

International Marine Biology Course (IMBC) 2023

July 24-30, 2023



After the 3 years absence due to the COVID-19, Marine Biological Station, Sado Island Center for Ecological Sustainability, Niigata University (SMBS) revived an international in-person summer course named “International Marine Biology Course (IMBC) 2023”. The course was held from July 24th to July 30th, 2023. As the first trial, some parts of this course were also opened for online participants. We have invited five guest lecturers from Bangladesh, India, Viet Nam, and Japan. 18 students from Bangladesh, India, Viet Nam, Hong Kong and Japan have joined the in-person course, and 27 students from Bangladesh, India, and Hong Kong have joined by online (Table 1).

Table 1. Number of participants

University	Participants		
	In-person		Online
	Researcher	Student	Student
Bangladesh Agricultural University (BAU), Bangladesh		3	5
Chattogram Veterinary and Animal Sciences University (CVASU), Bangladesh	2	3	9
Cochin University of Science and Technology (CUSAT), India	1	3	10
Hanoi National University of Education (HNUE), Vietnam	1	3	
The University of Hong Kong (HKU), Hong Kong		4	3
Shimane University (SU), Japan	1		
Niigata University (NU), Japan		5	
Total	5	21	27

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IMBC 2023 was supported by “Sakura Science Exchange Program” under a grant by Japan Science and Technology agency. Thanks to the grant, we could support 15 well motivated students from 5 different Asian universities to participate the in-person course. The aim of IMBC 2023 was to study about marine biodiversity and animal evolution as well as to acquire several fieldwork and lab work skills to collect marine animals and assess marine ecosystems through the beautiful and well-preserved ocean ecosystem of Sado Island. Because this course was held as hybrid of in-person and online courses, some activities for the in-person course were also broadcasted online to help online participants to achieve the goal. The list of the activities in this program was as follows:

- 6 lectures in different fields of marine biology
(3 of them were broadcasted online)
- Artificial fertilization and observation of early development of sea urchin
(Artificial fertilization was broadcasted online)
- Animal sampling by snorkeling at a rocky shore
- Nocturnal animal sampling at a wharf
- Plankton and benthos sampling using a research vessel IBIS II
- Classification, observation, biological drawing, group/individual discussion and presentation about collected marine animals
(Part of the classification and observation were broadcasted online)
- Observation of sea firefly bioluminescence.
- Visiting Sado Gold Mine Museum and Meotoiwa Geosite.
- Visiting Tokyo Sea Life Park and National Museum of Nature and Science

In spite of some trouble about the transportation, every in-person course participant gathered in time at meeting place at Niigata station on July 24th. After moving to SMBS, first day of the course has started with both in-person and online course participants. In this hybrid course, two lectures about marine environment of Sado Island and taxonomic classification of marine animals were presented by SMBS staffs. After the lectures, ice breaking dinner was held for in-person course participants.

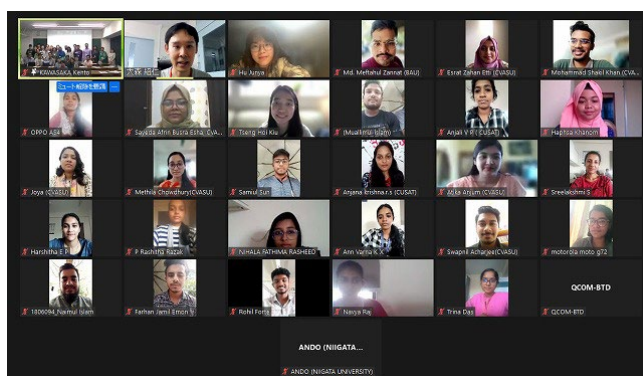


Fig 1. Group photo of the hybrid course



Fig 2. Icebreaking dinner

The 2nd day was started with an active learning of marine biology by Dr. Tran Duc Hau (HNUE, Vietnam) for the in-person course. In this lecture, students were separated into four groups and discussed about features related to marine biology in the four region of world oceans, namely east Pacific, Indian, Atlantic and west Pacific oceans, following sketching those features in the world map, which had been drawn by HNUE students on a blackboard of the lecture room of SMBS. Unique and well thought out sketches colored the world map, which leads us understanding the features of world ocean at all. Dr. Hau also presented their recent work about application of AI and remote sensing techniques to the ecological studies of early stages of fish in Vietnamese estuaries.

Next was the first field activity of the course; animal sampling by snorkeling at rocky shore. After the brief introduction about how to snorkel and collect benthic marine animals, in-person course participants (some of them swim in the ocean for the first time!) enjoyed snorkeling and collected snails, sea slugs, hermit crabs, sea urchins, brittle stars etc... at the shallow rocky shore near SMBS.



Fig 3. Active learning about marine biology



Fig 4. Animal sampling by snorkeling

The afternoon of the second day was the continuation of the hybrid course. First, we had an invited lecture by Dr. Masa-aki Yoshida from Oki Marine Biological Station, Shimane University, Japan. He has talked about his recent survey using environmental DNA, a strong tool to understand marine biodiversity of the target area. Although Oki is also an island which locate in Japan Sea and affected by Tsushima warm current, his data suggested several differences in marine fish biota between Oki and Sado Islands. Participants might understand highly diverse marine biota of the Japan Sea.

Following was the hybrid practical course about marine animals of Sado Island. In this session, the animals collected by in-person course participants by snorkeling were classified in each phylum by both in-person and online course participants. Many characteristic marine animals puzzled the participants which phylums they belong. After the classification activity, SMBS staffs introduced features of each phylums and some species with broadcasting. In addition, artificial spawning and fertilization of Japanese purple sea urchin *Heliocidaris crassispina* were also performed and broadcasted. These activities about development of sea urchin were traced by in-person course students after the closing of the online course, which included observation of the fertilized eggs and early embryos using a binocular microscope. In-person course participants also started biological drawing of the collected marine

animals and the developing sea urchin embryos, which might make the participants understand the morphology of these animals deeply.

After the dinner, we held a nocturnal animal sampling at a wharf of Tassha Port, which is located just in front of SMBS. Participants tried to catch swimming and benthic marine animals using hand nets, which hide between sea weeds and/or were attracted to the light trap. Many animals which were not observed in the snorkeling sampling, namely some fish, shrimps, crabs etc... were collected. Participants might realize the high marine biodiversity of the swimming and benthic marine animals in Sado Island through these day 2 practices.

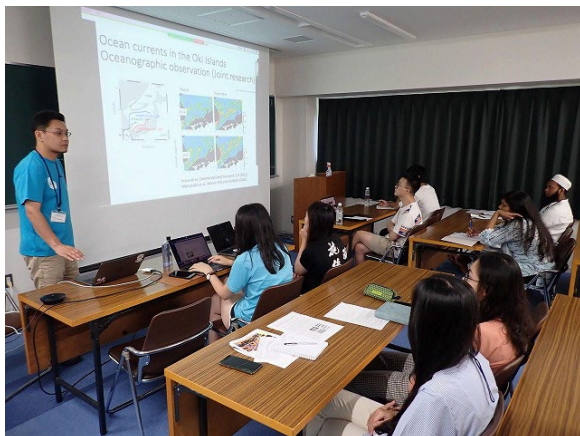


Fig 5. Invited lecture by Dr. Yoshida

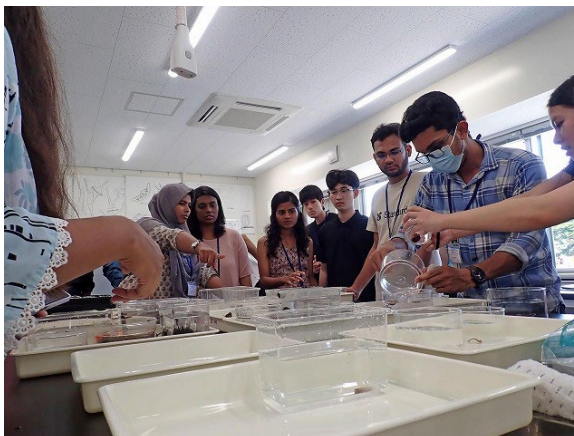


Fig 6. Classification of the collected animals



Fig 7. Hybrid course: sea urchin development



Fig 8. Nocturnal animal sampling

At the 3rd day, plankton sampling was carried out using the research vessel IBIS II in the morning. Participants challenged to collect planktons from the vessel using a 100 μ m mesh plankton net under the clear weather. We also conducted sediment sampling by bottom grab sampler to collect small benthic animals. The collected planktons and benthos were moved to the practical training room of SMBS and were observed under the binocular microscope and/or the stereo microscope. Highly diverse morphology of the diatoms, dinoflagellate, radiolarians, copepods, etc.. might impressed the participants.

In the afternoon of the 3rd day, first we had lectures by Professor Mohammed Nurul Absar Khan

and Dr. Md. Mahiuddin Zahangir (CVASU, Bangladesh). Prof. Khan introduced their faculty at CVASU, and Dr. Zahangir talked their recent study about the effect of the ablation of craws and eyes in the farming of shrimps & prawns, which improved our knowledge about the aquaculture of the tropical Asian country. After the lectures, participants visited Sado Gold Mine and some geosites at the west coast of Sado Island. Visiting these geologically interesting places might impress the participants how the geographical features of Sado Island diverse.



Fig 9. Plankton sampling



Fig 10. Visiting Meoto-iwa geosite.

At the 4th day morning, last lecture of this course was presented by Dr. Priyaja Prabhakaran (CUSAT, India). She talked about climate, coastal environments, and marine biodiversity of India, which is the 7th largest country of the world with over 1,300 islands. The beautiful coral reef around the south Indian coast impressed us how diverse the world marine environment is. This day was the final day of the activity at SMBS, so we held a final group presentation after the optional snorkeling activity. For the preparation of the presentation, participants had separated into four groups, and each group had selected one phylum of the animals to be explained after the nocturnal animal sampling at the 2nd day. They have researched and discussed about the features of their selected phylums, and made a presentation material to introduce their phylums to the other participants. Each participant also sketched and introduced their favorite animals which are classified in their selected phylums. Each presentation material was well-thought and highly comprehensible! After the group presentation, Ms. Sajna Beegum, one of the participants from CUSAT, introduced her home island Lakshadweep Islands with beautiful pictures. Finally, we held a BBQ party to celebrate the successful finish of the activity at SMBS.

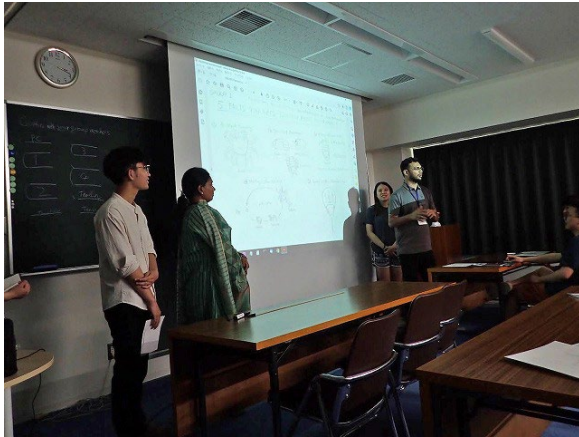


Fig 9. Group presentation



Fig 10. BBQ party

At day 5, we closed the practical course at SMBS with certifying each participant as a member of SAKURA science club. We then moved to Tokyo via Niigata, and at day 6, we visited Tokyo Sea Life Park and National Museum of Nature and Science. Participants might study typical marine ecosystem of the pacific coast of Japan, and natural history and ecology of Japan.



Fig 11. Group photo at Tokyo Sea Life Park

Through these 2 days online course and 7 days in-person practical course, participants learned about various marine ecosystems and biodiversity in Japan and Asian countries, and communicated and discussed with people from other Asian countries. In-person course participants also experienced several sampling methods of marine animals. We hope all the participants enjoyed this course, and will continue to communicate each other. SMBS will continue to hold the international course next year and in the future. We hope we will have a chance to see the online participants at the next course, and for the in-person course participants, we hope they will use the experience of this course for their future lives, and we will have a chance to meet again in the future.