

IMBeR West Pacific Symposium 2021

Session 2: Strengthening Coral Reef Resilience to Climate Change and Human Impacts

November 23, 2021

Session Introduction

The virtual session 2: Strengthening Coral Reef Resilience to Climate Change and Human Impacts was started at 1.00 UTC on 23 November 2021 with a total of 283 participants who registered for this session. The session was moderated by Dr. Thamasak Yeemin and Dr. Takashi Nakamura and Dr. Wichin Suebpala was a rapporteur.

1. One or two major highlights from each presentation

Keynote Presenter 1 Makoto Tsuchiya

- Capacity of coral reefs to supply ecosystem services, resilience of coral reefs, ecosystem connectivity and integrated coastal management
- Payment for ecosystem services

Keynote Presenter 2 Peter J. Mumby

- Coral bleaching, recovery, and coral reef refugia
- Coral reef resilience, adaptation, restoration and protection

Oral Presenter 1 Christine Baran

- Investigation of susceptibility of soft corals to bleaching in the Philippines.
- Soft corals *Sarcophyton* and *Sinularia* are more susceptible to bleaching than *Lobophytum*.

Oral Presenter 2 Katya Bonilla

- Fertilization and settlement successes of the massive coral *Favites abdita*.
- F1 colonies in succeeding massive coral sexual propagations can be applied to restore degraded reefs.

Oral Presenter 3 Dio Dirgantara

- Tissue necrosis infection process in coral *Acropora* sp. accelerated by addition of pathogenic bacteria in the surrounding water in Japan.
- Rapid infection and mortality in healthy corals can be induced by pathogenic agents.

Oral Presenter 4 Christine Segumalian

- Hard coral recruitment in eutrophic reefs of Bolinao, Pangasinan, Northwestern Philippines.
- High nutrient inputs and sedimentation cause low coral recruitment.

Oral Presenter 5 Mariyam Shidha Afzal

- Coral reef assemblages and reef resilience across a latitudinal gradient on the Ryukyu Archipelago, Japan.
- High latitudinal populations have lower species richness compared with low latitudinal populations.

Oral Presenter 6 Nguyen Van Long

- Recovery and resilience of coral reefs in Cu Lao Cham marine protected area, south-central Vietnam
- Slow recovery of coral reefs was found, even they were in the MPA. Only protection measures are not enough for enhancing coral recovery.

Oral Presenter 7 Vina Listiawati

- Seagrass meadow as a refugia for corals against ocean acidification.
- Coral calcification decreases as seagrass density become denser.

Oral Presenter 8 Man Ying Mok

- Role of sea urchins as biological controllers of algae on a reef flat in Rawa Island, Peninsular Malaysia.
- Herbivory of sea urchins was more effective compared to herbivorous fish.

Oral Presenter 9 Norhanis Razalli

- Phylogenetic structure of false clownfish, *Amphiprion ocellaris*, in the Straits of Malacca and South China Sea.
- The larvae dispersal potential of the false clownfish depends primarily on the period of the larval stage.

Oral Presenter 10 Matt Glue

- Promoting the rehabilitation of coral reefs in Cambodia through community-led enforcement.
- Community-led enforcement helps safeguard both biodiversity and small-scale fisheries and support MPA management.

Oral Presenter 11 Wichin Suebpala

- Roles of governments and other sectors enhancing local efforts in management and conservation of coral reefs in Thailand.
- Collaboration of various sectors and local communities drives local efforts in support of coral reef resilience.

Poster Presenter 1 Kok Lynn Chew

- Effects of physical damage on recovery and growth rates of corals with different adaptive strategies at Pulau Rawa, Johor, Malaysia.
- Corals with different adaptive strategies (r, k) have different recovery capacities from physical damages.

Poster Presenter 2 Jihad Wajdi Mohd Erfino

- Regenerative capacity of apical and basal transplants of *Acropora muricata* and *Echinopora horrida*
- Regeneration rate and health recovery of the transplants from the apical and basal regions remain similar.

Poster Presenter 3 Syamil Sahar

- Assessment of coralline Ba/Ca ratios as riverine runoff proxy in Talang-Talang Island, Sarawak.
- The surges of Ba/Ca ratios can be applied to indicate terrestrial runoff mainly caused by the growth of industrial oil palm plantations.

Poster Presenter 4 Febrienne Sukiato

- The effect of shading on colour and growth of *Acropora muricata* and *Porites lutea* in Malaysia.
- The benefits of reduced light stress through shading could be species-specific.

Poster Presenter 5 Charernmee Chamchoy

- High diversity and abundance of coral recruits in Mu Ko Chumphon, the Western Gulf of Thailand to support coral reef resilience.
- Diversity and abundance of coral recruits vary spatially between reef flat and reef slope.

Poster Presenter 6 Wanlaya Klinthong

- Coral recruitment on settlement plate experiments from different sediment loads in the Gulf of Thailand.
- Higher sediment load causes a lower density of coral recruitment.

Poster Presenter 7 Laongdow Jungrak

- Community structure of soft bottom macrofauna on fringing reefs in the Western Gulf of Thailand.
- The composition and abundance of macrofauna living in the soft bottom at reef sites vary spatially.

Poster Presenter 8 Takashi Nakamura

- Monitoring of mass coral bleaching impacts and recovery potentials in the Islands of Ryukyu Archipelago, Japan.
- Multidisciplinary research is highly required for solving coral reefs in the Anthropocene.

Poster Presenter 9 Chiara Pisapia

- Multidecadal changes in coral reef community structure and function following multiple disturbances.
- Multiple acute disturbances such as bleaching with anthropogenic stressors may interfere the dynamics of coral reef ecosystem function.

Poster Presenter 10 Makamas Sutthacheep

- Underwater pinnacles can be used as a thermal refuge in the Andaman Sea, Thailand.
- With diverse corals, benthic macroinvertebrates, and reef fishes, underwater pinnacles can also be promoted as ecotourism sites.

Poster Presenter 11 Joana Andrea Maningas

- Coral response and recruitment in an acidified environment in Mabini, Batangas, the Philippines.
- Higher algal cover and lower hard coral coverage were observed in the vent site (acidic) than the non-vent site.

Poster Presenter 12 Wiphawan Aunkhongthong

- Coral restoration project for enhancing stress-resistant coral populations in the Gulf of Thailand.
- Parent coral colonies from shallow reef flat environments are relatively high stress-resistant, which can be used for coral transplantation.

Poster Presenter 13 Arirush Wongnutpranont

- Quantification of microplastics in scleractinian corals from estuarine environment in the Inner Gulf of Thailand.
- Microplastic contamination can be found in corals and may have some negative impacts on corals, particularly potential effects on calcification and growth.

Poster Presenter 14 Ploypailin Rangseethampanya

- High diversity and abundance of target fish for fisheries on Hin Phae underwater pinnacle compared to a fringing reef at Ko Mattra in the Gulf of Thailand.
- The underwater pinnacle, which is relatively isolated from the nearshore environment can support high fish biodiversity.

2. Session summary

This session was organized consisting of three major activities; keynote lectures, oral and poster presentations. Two keynote speakers delivered their keynote presentations, including Prof. Dr. Makoto Tsuchiya with his presentation entitled “*Payments for ecosystem services offered by coral reefs*” and Prof. Dr. Peter J. Mumby with his presentation entitled “*Rising to the challenge of managing the impacts of coral bleaching*”. There were eleven oral presentations in this session.

Most of the presentations were relevant to ecology and molecular biology of corals in support of coral reef resilience. There was a paper explaining how seagrass meadow can be as refugia for corals against ocean acidification. The other paper revealed the interaction between sea urchins and coral reefs in terms of the support of coral reef resilience. Two of them focus on the socio-economic dimension, particularly the roles of local communities in promoting coral reef resilience. For poster presentation, a total of fourteen papers were presented, relating to various aspects. Most of them focused on recovery, growth, adaptive capacity, coral recruitment, bleaching, changes in community structure, and restoration of coral reefs. Three of them were relevant to the community structure of soft-bottom macrofauna, reef fishes, and coralline algae. One paper assessed microplastics in scleractinian corals and the other one presented underwater pinnacle as a thermal refugium during climate change.

In the discussion, several key points were raised as follows:

- Information on water quality is important; however, long-term monitoring data in most areas in this region is still limited. More monitoring stations should be established covering critical areas. It is also important to develop a system for supporting data sharing among the west Pacific countries.
 - Coral reef resilience is linked with ecosystem connectivity. The connectivity should also be studied as this information is important for managing marine protected areas and enhancing coral reef resilience.
 - Both quantitative and qualitative research on socio-economic aspects, particularly resource utilization, ecosystem services etc., as well as the integration of ecological data and socio-economic information, should be promoted to support the management for sustainable utilization and coral reef resilience.
 - Research collaboration can be enhanced by mutually creating research proposals at a regional scale where researchers in different countries work together. This kind of research collaboration can also help develop standard methods and protocols as well as benchmarking in this region.
 - It is important that research networks should be built up and maintained to enhance the research collaboration in the western pacific regions. It is also beneficial in research mentoring and the communication among researchers and scientists who have different expertise, thus supporting transdisciplinary research projects.
3. New IMBeR West Pacific Marine Biosphere Research projects/directions for the next three years from this session (one or two bullet points)
- ✓ - Ecological and socio-economic monitoring for resilience-based management of coral reefs in the West Pacific region
 - ✓ - Establish a formal network for research collaboration on coral reef resilience in the West Pacific region