and the opposite for large fraction samples that were also densest at nighttime and most species rich in the coral site at night. Offshore stations generally showed higher species diversity than those from onshore stations due likely to ecotonal effects of overlapping oceanic and nearshore communities. This study demonstrates the usefulness of univariate and multivariate analytical techniques in identifying patterns in zooplankton community structure in the representative shallow tropical habitats, and the need for accurate zooplankton taxonomy, nighttime and daytime and onshore and offshore sampling, size fractionation of samples, and knowledge on predation and hydrodynamics.
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Zooplankton and phytoplankton play a very important role as the base for the source of energy in a coastal ecosystem. Their interaction in estuarine habitat could be influenced by the changes of the environmental factors particularly the salinity fluctuation and human activities on the mainland. Sungai Pulai estuary has been exposed to the increasing marine industrial activities from the establishment of the ports, power plants and changing in land use due to the nearby development of Danga Bay and Iskandar development Region. It is hypothesized that there would be differences in distribution and species composition of phytoplankton and zooplankton in the estuary in relation to the different habitat and marine industrial activities. Samples of phyto- and zooplankton were collected in six stations at Port Tanjung Pelepas (S1), Tanjung Bin Charcoal Plant (S2), Second-Link Bridge (S5), seagrasses of Pulau Merambong (S4) and mangrove areas (S3, S6). A total of 12 and 14 phytoplankton species were identified during the first (November 2013) and second sampling session (March 2014) respectively. Skeletonema sp. dominated the sampling area with highest percentage of contribution (89.31%) to the phytoplankton community. It is important to note the occurrence of the dinoflagelates species particularly in March 2014. Protoperidinium sp. was found in S4, S5 and S6 while high abundance of Alexendrium sp. occurred in all stations except S1. Biomass of phytoplankton was comparatively low in November 2013 (30.16 and 31.32 mg/m³) while the highest biomass was noted in S5 during the second sampling (228mg/m³). Copepods contributed more than 80% of the total abundance of zooplankton in the estuary. Out of the eight calanoid species, the highest percentage occurred in November 2013 was the Oithona sp. (37.24%) and followed by Microcalanus sp. (26.63%) and Paracalanus sp. (15.56%). Microcalanus sp. maintained its dominance in S1, S3, S5 and S6 March 2014, with the highest percentage of 31.91% in S5. Nonetheless, Oithona sp. limited its high percentage only at S6. A harpacticoid species, Euterpina sp. which is known as an estuarine harpacticoids occurred in low percentage during the first but drastically increased their contribution in almost all station during the second sampling.
Seasonal Variation of Zooplankton in Two Seagrass Habitats of Malaysia

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Abstract

This study was conducted to investigate the seasonal variation of zooplankton at two different seagrass habitats of Malaysia. Sampling was carried monthly at Merambong shoal and Tinggi Island from April 2013 to March 2014. The two seagrass beds have their own unique characteristics; Merambong shoal is exposed during low tide and Tinggi’s seagrass bed stay submerged. Merambong shoal is located in the Strait of Johor, south of Peninsular Malaysia and is experiencing coastal development before and during sampling period. As a result, the seagrass bed at Merambong is separated into two. Samples were also taken on both sides of the shoal and were observed. Tinggi Island is located in the South China Sea. The seagrass species that is dominant at Merambong shoal is *Enhalus acoroides* and at Tinggi station is *Cymodocea serrulata*. Zooplankton samples were obtained by horizontal tows using a 140 µm plankton net over the corresponding seagrass beds. Temperature was generally higher during Southwest (SW) monsoon in both areas. Salinity was higher during the SW monsoon at Tinggi and higher during the Northeast (NE) monsoon at Merambong. Chlorophyll a concentration showed the same pattern as salinity. The zooplankton abundance was relatively higher during the SW monsoon at both locations (1.8 times higher at Tinggi and 1.2 times higher at Merambong shoal). Cluster analysis of the zooplankton community showed two distinct groups between SW and NE monsoon at Merambong, however Tinggi did not reveal any distinct groups. Generally, chlorophyll a concentration at Merambong was higher during study period compared to Tinggi (2.8 fold), which may explain the higher overall mean zooplankton numbers at Merambong (2.2 fold of Tinggi). Collectively, monsoon season and the characteristics of the seagrass community may play a role in determining the zooplankton structure at these seagrass areas.
Interconnectivity of Ichthyofaunal Communities in the JSPS-ACORE-COMSEA Study Site along Sg. Pulai Mangrove, Seagrass Bed and Pulau Merambong Reef Ecosystems

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Abstract

This paper described the interconnectivity of ichthyofaunal between the three major biotopes of western Johore estuary ecosystem. Fishes migrate to their preferred biotopes e.g mangrove, seagrass and coral reef for certain bio-physiological needs such as reproduction, nursing and feeding in their life cycles. These biotopes might be a permanent habitat for these fishes or it might be a stopover for nursing juveniles. Studies have shown that these three biotopes were related to each other and play an integral role in sustainable estuarine-marine resources. Intensive survey on the fish's community within three different biotopes namely Sg. Pulai mangrove, seagrass bed and Pulau Merambong reefs ecosystem have been carried out. These inter-connected ecosystems have been chosen as a primary pilot study sites for JSPS-ACORE-COMSEA multilateral joint research. Intensive monthly samplings using small trawl net installed on 30 hp fiberglass boat were started in Mei 2013 and the field survey was forced ended in April 2014 due to un-expected reclamation activities on the seagrass bed of Merambong Shoals. The result presented in this paper encompasses, the composition of the ichthyofaunal communities within the three biotopes and general population biology of several abundant fish species presented in the study areas. The results showed diverse families of fishes composition in the studied area. There were four most common fish family namely, Leiognathidae, Plotosidae, Monacanthidae and Ariidae. Other small composition of common seagrass fish species such as Monacanthidae, Triacanthidae and Sygnathidae. Meanwhile, trawl sampling surrounding coral reef areas off Pulau Merambong yielded insignificant amount of catches that only comprise two families, the Leiognathidae and
Monacathidae respectively. The percentage composition ranged from 1.1% up to 97.37% of fishes in that families caught in all of the catches for the whole study period. Leiognathid fish species was the most common in all three biotopes mainly in the seagrass biotope (66-91%), whereas other family can only be found in either one or two biotopes only. However the most common family found in mangrove biotope was Plotosidae with range from 0.71% to 55.08% in all the catches. The monacanthid fish was mainly found in the coral reef biotopes (1.97-100%). Length weight relationship analyses of the most abundant species was carried out, started with the Leiognathid fish *Eublekeeria jonesi* (b=3.07±0.03), estuarine catfish, *Arius maculatus* (b=3.3±0.03) and *Plotosus lineatus* (b=3.32±0.1). Length-weight analysis was also carried out on Monacanthid fish, *Monacanthus chinensis* (b=2.76±0.06) collected from Merambong Island patchy reef biotope. This study concluded that Leiognathidae is the most common family to be found in all the three biotopes and it could be use as an indicator of inter-connectivity between the three biotopes. Details troph analyses on Leiognathid fish denoted that the trophic level for *E. jonesi* ranged between 2.1 – 2.6 from both mangrove and seagrass biotopes. Details stomach contents analyses revealed that this species is carnivorous benthic organism feeder with RGI 0.328 respectively.
Metagenomic Analysis of Meiobenthic Communities

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Abstract

Seagrass ecosystems are important in terms of biodiversity and biological production in coastal areas, but little is known of their current status and historical changes in Southeast Asia. With this circumstance, we have been analyzing meiobenthic communities, expecting that they would provide useful proxies to evaluate environment and biodiversity. In the present study, we analyzed meiobenthic communities in- and outside of the seagrass areas in Merambong Shoal and Tinggi Island, applying a metagenomic analysis. DNA were extracted from soil samples and amplified targeting 18s rRNA gene. The amplified samples were sequenced by a 454 GS Junior and the sequencing data were analyzed with the metagenomic data analysis software ‘mothur’. Comparison of the metagenomic and microscopic analyses indicated that the meiobenthic composition by metagenomic analysis (number of reads per molecular operational taxonomic unit: MOTU) approximated biomass composition. The results of clustering analysis based on the meiobenthic composition were consistent with the macro-scale habitat types (in/out of seagrass beds) and geographic locations (Merambong and Tinggi). In contrast to the common predominance of nematodes both in terms of abundance and biomass in temperate seagrass habitats, predominance of ostracods (in reads of MOTU), followed by annelids and nematodes, was observed in some of the present samples. The number of reads of phylum Kinorhyncha, reported as sensitive to pollution (e.g. eutrophication and oxygen depletion), was higher in Tinggi Island than in Merambong Shoal. These suggest that metagenomic analysis is a powerful tool in elucidating biodiversity in seagrass ecosystems in Southeast Asia, wherein a large amount of unexplored diversity is expected.
Biomining Marine Invertebrates and Microbes for Novel Natural Products

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Abstract

The tremendous diversity of structurally unique compounds, produced by marine invertebrates, predominantly those characterized for their toxicity, has sturdily enthused marine natural product research. Hitherto, marine sponges have been subjected as a source of new chemicals with therapeutic potential. Twenty samples from different species of marine sponges were collectively from Merambong Island, Johor, Telok Kemang, Port Dickson and Pulau Singa, Langkawi. The crude methanolic extracts of these samples were pre-screened for biological activities namely; cytotoxic activity against a panel of cell lines, MCF-7 (breast cancer) using a colorimetric tetramethyl (MTT) assay and a-Glucosidase inhibitory activity.
An Economic Analysis of the Development of Merambong Shoals and the Gazettement of Marine Park of Pulau Tinggi and Pulau Sibu and its Implications on the Local Community

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Merambong Shoal, one of the mangrove reserves in Malaysia is currently in danger of environmental degradation from overfishing and environmental degradation in the area. However, recent rapid coastal development and nearby port activities had already devastated most of the vital food resources for sustainable marine livelihoods. Furthermore, the establishment of Marine National Park Malaysia is to protect and conserve the ecosystem of various habitat and aquatic marine life surrounding 42 islands. However, the gazettement has created some problems to the fishermen and community living in the island of Pulau Tinggi and Pulau Sibu particularly fishing activities as their income. Thus, three main objectives have been established for this study such as 1) to investigate the extent of fishermen involvement in sustainable fishing activities and the factors that influence their involvement, 2) to profile the socio-economics of the local fishermen and estimate the technical efficiency of fishing at Merambong, and 3) to investigate the impacts of Marine Park gazettement to the socio-economics of the local community of Pulau Tinggi and Pulau Sibu. In accordance with this intend, face-to-face interviews were conducted with 73 fishermen using a structured questionnaire in Merambong and face-to-face interviews were also carried out based on census sample of 60 local peoples in Pulau Tinggi and Pulau Sibu. Descriptive analysis and Data Envelopment Analysis (DEA) approach were conducted to analyze the data. The results of the study highlighted a significant relationship between fishermen's socio-demographic profiling and their perception towards sustainable fisheries. Majority of them were aware of sustainable practices and agreed on enforcement of the fisheries acts and incentives as well as government involvement in sustainable fisheries. The underlying factors to the fishermen involvement were ecological, socio-economic, community sustainability, and the government’s involvement through various fisheries programs and policies. Further analysis indicated that current efficient fishermen were mostly influenced by both their fishery family backgrounds and experiences. These factors are still exerting positive influences towards maintaining good catches among the higher priced fishery catches. Finally, the result of the gazettement of Pulau Tinggi and Pulau Sibu as the Marine Park has contributed impacts to the local community and they suffered economic losses.
Current Status of Reclamation Work in Sungai Pulai Estuary: A Case Study of the Merambong Seagrass Shoal

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Abstract

In the past, losses of seagrass communities in coastal area of Malaysia caused either by natural causes or human activity generally passed unnoticed or unrecorded. Decline and losses of seagrass particularly in many places in Malaysia including seagrass beds of Sungai Pulai estuary, Johor are abrupt and due to human activities. A good example was those in Sungai Pulai estuary, Johor of Tanjung Adang Darat seagrass shoal, which was at risk in 1998 and totally disappeared in 2003 due to dredging of the shallow shipping passageways and land reclamation for the development of new port facilities. Starting in February 2014, more land reclamation was planned to reclaim part of the Sungai Pulai estuary including seagrass bed of Merambong. Current status of reclamation work in Sungai Pulai estuary specific to seagrass bed of Merambong is reported and discussed based on observation through repeated visits to the seagrass area. These include insights on seagrass aereal loss, changes of seagrass and associated resources at the immediate reclaimed site and the future of Merambong seagrass bed.
Food Web Analysis on Seagrass Bed Ecosystems in Malaysia using Stable Isotopes

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Abstract

To clarify a food web and organic material transfer through the web in tropic eutrophic and pristine coastal waters, intensive collection of end-members inside and outside seagrass beds were conducted at Merambong shoal and Tinggi Island, Malaysia in 2012 and 2013. Carbon and nitrogen stable isotope ratios were measured for all samples.

(1) In mangrove leafs the average of δ¹³C was ca. -30‰ at both localities, but their mean δ¹⁵N were ca. 9 and 7‰ at Merambong and Tinggi respectively. The variations of δ¹⁵N were high in both localities.

(2) Seagrasses were much enriched in δ¹³C compared with mangroves. The δ¹⁵N levels of seagrasses were different between two localities, higher in Merambong by ca. 8‰ than in Tinggi Is.

(3) Size fractionation of POMs (GF/F~100~335 µm) showed variation both in δ¹³C and δ¹⁵N values in Merambong. Near mangroves the δ¹³C values were depleted. But apart from mangroves both at seagrass and sandy bottom sites, the enrichment of δ¹³C and δ¹⁵N along mesh size (GF/F and 100~335 µm) was observed, corresponding to pelagic food chain from phytoplankton to zooplankton. In Tinggi Is. the yields of POMs from water
columns are less than in Merambong, and some POMs were enriched in $\delta^{13}C$. The higher $\delta^{13}C$ values seemed to reflect the higher contribution from seagrasses.

(4) Among benthic invertebrates, holothuroids, gastropods, and asteroids tended to have higher $\delta^{13}C$ values than bivalves. Formers were suggested to have contribution from seagrasses, and the level of the contribution seemed to be very high in Merambong. Bivalves were suggested to mainly depend on micro phytobenthos (MPB).

(5) Fishes: In Tinggi Is. coral reef fish were mainly collected. Piscivorous Lutjanid fish had depleted $\delta^{13}C$ and enriched $\delta^{15}N$, while fish more dependent on benthos such as Arothron and Cheilodictyum showed enriched $\delta^{13}C$ and depleted $\delta^{15}N$ signatures. In Merambong such clear tendency was not seen. But ontogenic enrichment of $\delta^{13}C$ observed in Monacanthus chinensis and other fish could be a result of increasing contribution of food chain from seagrass origin.

(6) Higher $\delta^{15}N$ signatures in Merambong seagrass ecosystem suggested anthropogenic nitrogen source with high $\delta^{15}N$ had highly contributed to the system. Seagrasses seems to play very important roles with their large biomass and high turnover rate to maintain the ecosystem in the habitat both in Merambong and Tinggi Is.
Contamination by Organotin Compounds in Tinggi Island and Merambong, Malaysia

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Abstract

Concentrations of organotin (OT) were measured in sediment, aquatic animals and plants collected from Merambong and Tinggi Island in Malaysia between 2012 and 2013. From these data, current status of OT contaminations and accumulations of OTs in aquatic organisms were discussed.

BTs concentrations in sediment from Tinggi Island were higher than those from Merambong. Tributyltin (TBT) compounds among butyltin (BT) compounds were dominant species in Tinggi Island and ratio of monobutyltin (MBT) or dibutyltin (DBT) compounds which are degradation compounds of TBT's, was high in Merambong.

OTs concentrations in aquatic organisms were surveyed in these areas. BTs and phenyltin (PT) concentrations were higher in the order of plant>fish>benthos. The concentrations of BTs and PTs in plant from Tinggi Island were higher than those from Merambong. Ratios of DBT among BTs were higher than those of MBT and TBT in plant from Merambong and Tinggi Island, 2012. On the other hand, MBT was dominant species in plant from mangrove and seagrass from Merambong, 2013. Monophenyltin (MPT) or diphenyltin (DPT) compounds among PTs were dominant species in plant from Merambong.
BTs and PTs concentrations in fish and benthos from Tinggi Island were higher than those from Merambong. The ratios of MBTs among BTs were high in fish and benthos, and TPT was dominant species in these samples, the relationships between the weights of fish and benthos and concentration of BTs and PTs were discussed. BTs concentrations were increasing as the weights of sea cucumber were increasing in Tinggi Island, while BTs concentrations were increasing as the weights of fish and benthos are increasing in Merambong.

The accumulations of BTs in aquatic animals through the food web are investigated by stable isotope. The relationships between TBT or BTs concentrations and $\delta^{13}C$ and $\delta^{13}N$ values were not observed significantly. Further study was needed to clarify the accumulation of OTs in food web in mangrove and seagrass in Malaysia.
Distribution of Polycyclic Aromatic Hydrocarbons (PAHs) in Sediments from Merambong Shoal, Peninsular Malaysia

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Abstract

This is the first evaluation of polycyclic aromatic hydrocarbons (PAHs) in sediments from Merambong shoal, peninsular Malaysia. PAHs have drawn a great deal of attention recently considering their carcinogenicity, mutagenicity and persistence in the environment. Peninsular Malaysia has gone through rapid industrialization and urbanization, causing major pollution problems specifically from petroleum and petroleum products. Merambong shoal is located in an ecologically sensitive area, bordering with Singapore, Malaysia and Indonesia. Surface sediment samples were collected from three different locations along the shoal and investigated for 16 USEPA priority PAHs using gas chromatography-mass spectrometry (GC-MS). Concentrations of PAHs were categorized as moderate in sediments of Merambong shoals. The highest concentration was 412 ng.g⁻¹ dw measured at Station 1. Molecular ratios showed a predominance of pyrogenic sources of PAHs in sediments of Merambong shoal.
Integrated Monitoring and Assessment of Selected Hazardous Chemicals in Merambong Seagrass and Coastal Areas of the Straits of Johor

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Abstract

An integrated monitoring study has been conducted to assess present level of hazardous chemicals, particularly heavy metals, in various physical and biological species. Surveys and samplings were conducted at Merambong seagrass and coastal areas of the Straits of Johor at different periods in a year. Heavy metals in surface sediments were significantly higher in locations near to Johor Causeway than locations near to Merambong seagrass areas. Similar trend was observed in bottom sediments of the sample core. Sequential extraction revealed most sampling areas have lower anthropogenic metals than lithogenic metals. Analyses of metals and other physicochemical properties of sea- and pore-water samples provide another important tool to demonstrate factors influencing metal’s binding and mobility behavior. Another study showed iron bioavailability to the phytoplankton in seawater is affected by the changing of seawater pH. Heavy metals in biological samples were found occurring at various concentrations. This event could be due to various feeding and living strategies, physiology, enzymetic activities and others adopted by each of the species. Imposex among female Thais bitubercularis was found only 18% (significantly lower than previously data) with almost normal male:female ratio (5:7). Surveys on Javanese medaka distribution found they are wide spread in this area. Toxicity tests of some booster biocides showed some important results. Bulk stable isotope analysis was used to determine carbon and nitrogen fingerprint signatures. Specific food chains and feeding strategies were identified but yet to complete the complex
foodweb in this area. Future studies may include in-depth understanding of imposex stages and recovery, continuous assessment of hazardous chemicals contamination in coastal area, utilization of local vertebrate (Javanese medaka) and invertebrate (green-lipped mussel) species as in situ and ex situ bioindicators, application of compound-specific stable isotope analysis (CSIA) and some advanced envirometric analyses, and others. These could be a key-step to further enhance our understanding of impacts of hazardous chemicals and other functions in food webs of seagrass bed and coastal areas of the Straits of Johor.

Activity Levels of Natural Radionuclides at the Western Strait of Johor, Malaysia

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Abstract

Western Strait of Johor is an active site for land use, fishing and caged mussels' activity due to the facts of high production of green mussels and the availability of spat fall in this area. The study of natural radionuclide in marine environment had been concerned due to the fact that short half-life radionuclide such as $^{210}$Po and $^{234}$Th have availability to associate and get involved in organism tissue. Meanwhile, long half-life of radionuclide such as $^{210}$Pb, $^{232}$Th and $^{230}$Th can be used in determination of sedimentation rate and investigate the geochemical behavior in marine environment. Thus, this study was carried out to determine the current level of $^{210}$Po and $^{234}$Th in various sizes of green mussels obtained around Straits of Johor, Malaysia. Meanwhile, long half-life of radionuclide such as $^{210}$Pb, $^{232}$Th and $^{230}$Th were analyzed in sediment core in order to determine the sedimentation rate and also to understand the geochemical behavior of these radionuclides at this area. The highest radioactivity level of $^{234}$Th is $388 \pm 315$ Bq/kg while $^{210}$Po
is $150 \pm 65$ Bq/kg. Meanwhile, samples obtained from the wild origin had the highest radioactivity levels of $^{234}$Th with $641 \pm 509$ Bq/kg in stomach and $260 \pm 166$ Bq/kg in other tissue. The activity of $^{210}$Po show high activity with $257 \pm 62$ Bq/kg in stomach and $70 \pm 18$ Bq/kg in other tissue. It is seen that the natural radioactivity levels from this organism was relatively higher than other marine organisms from different areas in Malaysia as well as the world wide values. Therefore, it can be assumed the green mussels may contribute slightly higher radiation risks to the seafood consumers in the Straits of Johor than the permitted levels recommended by the USEPA with estimated effective radiation dose of $^{234}$Th is $3.37 \times 10^{-2}$ mSv/year and 4.75 mSv/year for $^{210}$Po. The sediment core was analyzed to determine the activities of $^{232}$Th, $^{230}$Th and $^{210}$Pb. The activity of $^{232}$Th show the consistent profile from bottom to the top of sediment core with the range activity between $52.1 \pm 0.46$ Bq/kg to $92.0 \pm 0.55$ Bq/kg while the activity of $^{230}$Th decreased from bottom the top area with the range activity from $40.3 \pm 0.37$ Bq/kg to $66.5 \pm 0.51$ Bq/kg. The decreasing trend of $^{230}$Th might suggest the degradation of mangrove forest at this area. The sedimentation rate of core sediment from PTP was successfully estimated by using $^{210}$Pb model. The sedimentation rate at PTP estimated around 0.28 cm/year. As conclusion, $^{210}$Po and $^{234}$Th show high activity in the green mussels which indicate the capability of green mussels as an effective in-situ bio-indicator. Straits of Johor may susceptible to some degree of radioactive contaminations. The behavior of $^{230}$Th might suggest the degradation of mangrove forest at this area due to the development at Tanjung Pelepas which transformed the river and mangrove area into one of the world’s most equipped container port. The sedimentation rate estimated from this study can be used to determine the age of sediment core. Well dated sediment core can be used in forthcoming research to investigate the historical profile of anthropogenic activities affecting to this area.
Mapping of Seagrass Beds in Thailand under COMSEA Project

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Abstract

Seagrass and seaweed beds provide numerous ecological services to human societies. However, they face human pressures in Thailand because its economy is developing rapidly. To conserve them, it is necessary to know their distributions. For this purpose, remote sensing is one of the most effective methods to map them. Under COMSEA Project, Asian Core Project of JSPS, we conducted researches on Sargassum beds in waters off Sattahip Bay, Chon Buri Province, and seagrass beds in Khung Kraben Bay, Chanthaburi Province, Thailand. Ground truth data were obtained at Sattahip Bay in February 2012 by using continual pictures taken by manta tow and Khung Kraben Bay in October 2011 using side scan sonar and scuba diving. NRCT of Thailand funded the Thailand-Japan joint research of COMSEA on coastal ecology represented by Dr. Lerdwithayaprasith Thaithaworn in 2013-14. We conducted ground truthing in Samui Island and Phangan Island in January 2014. We used sidescan sonar to obtain information on bottom habitats. Using the information of ground truthing, we analyzed LANDSAT 8 OLI images. In next year, project focuses on seagrass beds in Talibong in Trang Province that is one of the biggest seagrass beds in Andaman Sea of Thailand.
Mapping of Seagrass Beds in Indonesia under COMSEA Project

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Abstract

Spermonde Archipelago is located in Makassar Straight between Kalimantan and Sulawesi Islands. It belongs to Coral Triangle which is the richest marine biodiversity in the world. Recently, pollution from Makassar the biggest city in Sulawesi and destructive fisheries threat habitats in coral reefs and lagoons in Spermonde Archipelago.

Under COMSEA Project, we have conducted researches on seagrass and coral beds in Barrang Lompo Island. This island is surrounded by barrier reef. Reef lagoon between the reef and the island is broadly occupied with seagrass beds. After conducted ground truthing, we used World View 2 multiband image with 2 m spatial resolution to produce a map on benthic habitats. The results show that precision of classification is enough high to monitor benthic habitats. We also observed fish community in coral reef. A strong edge effect of coral reef was detected on composition and abundance of fish by an analysis of fish distributions with those of habitats. We plan to examine a temporal change in seagrass distribution in Barrang Lompo Island using achieved satellite images as next step of this study and also compare influence of distance from Makassar on habitat distributions.
Preliminary Study of $\delta^{13}$C(‰) and $\delta^{15}$N(‰) Content in Seaweed and Seagrass Community along Southern Peninsular Thailand: A Work in Progress

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Abstract

Carbon and Nitrogen isotopes can provide an important insight to marine environment and how the organisms response to the changing environments; and have been well studied during the past years. However, there were little studies about $\delta^{13}$C(‰) and $\delta^{15}$N(‰) in seagrass community yet in this region. Here, we examined the $\delta^{13}$C(‰) and $\delta^{15}$N(‰) contents of some seagrass species such as Enhalus acoroides, Halophila ovalis, Cymodocea rotundata and C. serrulata from various sites including within the sediment column. The results showed great variations in $\delta^{13}$C(‰) and $\delta^{15}$N(‰), % Nitrogen weight and $\delta^{15}$N(‰), % Carbon weight and C:N ratio to $\delta^{15}$N(‰) among species and sites. This study reports a great variation of those parameters, which allow us to better understand the plants’ environment as well as each plants species. This is a second year study, which shall be completed in the 2015; and further research collaborations can be developed and expanded using such techniques.
Phylogeny and Morphology of the Benthic Dinoflagellate *Amphidinium* Spp. Collected from Sediments of Southeast Asia and Adjacent Area

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Abstract

Morphology and phylogenetic positions of benthic unarmored dinoflagellate *Amphidinium* spp. were examined by using microscopy and molecular phylogeny to determine species distribution in Southeast Asia and adjacent areas. For evaluation of benthic environments, unambiguous identification of benthic flora is essential, however, identification of many dinoflagellate species is still difficult. In this study, surface sediment samples containing *Amphidinium* cells were collected from coasts of Australia, Indonesia, Japan, Malaysia, Palau, Thailand and Vietnam, and 53 clonal cultures were established. Of these 38 cultures were identified to 7 previously described *Amphidinium* spp. based on morphology and phylogeny, i.e., *A. carterae* (Palau), *A. cupulatisquama* (Japan and Palau), *A. gibbosum* (Indonesia and Palau), *A. massartii* (Palau), *A. mootonorum* (Japan), *A. thermaeum* (Indonesia, Japan and Malaysia) and *A. trulla* (Australia). Other 15 cultures could not be identified based on their morphology and phylogenetic positions, and tentatively designated as *Amphidinium* spp. 1–7. *Amphidinium* sp. 1, spp. 2–4 and sp. 7 were smaller species similar to *A. thermaeum* but not related to *A. thermaeum* in phylogenetic tree. *Amphidinium* sp. 1 (Thailand and Vietnam) measured 17.0–35.5 µm long, and was having multiple pyrenoids about 10. Cells of *Amphidinium* sp. 5 (Palau) and *Amphidinium* sp. 6 (Palau) were similar to *A. operculatum*, and their phylogenetic positions were also somewhat related to the species. However, the former species had two pyrenoids, and the latter species had clear structure at the cingulum; these structures were different from *A. operculatum*. 
Composition of Demersal Zooplankton in Non-Pristine Seagrass Beds in Iligan Bay, Philippines

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Abstract

Zooplankton occupy a key role in seagrass ecosystem food webs by chanelling energy and material from primary production and the microbial loop system to fish. However, information on the ecology of seagrass bed zooplankton in the Philippines is wanting. The specific aim of the study was to investigate the composition of demersal zooplankton during a consecutive daytime and nighttime samplings using modified Porter and Porter (1977) trap at the southern (Kauswagan) and eastern (Laguindingan) sites of Iligan Bay, Southern Philippines. The two sampled beds have contrasting seagrass complexity with the Kauswagan site having two coexisting species (Thalassia hemprichii and Cymodocea serrulata), while the Laguindingan site have only one (Syringodium isoetifolium) species. Water quality parameters such as temperature, salinity, dissolved oxygen, total suspended solids and chlorophyll a were also determined during sampling. A total of 24 zooplankton taxa were identified with Oithona sp. and Foraminifera as the top two dominant taxa contributing 52-62% of the total abundance. Day and night samples showed similar abundance and diversity, but more taxa were observed in night than day samples. High average abundance of demersal zooplankton appears to be associated with the two-species seagrass bed and lower levels of total suspended solids and chlorophyll a. Conversely, the seagrass bed with single needle-like species and elevated total suspended solids and chlorophyll a seems to support low average abundance of demersal zooplankton. These findings suggest both water quality parameters and seagrass complexity can influence demersal zooplankton composition.
Inventory Study on Marine Fishes of Vietnam

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Abstract

Japanese and Vietnamese ichthyologists have made a joint research team in early December 2014 to study marine fishes of Vietnam under the JSPS ACORE project. The joint research team is composed of ichthyologists of the Kagoshima University Museum, the National Museum of Nature and Science, the Mie University, the Hokkaido University, and the Institute of Environment and Resources (IMER). This joint research has launched to make a checklist of shallow water fishes of Vietnam and to publish a field guide to marine fishes of Vietnam. Although the joint research team has just started surveying marine fishes in Halong Bay and the adjacent areas in early December of 2014, the Japanese members obtained fish specimens from several areas along northern and southern Vietnam during the period of the JSPS Multilateral Project. In addition to these materials, the ichthyologists of the National Museum of Nature and Science collected fish specimens in from 2001 to 2003 under the joint research project with the Research Institute of Marine Fisheries (RIMF). Based on these already obtained materials, the joint research team will start making a working checklist of fishes from the next year and visit again northern Vietnam at least in 2015. Constraints of budget make it difficult for the joint research team to state when the field guide will be completed and published, but digital publication would be a way to provide us a good opportunity to make the field guide on websites of the participants’ institutions.
Biodiversity, Dynamics and Structure of Zooplankton Community in Seagrass Habitats in Lawas, Sarawak, Malaysia: A Work In Progress

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In Malaysia, the biggest seagrass bed is located in Lawas, Sarawak. Opportunity to conduct research on the biodiversity, dynamics and structure of zooplankton communities in the pristine seagrass beds in Lawas began late 2014. The research was conducted at the seagrass bed located in the Punang River estuary, Lawas. Sampling program has been planned for August 2014, November 2014, February 2015 and May 2015, corresponding to monsoonal changes in Malaysia. Sampling time were chosen to coincide with high tide conditions. Till date, two successful sampling programs have been conducted on 25-26 August 2014 and 17-18 November 2014. A total of twelve sampling stations were established for the study. At each sampling station, zooplankton was collected using 150 µm plankton net. The plankton samples were collected by horizontal tows above the seagrass bed. The volume of water filtered was determined using a flowmeter attached to the plankton nets. For more understanding of the seagrass ecosystem, other biological samples consisted of phytoplankton and macrobenthos were also collected. Phytoplankton samples were collected using 20 µm plankton net while macrobenthos samples were collected using an Ekman grab. Three replicates of samples were collected at all sampling stations. In addition, water characteristics data were collected in situ (salinity, temperature, pH, dissolved oxygen, total dissolved solids and turbidity) using a multi-parameter sonde Hydrolab. Water samples were collected for analysis in the laboratory for nutrients, chlorophyll a, and total suspended solids. The biological samples were analyzed for diversity, abundance, biomass (zooplankton) and community structure. Findings from this project will shed new knowledge to the species distribution of zooplankton from seagrass beds in Lawas, Malaysia. This presentation share some of the current data collected from the study area.