Newsletter from
NOWPAP CEARAC
Northwest Pacific Action Plan
Special Monitoring & Coastal Environmental Assessment
Regional Activity Centre
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Greeting from Director of CEARAC

Mr. Takahiro YANAGIDA

Dear Readers,

It is my great pleasure to greet you through this newsletter. I've been serving as CEARAC Director since July 2025.

The Regional Seas Programmes (RSP) of the United Nations Environment Programme (UNEP) have promoted concerted actions by relevant states under regional frameworks to pursue management and protection of shared marine and coastal environments. Northwest Pacific Action Plan (NOWPAP), started in 1994 by China, Japan, Korea and Russia, is one of the RSPs aiming at conservation of the marine and coastal environments of the Northwest Pacific region.

A regional activity centre (RAC), the main body to implement NOWPAP activities is set in each member state, and in 1999, the Northwest Pacific Region Environmental Cooperation Center (NPEC) in Toyama, Japan was designated as the host body of a RAC in Japan: Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC). Since then, as its name suggests, CEARAC has carried out various activities with a focus on special monitoring: monitoring and assessment of the marine and coastal environments using remote sensing technology.

Biennial NOWPAP workplan and budget are to be adopted by the member states. However, the adoption of the 2022-2023 activities has been suspended because of global political uncertainty that began in February 2022, severely affecting CEARAC activities. Under such a circumstance, CEARAC continued implementing its 2020-2021 activities for the extended period until June 2024. Then, from July on, we have been preparing to restart our full-scale activities with the support of the Ministry of the Environment, Japan and Toyama Prefectural government. We strongly wish to separate environmental issues from political ones and to resume NOWPAP activities fully sometime soon.

In 2025, CEARAC staff revised the English version of the Environmental DNA (eDNA) Sampling and Experiment Manual and provided trainings on remote sensing data analysis as well as sharing information and introducing CEARAC outputs at international conferences and workshops. We also participated in the symposium to commemorate the 30th anniversary of NOWPAP/the 20th anniversary of the NOWPAP Regional Coordinating Unit (RCU) and gave a lecture there. Please see more details in the following pages.

In recent years, the rapid evolution of environmental assessment techniques, including eDNA and remote sensing, has been remarkable.

By leveraging our accumulated knowledge and experiences in these techniques, CEARAC will make further efforts to lead the world in overcoming existing challenges in the marine and coastal environments. We will also continue contributing to marine conservation and protection in the NOWPAP region and others around the world while paying attention to the latest trends regarding the triple planetary crisis of climate change, biodiversity loss and pollution, in particular marine litter.

I hope that CEARAC's visibility will increase globally through our activities. I also expect more people will get interested in environmental conservation actions of Toyama Bay and the NOWPAP region, and this will accelerate marine environmental conservation actions under cooperation and collaboration among related organizations and institutions around the world.

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Hisui Coast, or jade coast (Asahi Town, Toyama Pref.)

1. CEARAC-related Activity Report 2025

1.1 Revision of the English version of the Environmental DNA Sampling and Experiment Manual

Environmental DNA (eDNA) analysis is one of the monitoring techniques to estimate the presence of organisms by analyzing DNA included in sample sea water, river water and/or soil. Developing special tools to monitor the marine and coastal environments is one of the working areas of CEARAC; therefore, recognizing its applicability in biodiversity studies such as biodiversity assessments and/or better understanding of invasive species distribution, CEARAC prepared an English version of the Environmental DNA Sampling and Experiment Manual (version 2.1) in 2019 in order to disseminate this technique widely among the four NOWPAP member states, in cooperation of the eDNA Society, Japan, which developed the original manual in Japanese.

The advancement of eDNA technique has been remarkable in recent years. New methods/approaches have been developed and their application in academia and government has been widely recognized. When the eDNA Society revised the Japanese manual in 2024, CEARAC also undertook the revision of the English version in cooperation with the society and completed Version 3.0 (published June 16, 2025).

The major change in the Version 3.0 is the addition of a chapter, "eDNA metabarcoding." EDNA metabarcoding is a multiple-species detection method for particular taxonomic groups using a next-generation sequencing platform. Large amounts of DNA fragments are amplified by polymerase chain reaction (PCR). Then, various adapters are appended to both ends of the PCR products and a large amount of information is analyzed (massively parallel sequencing) with the next-generation sequencer to estimate the existence of organisms. Such big data analysis is basically conducted by a combination of several software applications, which is called "pipeline." The revised manual has detailed explanations of the procedures and examples for two major pipelines used in Japan: the MiFish pipeline and Claident, with Q&A sections.

In addition to recent wider spread of eDNA technology and its application as a supplement to conventional biological monitoring in various organizations, a new technique using RNA has been developed. RNA exists in an environment for a shorter time than DNA, and the new technique is used to conduct more spatially and temporally accurate analysis. While sharing such effective and efficient techniques with the NOWPAP member states, CEARAC will collect significant information that contributes to marine biodiversity conservation in the NOWPAP region.

See the website of the eDNA Society:

For English manuals: https://ednasociety.org/en/manuals/

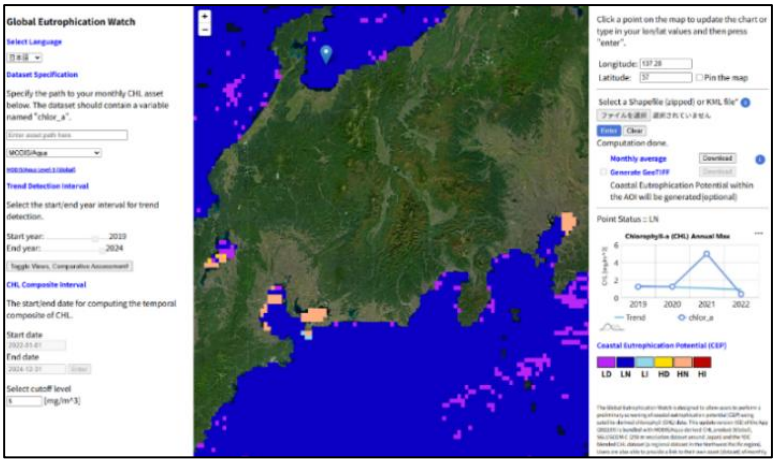
For Japanese manuals: https://ednasociety.org/manual/

1.2 Satellite Data Analysis Training

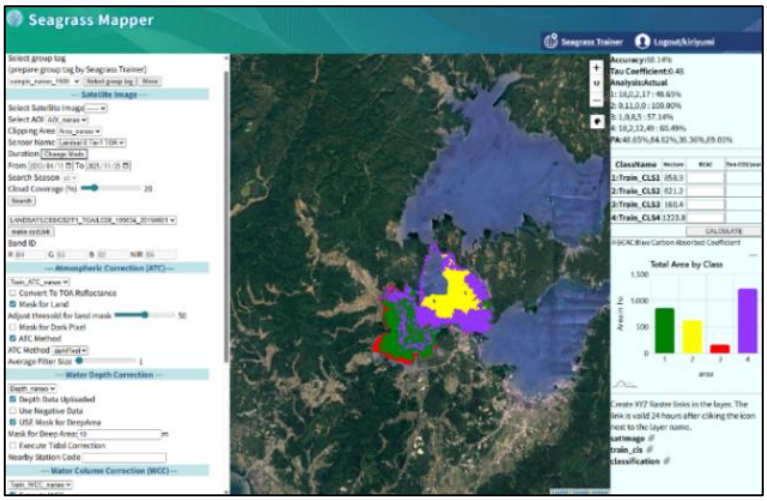
One of the mandates of CEARAC is development and spread of monitoring and assessment tools for the marine and coastal environments using new technologies such as remote sensing. Dr. Genki Terauchi, senior researcher of CEARAC, conducted training courses on remote sensing data analysis in Japan and abroad, using Global Eutrophication Watch (GEW) and Seagrass Mapper. CEARAC has involved in the development of both tools. In respective trainings, participants learned how to monitor/assess water quality with GEW and how to

map seagrass beds with Seagrass Mapper.

GEW, developed by NPEC, is a tool to analyze satellite data based on the level and trend of Chlrophyll-a (Chl-a) concentration to visualize the status of eutrophication in the marine environment globally on a map. GEW is designed to be easily operated by a person who does not have any specific knowledge in computer analysis by using 20-something years' accumulated data imported in the tool. At present, CEARAC is improving GEW to enhance users' accessibility to datasets around the world, which are well-tuned by local-specific algorithm.



GEW: https://eutrophicationwatch.org/



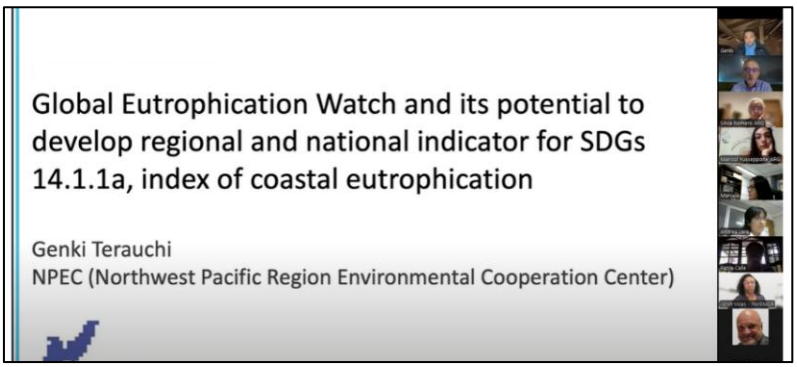
Seagrass Mapper: https://seagrassmapper.org/

Seagrass Mapper, developed by the Ministry of the Environment (MoE), Japan, is a tool to map seagrass beds in shallow waters. CEARAC has improved its ability along with collection of ground-truth data around the world. This tool is operated as a part of the NOWPAP Marine Environmental Watch System (the Watch System) developed by the MoE and operated by NPEC. The Watch System automatically acquires remote sensing data released by space agencies and research institutes on a cloud computing environment, then processes and visualizes the data for the NOWPAP sea area.

The training programs in 2025 are shown in the table below.

Webinar on Global Eutrophication Watch for REMARCO

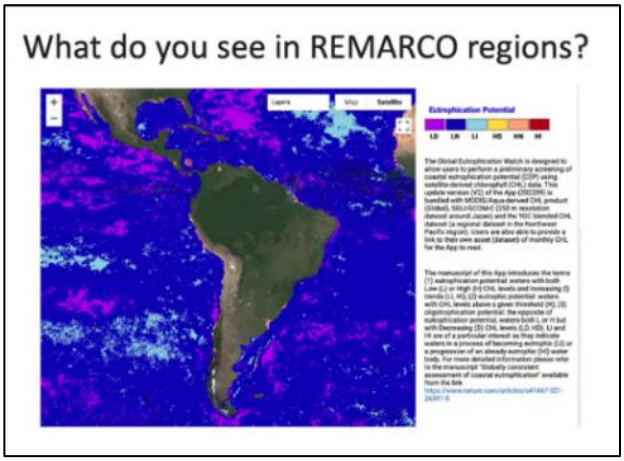
On January 10th, Dr. Terauchi gave a webinar on GEW to the Research Network of Marine-Coastal Stressors in Latin America and the Caribbean (REMARCO).



Through recommendation from UNEP, REMARCO recognized CEARAC's activities on eutrophication assessment and asked us for a webinar, especially, on how to use satellite data for assessing the eutrophication status in the Central and South America and the Caribbean Sea.

Dr. Terauchi explained the function of GEW and the procedure of the eutrophication assessment using GCOM-C/SGLI data. He also introduced a CEARAC's plan on the development of regional-/national-level SDG Indicator 14.1.1a: Index of coastal eutrophication. The webinar was well received by its participants and followed by an active Q&A session.

Through this opportunity, CEARAC expects GEW to be used more widely around the world, including Latin America and the Caribbean region.



Training Course on Remote Sensing Data Analysis at the Prince of Songkla University, Thailand

On March 11th, CEARAC held two training sessions on remote sensing data analysis using GEW and Seagrass Mapper at the Prince of Songkla University, Thailand. This training was organized as requested by Dr. Anchana Prathep, Dean of Faculty of Science. She is a principal investigator of Thailand in an on-going project "Coastal ecosystems as nature climate solution in Asia," which is being carried out in an international joint project of Japan, Thailand and Indonesia, as a part of The East Asia Science and Innovation Area Joint Research Program (e-ASIA JRP) which NPEC takes part in.

In the first training session, after listening to a presentation on CEARAC's activity for preliminary assessment of the eutrophication status, trainees exercised how to obtain ocean color data from the Watch System, analyze them using Google Colaboratory, and validate them against in-situ data.

At present, the turbid water of Andaman Sea in Thailand is a concerning issue as it may be one of the factors to the decline of seagrass beds, so the participants requested Dr. Terauchi to incorporate a high-resolution dataset and a long-term analysis function tailored for Thai waters on GEW.

In the second training session (seagrass mapping), Dr. Terauchi demonstrated the steps to be taken, from how to upload sample data (Nanao Bay, Japan) into Seagrass Mapper, to how to activate the tool. He also told that it is required to apply tidal level correction for waters in Thailand as part of seagrass beds are above water at low tide. Then, he introduced classification by Normalized Difference Vegetation Index (NDVI) using red and near infrared values, which is useful for seagrass mapping at low tide. At present, however, unfortunately Seagrass Mapper does not support this approach. Because of scarce bathymetry data in many coastal areas in Thailand, he taught the trainees how to mask deep-sea areas using bathymetry data estimated from satellite images as well as encouraged them to collect bathymetry data on their own using fish finders. After the training sessions, there were many

questions and feedbacks given from both in-the-venue participants and online ones to Dr. Terauchi, all of which can help CEARAC improve Seagrass Mapper to be more competent.

There were 48 participants in the training in person and online, who were university students, researchers and faculty members and so on from nine countries from Thailand and other southeast Asian countries mainly.

The training course in Thailand was an important step for CEARAC to advance conservation of seagrass beds and application of satellite remote sensing in assessing blue carbon ecosystems in Asia.

Tutorials on remote sensing data analysis at the 16th PORSEC in Taiwan

In April, the 16th Pan Ocean Remote Sensing Conference (PORSEC) was held at National Taiwan Ocean University. On the last day of the three-day tutorials organized as a part of PORSEC, Dr. Terauchi gave two practical trainings on remote sensing data analysis, upon request from the tutorial leader, Dr. Mubarak Mammel (postdoctoral researcher, National Taiwan Ocean University).

The first training was on water quality monitoring and assessment using GEW. Following Dr. Terauchi's introduction about one CEARAC ' s activity on a preliminary assessment of the eutrophication status using satellite-derived Chl-a data, the tutorial participants practiced time series analysis of ocean color data in the Watch System with Google Colaboratory. Then, they compared the analysis results with in-situ data for validation and understood the usefulness of satellite-derived data.

The Second training was on mapping seagrass beds with Seagrass Mapper. After explaining significant roles of coastal seagrass/seaweed beds in conserving marine biodiversity and absorbing carbon dioxide (CO_2), Dr. Terauchi demonstrated basic functions and operations of the tool with a sample data of Nanao Bay, Japan. All the participants listened attentively to his lecture.

15 master's and doctoral students at National Taiwan Ocean University joined the trainings, who are not only Taiwanese but also from Malaysia, India and Papua New Guinea.

CEARAC hopes that these trainings will inspire young researchers to apply remote sensing technology to monitoring the marine environment, thereby advancing their research themes and contributing to the resolution of global marine environmental issues through the utilization of satellite data.

Training session on Seagrass Mapper at Tottori University of Environmental Studies (TUES), Japan

This training was realized when Associate Professor Dr. Tatsuyuki Sagawa of TUES and the Tottori prefectural fish farming center got interested in introduction and utilization of Seagrass Mapper in their studies. A total of 26 junior and senior students of TUES with some graduate students from Dr.

Sagawa's laboratory participated in the hands-on session. The main study of Dr. Sagawa's lab is environmental monitoring using remote sensing techniques, and Dr. Sagawa himself and some staff members of the fish farming center also joined the training, which made it a very active learning opportunity for all of the participants and an important initial step for NPEC to consider future collaboration with both organizations as well.

Dr. Terauchi demonstrated how to operate Seagrass Mapper with handouts of explaining the basic step-by-step procedure to activate the tool, what to be considered when obtaining data and how to analyze obtained data. Then, the students tried to operate Seagrass Mapper themselves to map seagrass beds by using sample data of Nanao Bay, Japan. At the Q&A session, the participants asked many questions to both Dr. Terauchi and Dr. Sagawa, and they discussed their concerns together. Some of their questions were how to interpret verification results, what to do with low accuracy, time gap between the satellite data and in-situ data, and spatial resolution of uploaded data, and so on.

Workshop on "Analysis of Remote Sensing Data for Coastal Ecosystem Studies" at Burapha University, Thailand

On October 13th and 14th, a workshop on "Analysis of Remote Sensing Data for Coastal Ecosystem Studies" was organized at Burapha University, and Dr. Terauchi gave a lecture there upon request by Dr. Eko Siswanto, leader of the Task Group 4 (TG4) at the 17th Asia-Oceania Group on Earth Observations (AOGEO) Symposium, and also by Dr. Anuku Buranapratheprat of the university.

In the workshop, he demonstrated monitoring and assessment of water quality using satellite remote sensing technology and seagrass mapping with optical sensors to the participants including 10 students of the university and local government officials in charge of remote sensing-related tasks in the coastal areas in Thailand.

2. Cooperation with NOWPAP Partners and Organizations

CEARAC staff participated in several international conferences in 2025, which were hosted by either subsidiaries of UNEP, such as the UNEP Nitrogen Working Group, the UN Statistics Division, and the Group on Earth Observations (GEO); a NOWPAP partner organization, PCIES; or others whose business/activities are closely related to CEARAC activities with remote sensing techniques such as Google.

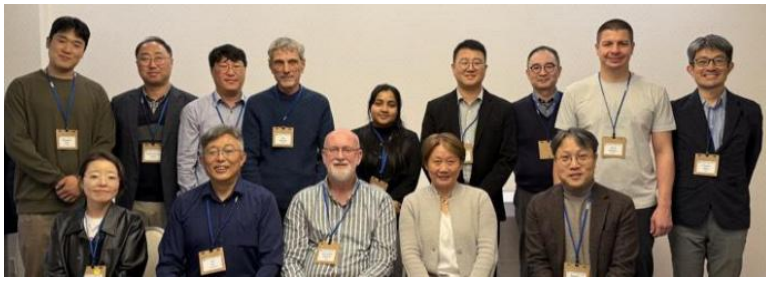
2.1 The annual meeting of PICES 2025

The annual meeting of the North Pacific Marine Science Organization (PICES) was held on November 8th – 14th in Yokohama, Japan. As its main works are highly relevant to projects and activities of CEARAC, Dr. Takafumi Yoshida participated in business meetings and workshops and sessions of relevant committees and expert groups including the Matine Environmental Quality Committee (MEQ) in which he serves vice-chair.

In recent years, young researchers, so-called early career ocean professionals (ECOPs) have actively involved in the PICES annual meetings, and about 40% of all participants were ECOPs. In some workshops

and sessions of 2025, the percentage was higher, and most of the presenters were young researchers there. PICES annual meetings are a good opportunity for younger generations to experience their first international conference as well as to build a closer connection with researchers from different countries. PICES itself puts some efforts to nurture personnels who can lead international cooperation and collaboration in the future, so this meeting was indeed very productive.

Upon an inquiry about the current situation of NOWPAP in some business meetings, Dr. Yoshida reported that all NOWPAP activities have been still suspended and the resuming schedule is unknown. As some expert groups of PICES strongly hope to collaborate again with NOWPAP in their on-going and future projects, it is highly expected to start discussion between NOWPAP and PICES on strengthening our old tie and at the same time, developing a new connection sometime soon.



Members of Business meetings: MEQ (Left) and Advisory Panel for Circulation Research in the East Asian Marginal Seas (AP-CREAMS) (Right)

● Town Hall Event

During the Town Hall Event held in the Opening Ceremony on the 10th, the participants actively exchanged opinions about PICES's future directions and/or cooperation and collaboration with different stakeholders. There, some keywords were repeatedly used : "Actionable Science", "Co-design, Co-produce", and "Digital Twin". Now is the time when scientific research organizations are strongly required to share their expertise with stakeholders including policymakers, and to contribute to achieving policy goals in cooperation with these people. This is not only the case to PICES; NOWPAP and other international organizations also must work together with non-researchers to let them understand current scientific research well and the importance of the researchers' contribution to governmental and local initiatives. NOWPAP is not a scientific research institution but rather a legal framework of intergovernmental cooperation among the member states. However, it is an important mission for us to bridge scientific understanding to governmental policies through collaboration with PICES.

● Topic Session: The Status and Future of Urban Oceans of the North Pacific — Pathways to Resilient and Sustainable Coastal Cities

Dr. Yoshida was one of the convenors with Dr. Brian Hunt of the University of British Columbia, Canada and Dr. Kathryn Sobocinski of the Western Washington University, U.S.A. for the Topic Session, "The Status and Future of Urban Oceans of the North Pacific – Pathways to Resilient and Sustainable Coastal Cities." Approximately three-quarters of the world's population live in the coastal areas, resulting in their anthropogenic impacts on the coastal environments and ecosystems. Under these circumstances, case studies and research from various countries on how to coexist with the natural environment were presented.

As invited speakers, Dr. Akio Sohma of Osaka Metropolitan University, Japan and Dr. Gen Kanaya of the National Institute for Environmental Studies, Japan, reported on the current status of tidal flats in Tokyo Bay and Osaka Bay, which are located in two major cities in Japan, and on the crucial roles of tidal flats as conserving marine biodiversity and environment.

Dr. Yoshida introduced the "*Satoumi*" concept, one of the effective tools for coastal area management in Japan, and a large audience, especially the ones from the countries other than Japan expressed their interest in "*Satoumi*," yet the term and its concept were not so familiar to them.

Dr. Jakob Takumi Dingwell of University of Victoria, Canada, MEQ Best ECOP Oral Presentation Award winner, reported that along with the change of seagrass/seaweed beds from eelgrass to an invasive *Sargassum* species, the spawning activity of herring has changed. He pointed out that initiatives and/or programs based on herring's spawning behavior are crucial for its population recovery and habitat restoration.

●S-MPP (Section on Marine Plastic Pollution) Business Meeting

One of the Terms of Reference (ToR) of the Section on Marine Plastic Pollution (S-MPP) is "harmonization of Observation Data." Monitoring activities are being carried out around the world to understand the current status of marine plastic pollution, yet there are no standardized monitoring approaches nor units used in data, and therefore, the comparison of respective data is not realistic. At the S-MPP Business Meeting, which is the newest section of PICES and has just started its full-scale operation this year, the members realized the importance of a unified methodology to grasp the current status of the pollution and discussed how to harmonize plastics monitoring methods internationally as well as to construct a consolidated global database. While exchanging opinions, some successful cases were introduced: In Japan, a harmonized monitoring method and database (Atlas of Ocean Microplastics) work well, and the Arctic Monitoring and Assessment Programme (AMAP) of the Arctic Council has implemented microplastic monitoring in the Arctic Ocean. Based on these presentations, there were opinions that it is essential to effectively utilize existing guidelines and databases, not to develop new monitoring methods or databases.

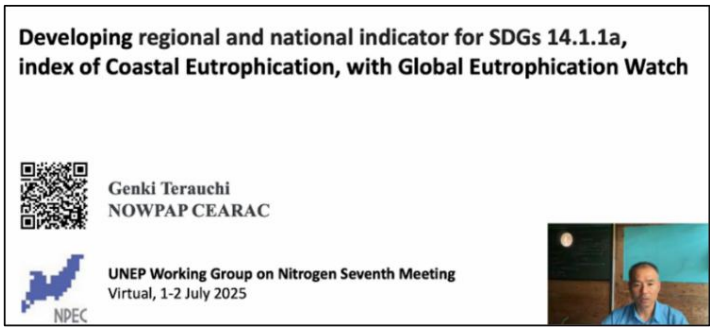
●S-HAB (Section on Ecology of Harmful Algal Blooms in the North Pacific) Business Meeting

At the S-HAB Business Meeting, the members discussed revision of its ToR, and they agreed to add a new task to promote information sharing and dissemination on integrated management/control related to HAB occurrence including prevention, prediction and forecast, mitigation, and follow-up. This revision is reflected by the attitude of the Section: it is their responsibility not only to provide information but also to contribute to national management policies.

The 2026 PICES annual meeting will be held in Nanaimo, Canada.

2.2 The 7th meeting of the UNEP Working Group on Nitrogen

The 7th meeting of the UNEP Working Group on Nitrogen was held online on July 1st and 2nd, and Dr. Terauchi gave a video presentation on GEW upon request of the working group at a time when many countries are struggling with monitoring nutrients. The group expects GEW to serve as a model case. More than 100 people from governmental organizations, international organizations, and academia attended the meeting and they actively discussed and shared their opinions on sustainable nitrogen management.



In the session on Agenda Item 6 "Monitoring of Nitrogen Pollution," Dr. Terauchi gave a lecture: "Developing an updated version of the Global Eutrophication Watch and a prototype of national reporting system for SDG indicator 14.1.1a" and demonstrated how to use GEW.

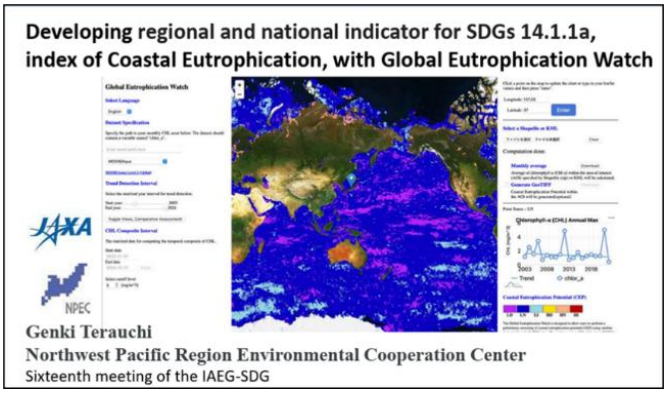
Eutrophication in coastal and marine waters is a phenomenon caused by excessive nutrient input in these areas. Referring to cases in several areas such as the Ariake Sea, the Bohai Sea and the Gulf of Thailand, he explained the applicability of GEW to accurately visualize the eutrophication status even in small coastal waters and turbid waters by using locally-tuned data.

In addition to GEW, Dr. Terauchi introduced a joint project (2025-2027) funded by the Japan Aerospace Exploration Agency (JAXA) to develop a national- and regional-level indicators of SDG 14.1.1(a): Index of Coastal Eutrophication, in which Chl-a data from GCOM-C/SGLI is used based on the approach of GEW. It is highly expected that the tool can contribute to achievement of SDG14: Life Below Water.

2.3 The 16th meeting of IAEG-SDGs

The 16th meeting of Inter-Agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs) was held on November 5th-7th in Kitakyushu, Japan, and Dr. Terauchi participated in the meeting. This meeting, the first of its kind held in Japan, was organized by the UN Statistics Division and hosted by Japan's Ministry of Internal Affairs and Communications.

In the session 6b "Harnessing AI and emerging data innovations to accelerate the SDGs", he gave a presentation: "Developing regional and national indicators for SDGs 14.1.1a, index of coastal eutrophication, with Global Eutrophication Watch." Introducing GEW and its driver, the NOWPAP Eutrophication Assessment Tool (NEAT), Dr. Terauchi explained that both tools combine the level and trend of Chl-a concentration for eutrophication assessment. He also introduced an on-going project regarding the development of regional- and national- level indicators for SDGs 14.1.1a and reported the results of the analysis by GEW using the JAXA's GCOM-C/SGLI data from 2018 to 2024.



2.4 The 17th AOGEO Symposium

The 17th Asia-Oceania Group on Earth Observations (AOGEO) Symposium was held in Thailand on October 15th-17th, and Dr. Terauchi participated in the event. AOGEO is a Regional Group on Earth Observations (Regional GEO).

He gave a presentation in the Task Group 4 (TG4) session on Oceans, Coasts, and Islands (OCI), titled "Development of Regional and National Indicator for SDGs 14.1.1a, Index of Coastal Eutrophication, using Ocean Color Data," and introduced GEW. After all presentations and discussion, TG4 decided that they will improve the local datasets for Jakarta Bay, Manila Bay and Tokyo Bay.

Then, Dr. Terauchi participated, as a panelist, in the Special Session 2, titled "Earth Intelligence for a Resilient Future: Understanding and Tackling Emerging Threats of Asia-Oceania region." The term "Earth Intelligence" refers to the knowledge and insights generated by combining Earth observation data (physical quantities) with various information, such as AI analysis, simulation models, and socioeconomic data. This Intelligence is intended to promote practical actions by central and local governments, businesses and citizens. As a representative of TG4, Dr. Terauchi reported the results of water quality monitoring and assessments using locally-tuned algorithms (e.g., ocean color algorithms for the Yellow Sea (YOC) and the Gulf of Thailand) when introducing GEW. He then shared the idea with other panelists that the approach used in GEW for analysis of big data, combining the level and trend of Chl-a concentration, can be applied to analysis of other physical quantities. He also pointed out that such ingenuity would be necessary for visualization of analysis based on earth observation data. Moreover, he emphasized that it would be useful to predict future scenarios with models; however, it is more important to understand what is happening at present and its causes.

On the last day of the symposium, the 2025 AOGEO Statement was adopted, and GEW-related issues were incorporated into the statement as part of TG4 future activities: enhancement of local datasets, integration of data from multiple sensors, and cooperation and collaboration with policy-makers.

2.5 2025 Geo for Good Summit Singapore

2025 GEO for Good Summit Singapore was held on September 8th -11th, and Dr. Terauchi introduced CEARAC activities there and exchanged ideas with specialists of geospatial information. This annual event is an occasion to showcase the state-of-the-art technology and best practices on Google Earth Engine (GEE). Dr. Terauchi was one of the accepted 100-something researchers, businesses and environmental activists.

He gave presentations in two sessions. In the session, “Coastlines in Crisis: Mapping Change & Navigating Hazards,” Dr. Terauchi introduced GEW and Seagrass Mapper, with a co-researcher, Dr. Robel ASHENAFI, a first-year doctoral course student in the Graduate School of Soka University, Japan.

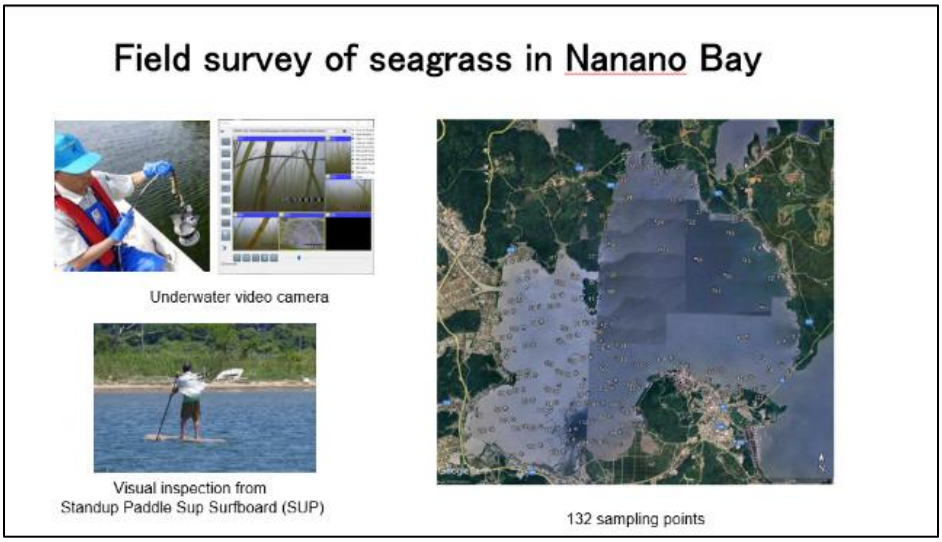
Then, in the other session, “What’s New with Data Catalogs,” he reported that GEW has mounted the ESA-Climate Change Initiative (ESA-CCI) Open Data to increase its dataset. The European Space Agency (ESA) developed the long-term time series data by blending ocean color data from multiple sensors. In the Q&A session, when Dr. Terauchi was asked about usability of GEW for monitoring harmful algal blooms (HABs), he explained that GEW is rather useful to observe long-term trends of water quality, and that specific algorithms and additional data on wind and sea currents are crucial to monitor short-term phenomenon, such as HAB occurrence. He also emphasized the importance of incorporating local datasets into GEE when no public datasets are available.

In the panel discussion, “ the Impact Equation Panel,” Dr. Terauchi involved in the discussion as one panelist on how to accurately evaluate project outcomes and disseminate such information to the world. Based on the experiences and lessons learned, he stressed the importance of justifying an activity/project to obtain and scale up funds for it.

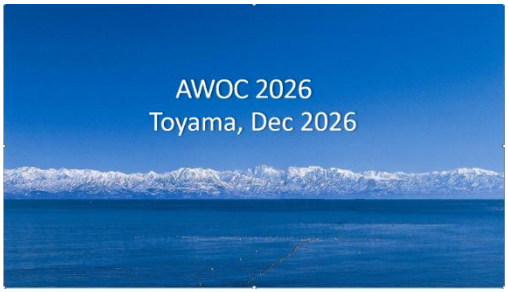
2.6 AWOC-JKWOC 2025

The Asian Workshop on Ocean Color and the Japan-Korea Workshop on Ocean Color 2025 (AWOC/JKWOC) was held on November 18th-20th in Busan, Korea, and Dr. Terauchi participated in the workshop. This event is an occasion to share the latest finding/technology in ocean color remote sensing with researchers in Japan and Korea and other Asian countries.

In Session 8 “Marine Ecology and Remote Sensing Applications,” Dr. Terauchi gave a presentation: “Monitoring Summer Eelgrass Die-offs in Nanao Bay Using a Compact Sonar Mounted on a Stand-up Paddle Surfboard.” In monitoring seagrass (Zostera marina) in Nanao Bay, Japan, he developed a unique method as described in the title of the presentation. With this method, Dr. Terauchi obtained vegetation density and substrate data, and utilized them as ground truth data in machine learning of Seagrass Mapper (satellite image classification using Random Forest). Then, using satellite images by Sentinel-2 of the European Space Agency (ESA), he was able to map seagrass distribution in a wider scale and in high-quality. The result of the analysis revealed that the mass die-off of seagrass in Nanao Bay occurred by the increase of sea water temperature in summer 2025.



At the closing session, Dr. Terauchi proposed Toyama City, Japan, as the next venue for the 2026 AWOC. The NPEC office is located in the city. The workshop’s participants agreed in a unanimous to organize the 2026 workshop in Toyama.



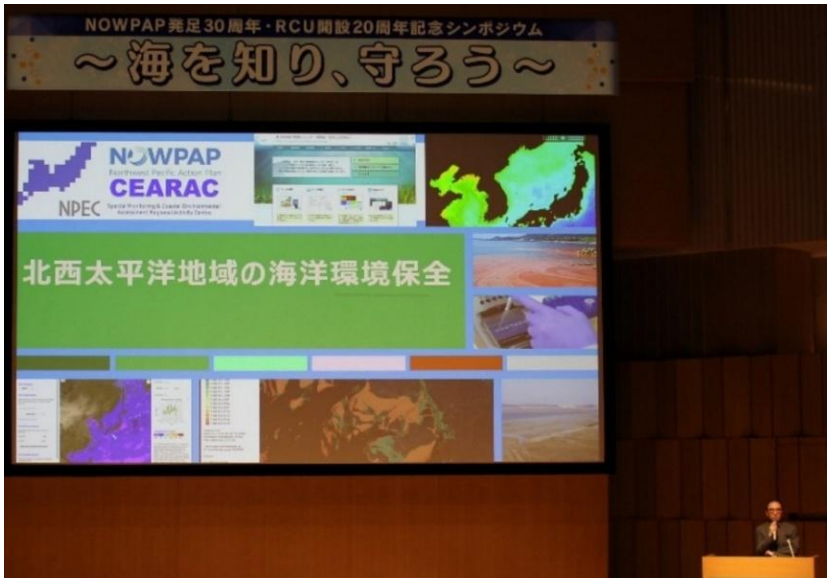
2.7 Symposium to celebrate the 30th anniversary of NOWPAP and the 20th anniversary of NOWPAP RCU

It has been 30 years since NOWPAP was adopted in 1994 by Japan, China, South Korea, and Russia. It has also been 20 years since the offices of NOWPAP Regional Coordinating Unit (RCU) were established in Toyama and Busan in 2004 to serve as a coordinating body among the member states for smooth operation of NOWPAP activities.

Unfortunately, all activities and programmes of NOWPAP have been suspended at present. Consequently, no large-scale ceremony was planned, instead, a commemorative symposium was held by the Toyama Prefectural Government and Toyama City, which has supported the NOWPAP RCU Toyama Office, on March 16th at the Toyama International Conference Center.

In response to the congratulatory speeches from Mr. Nitta, Governor of Toyama Prefecture, and Mr. Fujii, Mayor of Toyama City, Dr. Yegor Volovik, NOWPAP Coordinator, appreciated the great support of both organizations to the operation of NOWPAP.

In the symposium, local high school students, a professional football club based in Toyama, and a volunteer group in Toyama presented their activities to protect/conserve the marine environment. Dr. Yoshida, senior researcher of CEARAC, introduced the past activities of CEARAC and its achievements which are related to coastal environmental monitoring and assessment in the NOWPAP region. In particular, CEARAC has worked on developing monitoring/assessment tools using remote sensing and e-DNA techniques for special monitoring. CEARAC has also worked on to tackle serious environmental issues in the NOWPAP region such as red tides, eutrophication, marine biological diversity, and marine litter.



The negative impact of global warming and plastic pollution has become increasingly visible around the world. The NOWPAP region is said to be one of the most affected areas by these environmental problems, and therefore, international cooperation/collaboration is crucial to resolve these challenges.

We strongly hope that the operation of NOWPAP will be resumed in the near future and that we can contribute to improving the marine environment in the NOWPAP region under the strong alliance of the four member states.

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