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Center for International Research Collaboration
Atmosphere and Ocean Research Institute
The University of Tokyo

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The 57th Session of the Executive Council of Intergovernmental Oceanographic Commission (IOC)

Hiroaki SAITO
Professor and Director, Center for International Research Collaboration

Japanese Delegation

The 57th Session of the Executive Council (EC) of the Intergovernmental Oceanographic Commission (IOC) took place at UNESCO Headquarters in Paris from June 25 to 28, 2024. The Japanese Delegation was led by Prof. Hiroaki Saito of AORI. Prof. Mitsutaku Makino also attended as a delegate. A fresh impression of the IOC's new organization was left at the opening, which featured the new faces of Secretary General Vidar Helgesen, who assumed office in March 2024, Chairperson Yutaka Michida and five Vice Chairpersons elected at the 32nd IOC General Assembly in June 2023.

We are experiencing a harsh global situation with conflicts and religious strife. Member states have different opinions each other regarding maritime boundaries and maritime order. In this condition, we approached the EC with some tension, and carefully listened the statements from each EC member states. However, these concerns turned out to be unfounded. Each member made strong statements of supporting the IOC and continuous contributions to their respective IOC projects. As a result, the discussion and resolution at the EC proceeded relatively smoothly, of course with some serious interventions and discussion in the session and negotiation outside the venue.

At the EC, Japan, as a key country since its establishment of the IOC, took a fundamental stance of contributing to the international community by demonstrating leadership and driving IOC projects. I believe that the EC clearly recognized Japan's presence in IOC activities. Reports from the secretariat and various WG chairs highlighting Japan's significant contributions not only funding support but also activities such as UNDOS, regional early warning services, educational programs on World Tsunami Day, GEBCO, etc. This is solely due to the efforts of the relevant ministries, agencies, and committee members who have contributed to IOC activities over the years. I would like to express my deep gratitude here.

Regarding UNDOS, Japan established the National Committee and has been promoting domestic activities. Furthermore, Japan contributed to UNDOS through the hosting of numerous side events at the UNDOS conference in Barcelona, April 2024, and regional conferences of IOC sub-committee WESTPAC. Various scientific discoveries have been made thanks to the efforts of cooperating scientists. However, as mentioned in the statement from the Secretary General, national policies that address the emerging ocean related issues under the global change must be established. Cooperation between scientists, decision makers, NGOs/NPOs and the general public is necessary to achieve this. Although the structure and roles of national committee are different between states, Japan's *"scientific resolution of ocean issues"* and the achievement of sustainable development goals depend on further advancing the cooperation of the stakeholders engaged in the ocean through the activities of the national committee.

57th Session of Executive Council. Prof. Michida is answering questions on the stage.

As mentioned at the beginning, it was the first EC for Prof. Michida as the Chairperson. I'm sure that there were many challenges for Prof. Michida with the new government body of the IOC. However, I felt that his ability to listen to and respect the opinions of each member state while smoothly conducting the proceedings was fully demonstrated. As the session progressed, a sense of reassurance and trust in the new Chairperson was fostered. This also contributed to Japan's presence within the IOC. It is very presumptuous of me, but I would like to extend my compliments to Prof. Michida, Professor at AORI and Special Presidential Envoy for UN Ocean Decade at The University of Tokyo, for his sincere chairmanship.

The 2024 UN Decade of the Ocean Conference by Intergovernmental Oceanographic Commission of UNESCO at Barcelona

Naomi HARADA
Professor, Center for International Research Collaboration

Speakers from the left, Francisco J., Jimenez-Espejoa, Senior Researcher, Instituto Andaluz de Ciencias de la Tierra, CSIC-UGR, Spain Kotaro Tanaka, Research Fellow, Ocean Policy Research Institute of the Sasakawa Peace Foundation / ECOP Japan Coordinator Naomi Harada, Professor, CIC AORI, University of Tokyo

The 2024 UN Decade of the Ocean Conference, hosted by Spain in collaboration with the Intergovernmental Oceanographic Commission (IOC) of UNESCO, was held from April 10 to 12, 2024, in the coastal city of Barcelona.

Prior to the main conference, a side event on marine science literacy titled Ocean Literacy Dialogue was held on 8–9 April, organized by the IOC. The Atmosphere and Ocean Research Institute of the University of Tokyo co-organized a session, Ocean Literacy: Many cultures, Many ways, in collaboration with the Japan Agency for Marine-Earth Science and Technology, the Institute for Ocean Policy Studies, and Instituto Andaluz de Ciencias de la Tierra in Spain. This session emphasized the importance of disseminating different types of oceanographic knowledge to the public to improve ocean literacy. Key topics included ocean knowledge acquisition, capacity building, education, and promoting science by involving the public. The session highlighted a variety of approaches and activities undertaken in Japan and Spain.

Approximately 60 local participants attended the side event and engaged in discussions comparing Japanese and Spanish initiatives. Participants proposed that an Asian version of the Ocean Literacy Dialogue be held in collaboration with other Asian countries. It was decided to plan this event for the summer of 2025. Organizing an international conference in collaboration with Asian countries aims to improve marine science literacy by fostering mutual learning and exchanging best practices. In addition, many sessions at this conference were useful for understanding the latest developments related to the UN Decade of Ocean Science.

The audience and the speaker N. Harada during the session.

2nd UN Ocean Decade Regional Conference & 11th WESTPAC International Marine Science Conference

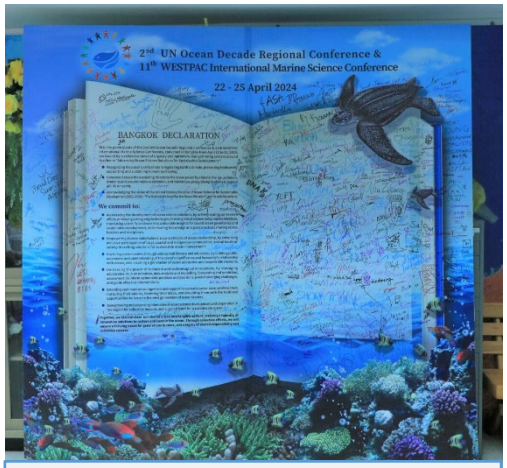
Hiroaki SAITO
Professor and Director, Center for International Research Collaboration

UNESCO/IOC Sub-Commission for the Western Pacific (WESPTAC) held the 2nd United Nations Decade of Ocean Science Regional Conference (UNDOS-RS) in conjunction with the 11th WESTPAC International Marine Science Conference (WMSC) from April 22–26, 2024, in Bangkok, which was hosted by the Government of Thailand. The purpose of the conference was to expedite scientific activities for the UNDOS (2021-2030).

The 1st UNDOS-RS was held in Tokyo in 2019 for kicking off the UNDOS and planning domestic and international activities. After 3-years of the start of UNDOS, the 2nd UNDOS-RS was entitled "*Accelerate Ocean Science Solution for the Sustainable Development*" to exchange the latest ocean knowledge as well as the challenges and success in achieving the Goals of UNDOS. It was featured by 25 scientific sessions on UNDOS priority issues and 13 Decade Action Workshops. Total participants of the concurrent events reached to 1,200. These clearly demonstrated the UNDOS's seamless launch and the high level of activity in the WESTPAC region. To establish Decade Actions in the middle phase of UNDOS after 2024, a total of 11 Decade Action Incubators were developed. The parallel activities were not just scientists but for a variety of ocean stakeholders. Various outreach activities were carried out such as town hall meeting for general public and/or pupil.

A special award was given to the research presentation on the conservation of seagrass bed by elementary school students from Ishigaki Island, Japan, and a certificate was presented by Prof. Saito of the AORI, UTokyo. This is a one of symbolic events that UNDOS is the real global activities by all the ocean stakeholders for sustainability of the ocean and society. Finally, the Bangkok Declaration was adopted for advancing ocean science solutions for sustainable development.

Greetings from IOC Chairperson Prof. Michida



Bangkok Declaration with signature of the attendees

PICES2024 Annual Meeting at Honolulu

Mitsutaku MAKINO
Professor, Center for International Research Collaboration

Logo for the 2024 Congress, designed by Ms Saeseul Kim of the PICES Secretariat

The 2024 annual meeting of the North Pacific Marine Science Organization (PICES) was held from October 26 to November 1 at the Hawaii Convention Center in Honolulu, marking the first PICES meeting in Hawaii in 20 years. The theme of the annual meeting was "The FUTURE of PICES: Science for Sustainability in 2030." Notably, this was the first PICES annual meeting organized solely by the PICES Secretariat, without a host country. I would like to pay tribute to the Secretariat for their tremendous efforts in making this annual meeting possible.

The annual meeting was attended by 549 participants from 23 countries, including 214 on-site Early Career Ocean Professionals (ECOPS), representing 39% of the attendees. This strong representation of ECOPs signals a promising future for PICES. Observers from 16 international and regional organizations and programs also attended the conference. One symposium, 12 topical sessions, 9 workshops, and 5 poster sessions were organized, and a total of 340 research presentations were presented.

A highlight of the meeting was the presentation of the Wooster Award, which honors researchers who have made significant contributions to marine science in the North Pacific. This year, the award was presented to Professor Shinichi Ito of the Atmosphere and Ocean Research Institute, Japan, in recognition of his high level of expertise, broad contributions to marine science, and integrity and fairness. The meeting also included an election for the position of PICES Chair, and Dr. Tetsuo Fujii, Executive Director of Japan Fisheries Research and Education Agency (FRA), was elected as the new Chair.

The next annual meeting (PICES-2025) will be held in Yokohama, Japan, under the theme "Innovative Approaches and Applications to Foster Resilience in the North Pacific Ecosystem."

Dr. Shinichi Ito receiving Wooster Award
(Photo by PICES Secretariat)

UTokyo-ANU joint short courses report

Yusuke YOKOYAMA
Professor, Division of Ocean-Earth System Science

A photo taken at the top of Mt. Hoei, with various lava flows erupting from the peak visible in the background.

A two-week joint international short program, Earth and Planetary Environmental Excursion (EPEE) II, was held from 1 to 14 September 2024, marking its 8th anniversary. (Note: After last year's CIC report was issued, a coordinated program involving University of Tokyo (UTokyo) students travelling to Australia, called EPEE I, was held in March 2024). The program was a collaborative project between the Australian National University (ANU) and UTokyo. This and related programs have been running for over 10 years since the inception of such programs in 2006. Although government support from Japan was discontinued at the end of FY2024, the course continues to be supported by various organizations, including the Department of Foreign Affairs and Trade of Australia (under the New Colombo Plan) and the Atmosphere and Ocean Research Institute (AORI). More than 15 ANU students studied various aspects of geohazards, encompassing science, technology, and social sciences, alongside UTokyo students.

Participants included not only students from ANU and UTokyo but also an exchange student from the University of Bremen, which has an MOU with AORI for student and staff exchange. The participants were divided into five groups, mixing students from diverse backgrounds, and all activities were conducted within these groups. Some ANU participants were from the Research School of Earth Sciences, while others were from the Centre for Public Awareness of Science (CPAS). This diversity allowed participants to explore better community engagement methods through various media, fostering lively discussions during group work. The students actively participated in these discussions and submitted daily reports, which were shared on social networking sites to help them reflect on strategies for public engagement.

The program began with lectures at AORI during the first two days, following an opening ceremony on the building's second floor. The group then travelled to Ohtsuchi, Mt. Fuji, and other locations. All students successfully climbed to the top of Mt. Hoei for the first time by working together and supporting each other.

An exchange student from the University of Bremen shared her impressions of the program, and I quote a few lines from her report (the full version is available at: http://lams-yokoyama.blogspot.com/2024/09/24-international-short-course-ii-earth.html).

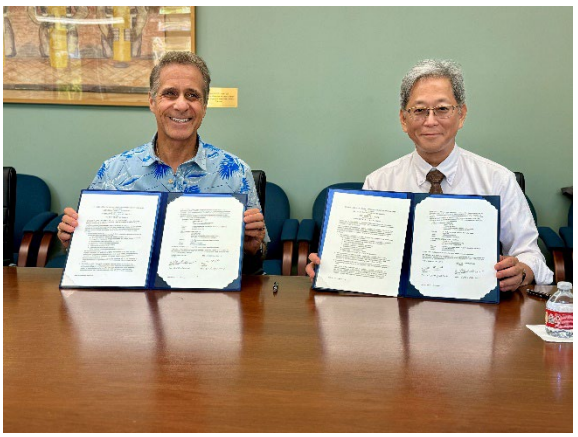
During my stay, thanks to Yusuke's invitation, I was very lucky to attend the International Short Course - here is an entry about my experience. I've always considered myself a "pure" scientist—focused solely on the scientific curiosity behind earth sciences, avoiding the societal implications. However, this course introduced me to the profound impact of natural hazards on humanity, which has subtly started to reshape my perspective. We visited museums and sites affected by natural disasters like earthquakes and tsunamis, and hearing firsthand stories from victims was eye-opening. It made me rethink my role as a geoscientist, shifting my view toward conducting research that could actively help people.

Face-to-face exchange programs like this require extensive preparation and effort, but the rewards are evident. Witnessing the fostering of student friendships across cultural and language barriers and realizing the importance of such activities for this young generation makes the effort worthwhile. We are deeply grateful for the support of various organizations and the AORI staff that have contributed to the success of this program.

A photo taken in front of a life-saving mound (命山) in Hamamatsu, which was constructed during the Edo period for evacuation purposes in the event of flooding and tsunamis

Exchange in MOU on scintific collaboratin with the University of Hawai‘i at Mānoa

Hiroaki SAITO
Professor and Director, Center for International Research Collaboration



Exchange the MOU. Director Susumu Hyodo (AORI, right) and UHM Provost Michael S. Bruno (left)

Scientific collaboration between UTokyo and the University of Hawai‘i at Mānoa (UHM) have a long history. AORI and School of Ocean and Earth Science and Technology (SOEST) of UHM exchanged MOU in 2004. Under the MOU, various cooperative scientific initiatives have been conducted including multiple joint symposia, collaborative projects, research cruises. The faculty members of the institutions visited each counterpart using the AORI's visiting professorship program and other funding. However, the COVID pandemic prevented in-person collaboration activities for years after 2020, and eventually expired the MOU even though continuing joint scientific activities.

After relaxing the COVID travel regulation, AORI and UH resumed discussion on the continuation of the collaboration, and decided to develop further the collaboration under the University-wide agreement.

On June 5, 2024, Director Susumu Hyodo of AORI, and Profs Hiroaki Saito and Eitaro Oka visited UHM and held a singing ceremony to exchange MOU for scientific collaboration between UTokyo and UHM with the attendance of UHM Provost Michael Bruno and Prof. Darren Lerner, Director of UH Sea Grant College Program. Following the ceremony, the UHM and UTokyo delegates talked about the institutions' strategic cooperation. It is planned to hold a joint symposium in the Kashiwa Campus of UTokyo in the near future.

Discussing future strategic collaboration in relax atmosphere in UHM. (Right) Prof Darren Lerner.

MoU with the Faculty of Mathematics and Natural Sciences, University of Bergen

Hiroyasu HASUMI
Professor, Division of Climate System Research

A new MoU was signed between the Faculty of Mathematics and Natural Sciences at the University of Bergen and the Atmosphere and Ocean Research Institute (AORI) of the University of Tokyo. The signing ceremony was held at AORI on March 7, 2024. Representing the Norwegian side were Dr. Marianne Støren Berg from the Norwegian Embassy in Japan, Professor Thomas Spengler (the corresponding person) from the University of Bergen, and five participants from a workshop held on the same day. Attendees from AORI were Director Susumu Hyodo, Professor Hiroaki Saito (the person in charge from CIC), Professor Hiroyasu Hasumi (the corresponding person), and Associate Professor Masakazu Yoshimori, who also attended the workshop. During the ceremony, Dr. Berg delivered a congratulatory message on behalf of the Norwegian Ambassador to Japan and followed it with her own congratulatory remarks. Dean Gunn Mangerud from the University of Bergen, the designated signer, could not attend the ceremony, and her video message was shown during the event.

This newly signed MoU is an updated version of the existing MoU with the Bjerknes Center for Climate Research (BCCR) signed in 2015. BCCR is the largest institute for climate research in the Nordic countries. Over the years, BCCR and AORI have maintained an active academic exchange in the field of climate science through initiatives such as annual joint workshops and the exchange of early career scientists for short- and long-term stays. The new MoU extends this partnership to a broader scope, accommodating a large number of scientists devoted to ocean observation and ocean biology. The new MoU is expected to enhance academic exchanges over broader research fields.

A scene from the signing ceremony

Renewal of the MoU on Academic Collaboration between AORI and Rajdhani College, University of Delhi

Ryoichi IMASU
Professor, Division of Climate System Research

The University of Delhi, India, is the largest university in the country, consisting of 16 faculties, 86 departments, 77 colleges (educational departments), and 5 research institutes, with a total number of students exceeding 133,000. One of the colleges, Rajdhani College, was established in 1964 and accommodates 3,500 students in 12 departments. Professor Surendra Kumar Dhaka, a faculty member at Rajdhani College, has an extensive research background in the field of atmospheric science, marked by many research accomplishments.

Prof. Dhaka has been collaborating with Prof. Masaaki Takahashi of the Center for Climate System Research (CCSR, formerly the Division of Climate System Research) since 2000, engaging in collaborative research on atmospheric dynamics. In parallel, Prof. Imasu initiated research on the atmospheric environment in India under the "GRENE-Environmental Information" project (2011–2015), a research program supported by the Ministry of Education, Culture, Sports, Science, and Technology, and sought a local counterpart for collaborative research. In response, Prof. Dhaka facilitated the establishment of a local observation site and observation personnel, paving the way for a collaborative research initiative between CCSR and the University of Delhi. To formalize this partnership, an MoU on academic collaboration was signed in 2014 between the Atmosphere and Ocean Research Institute (AORI) and Rajdhani College, University of Delhi. Although preparations were made to renew the agreement in 2019, the COVID-19 pandemic interrupted the process, and the renewal procedure was temporarily put on hold. With the resumption of normal activities, the renewed document was signed and exchanged by Prof. Susumu Hyodo, Director of AORI, Prof. Rajesh Giri, Principal of Rajdhani College, and Prof. Ashutosh Bhardwaj of Rajdhani College in 2024.

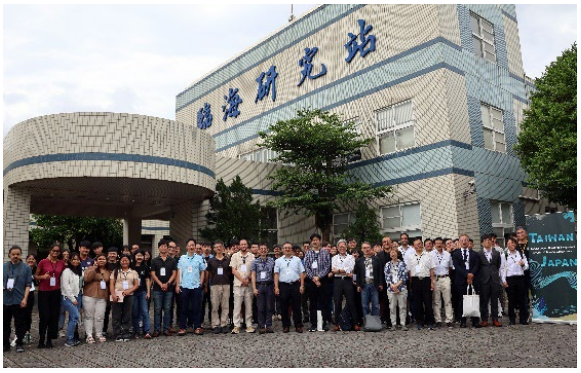
Between the initial signing of the agreement and the current renewal, significant collaborative activities were undertaken. These included a ceremonial launch of the research collaboration and a joint workshop on September 5, 2016, attended by the president of the University of Delhi. Annual joint workshops have since been conducted to present research results. In addition, the two universities jointly installed meteorological and greenhouse gas measuring instruments in the rice paddy areas of Haryana, northern India. These instruments were used to estimate the amount of methane emission in the rice paddy areas of northern India, as well as to study the climate of the region. The results of this research were published as a co-authored paper.

In 2024, Professor Dhaka spent approximately three months at AORI as a visiting foreign professor. During his tenure, he prepared a revised agreement document, finalized a co-authored research paper, and engaged in detailed discussions on future research collaborations.

The 2024 summer lab trip during the visit of Prof. Dhaka as an invited foreign professor at AORI. In the center of the back row stand Prof. Dhaka and Prof. Imasu.

Taiwan-Japan Bilateral Symposium of Critical Marine Ecosystems

Masahiko FUJII
Professor, Department of Local Research and Collaboration



Group photo at the symposium

Several shallow-water volcanic hydrothermal vents are located along the coasts of Japan and Taiwan where volcanic gases are emanating from the seafloor. The composition of these gases varies between vents. However, it is known that the vents emitting predominantly sulfides, which are harmful to many organisms, can dramatically change the biota in and around the vents. The shallow-water hydrothermal vent near the Kueishan Island (Turtle Island) in northeastern Taiwan is subject to massive sulfide-containing hydrothermal eruptions, which significantly alter the physicochemical properties of the surrounding seawater, making it inhospitable to marine organisms typically found along subtropical coastlines. Instead, unique organisms such as a shallow-water hydrothermal vent crab (*Xenograpsus testudinatus*), which can inhabit this extreme environment by housing symbiotic bacteria within the body that can detoxify harmful sulfides, dominate.

Studying the relationship between such extreme environments and biota in our familiar shallow-water areas provides valuable insights into how organisms may respond to future changes in the marine environment. For example, studying the biota in shallow-water hydrothermal vents where CO_2 is the main component of volcanic gases can provide insights into the future marine environment and its biological response to the ongoing anthropogenic CO_2 emissions, such as ocean acidification, thereby informing potential mitigation strategies.

The Taiwan-Japan Bilateral Symposium of Critical Marine Ecosystems was held on June 11–12, 2024, at the Marine Research Station (MRS) of the Institute of Cellular and Organismic Biology, Academia Sinica in Jiaoxi Township, Yilan County, Taiwan. Yilan was once governed by Kikujiro Saigo, son of Takamori Saigo, as mayor. Jiaoxi is a famous tourist destination with hot springs.

On the first day of the symposium, opening remarks and an introduction to MRS were delivered by Prof. Jr-Kai Yu. This was followed by introductory remarks from Prof. Susumu Hydo, Director of the Atmosphere and Ocean Research Institute (AORI). After three keynote speeches, including one by Prof. Masahiko Fujii, oral presentations were held for two days. From AORI, Profs. Hiroaki Saito, Mitsutaku Makino (Center for International Collaboration), Susumu Yoshizawa, and Takuya Yagagi delivered oral presentations.

A scene of keynote speech

A “pecha-kucha” session featuring flash talks of poster presentations was held before the poster session. Many young researchers and students from various universities and institutes participated. Notably, the symposium attracted researchers and students not only from Taiwan but also from Southeast Asia and other neighboring countries. This may be a benefit of the fact that much of the research and education is conducted in English.

MRS is located far from the city center of Jiaoxi and is difficult to reach by public transportation. Therefore, in most cases, attendees were often picked up and dropped off by local staff. As is the case every time I visit Taiwan, the logistics of the meeting were excellent, especially the staff and students were well prepared for the meeting. Overall, the symposium was highly beneficial, not only in terms of research and education but also in other activities.

Reference:
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AORI/UT - CEO/NTOU Joint Symposium on Marine Science

Masahiko FUJII
Professor, Department of Local Research and Collaboration

MoU signing ceremony between the Atmosphere and Ocean Research Institute and National Taiwan Ocean University

The Atmosphere and Ocean Research Institute (AORI) of the University of Tokyo (UT) and the Center of Excellence for the Oceans (CEO) of the National Taiwan Ocean University (NTOU) jointly conducted a symposium on marine science on December 11–12, 2023, at NTOU in Keelung, Taiwan. Profs. Susumu Hyodo, Director of AORI, and Hiroaki Saito and Mitsutaku Makino from the Center for International Collaboration, along with five other professors and one student from AORI, participated in the symposium as delegation members.

The first day began with welcome addresses by Profs. Ching-Fong Chang (CEO) and Susumu Hyodo, followed by an introduction of the CEO by Prof. Chang. Six professors and one student from AORI and four professors from CEO delivered presentations. A round-table discussion followed, covering topics such as a memorandum of agreement (MOA) between AORI and CEO, future collaborations on potential jointed projects, reciprocal research cruises, and mutual assistance for field trips and biological sampling, alternating annual joint symposium at NTOU and AORI, and other proposed collaborations.

The second day featured the MoU signing ceremony between AORI and NTOU. Following the ceremony, a guided tour, led by NTOU staff of the CEO campus and off-campus facilities was provided. The participants visited the CEO office, core facility laboratory, marine biological specimen exhibition, cultivation center for aquatic organisms on campus, and the aquatic organism research and conservation unit at Gongliao, New Taipei City. The biological rearing facilities were generally well equipped, and high-level research involving detailed rearing experiments was being conducted. Observing the cultivation of subtropical squid, groupers, tilapia, and other cultured species, as well as seaweed and corals in both indoor and outdoor settings was refreshing and interesting for participants from temperate zones.

Entrance of National Taiwan Ocean University with on-campus wind power generation equipment

The two-day symposium was so diverse and content-rich, with the time seemed to pass quickly. The presence of a large number of young students at NTOU was particularly noteworthy. The careful preparation, smooth logistics, and warm hospitality of the NTOU staff during the symposium, coupled with their high level of research, reiterate that the mutual exchange between the two institutions will become increasingly active. The symposium also sparked ideas for joint research projects, such as studying the impacts of shallow-water volcanic hydrothermal vents on biota. Moving forward, AORI and CEO aim to nurture and expand their partnership through research and educational activities.

Reference: NTOU office of International Affairs, "NTOU Renews MOU with the University of Tokyo, Japan, Continuing to Promote International Exchange and Cooperation with Full Efforts," https://oia.ntou.edu.tw/p/404-1022-94336.php?Lang=en

Exchange in MOU with ISMER, L'Université du Québec à Rimouski and AORI-ISMER joint symposium

Hiroaki SAITO
Professor and Director, Center for International Research Collaboration

Group photo at the signing ceremony

Institute de Science de la Mer (ISMER) of L'Université du Québec à Rimouski (UQAR) is the largest French-speaking institution in Canada dedicated to the advancement of multidisciplinary knowledge in ocean sciences. ISMER has been promoting various research on marine biology, ecosystems, fisheries science, the response of the ocean and marine ecosystems to anthropogenic environmental change, and the interrelationship between the ocean and human society. Many of the elements of these studies coincide with the six objectives of the Atmosphere and Ocean Research Institute (AORI).

In May 2023, Professor Guillaume St-Onge, the Director of ISMER, and Prof. Dominique Robert visited at AORI to discuss future cooperation between AORI and ISMER. Both institutions decided to exchange the MOU of scientific collaboration and hold a joint symposium at ISMER in October 2024 to introduce scientific activity each other and to discuss joint activities.

In October 2024, Director Susumu Hyodo and 5 faculties visited ISMER at Rimouski, Quebec, for the signing ceremony for the MOU and AORI-ISMER joint symposium. In the symposium, the delegates from AORI introduced on going activities on biogeography, microbiology, fish physiology, fish ecology, arctic physical oceanography, paleoclimatology and discussed with ISMER scientists on potential collaboration using the facilities of each institution. It was quite impressive that collaboration between ISMER faculties was quite active beyond disciplinary borders. It seems that the daily discussion between the scientists of ISMER and the leadership of the Director to be helping to shape research projects for emerging problems of anthropogenic environmental change and the accomplishment of acquiring research funds.

The delegates of AORI received the warmest welcome from ISMER. At the ice breaker in the evening of the symposium, craft beer including aroma of see weed was supplied which was technically supported by ISMER scientists. Also, Québec cuisine with local sea foods were served at the reception.

After the symposium, a tour to the ISMER's research vessel *Coriolis II* and the aquaculture station faced to the St. Lawrence Bay. The coastal station has various incubation and analytical equipment with quite high capacity of sea water supply. These are attractive facilities for visiting scientists and students from AORI.

AORI invited ISMER's Faculty to be a guest professor of AORI through the visiting scientist scheme. It is anticipated to carry out various joint activities using the facilities of both institutions under the MOU.

Ice breaker with craft beer

R/V *Coriolis II*

Research and Educational Cooperation between the Atmosphere and Ocean Research Institute of the University of Tokyo and the Basic Science Institute (G-LAMP) of Pusan National University

Jin-Oh Park
Associate Professor, Department of Ocean Floor Geoscience

Signing ceremony of the MoU on research and educational cooperation

The signing ceremony for an MoU on research and educational cooperation between the Atmosphere and Ocean Research Institute (AORI) of the University of Tokyo and the Basic Science Institute of Pusan National University (PNU) (G-LAMP: Global Learning & Academic Research institution for Master's, PhD students, and Postdocs), Republic of Korea, was held at AORI on November 11, 2024. The Korean government established the G-LAMP as a national science and educational program on October 1, 2023, with a vision of scientific intelligence to answer for the precious future of the Earth. G-LAMP aims to carry out the mission of expanding the boundaries of basic science to diagnose problems in the Earth's ecosystem that determine the future of humanity and to seek scientific solutions. The MoU was signed by Dr. Susumu Hyodo, Director of AORI, and Dr. JaeHun Cheong, Director of G-LAMP. It outlines the commitment of the two institutions to future cooperation and enhances mutual understanding through academic and educational exchanges. Specific areas of cooperation include:

1. Collaboration among faculty and staff in research, symposia, and other academic activities.
2. Student exchange programs.
3. Joint research initiatives.
4. Exchange of information materials on education, training, and research.

Group photo of the joint symposium attendees

Following the signing ceremony, a joint symposium was held to discuss future cooperation between the two institutions. Faculty members from both institutions presented their research and explored potential avenues for collaboration.

- Prof. Susumu Hyodo (AORI): Welcome and an introduction to AORI
- Prof. JaeHun Cheong (G-LAMP): Introduction of G-LAMP
- Prof. Shingo Kimura (AORI): Research and education systems of ocean alliance collaboration research organization in the University of Tokyo (UTokyo Ocean Alliance)
- Prof. Eui-Man Jung (G-LAMP): Effects of microplastic on the animal nervous system
- Prof. Jin-Oh Park (AORI): Underthrust sediments affecting shallow slow earthquakes along the Nankai subduction zone
- Prof. DongJoo Joung (G-LAMP): Methane and climate: Marine environmental changes and methane biogeochemistry
- Dr. Hilda Mardiana Pratiwi and Prof. Koji Inoue (AORI): Microplastic ingestion and retention by euryhaline Oryzias fishes
- Prof. Hiroyasu Hasumi (AORI): Coastal oceanography under the changing climate

Finally, the 2nd joint symposium is planned to be held at PNU in the coming year.

Workshop on Global Storm-Resolving Analysis Bridging Atmospheric and Cloud Dynamics

Masaki SATOH
Professor, Dynamic Marine Meteorology Group, Department of Physical Oceanography

A group photo was taken on June 9, 2024, at Ashinoko, Hakone.

The Workshop on Global Storm-Resolving Analysis Bridging Atmospheric and Cloud Dynamics was held from June 17 to 19, 2024, at the Prince Hakone Lake Ashinoko in Hakone, Kanagawa. This workshop aimed to advance discussions on the development of global storm-resolving model (GSRM) analyses, focusing on bridging advancements in atmospheric and cloud dynamics. Organized as part of the international core-to-core project on global storm-resolving analysis (ICCP-GSRA), the workshop was supported by the Japan Society for the Promotion of Science (JSPS) core-to-core program. The workshop was hosted by Prof. Masaki Satoh, leader of ICCP-GSRA. The even brought together distinguished experts, early-career researchers, and graduate students to promote interdisciplinary collaboration. A total of 33 participants attended. The agenda and summary of the workshop are archived at https://dpo.aori.u-tokyo.ac.jp/dmmg/ICCP-GSRA/ICCP-GSRA-WS2024.htm.

The workshop addressed the growing integration of high-resolution atmospheric models and advanced observational tools, such as satellite and ground-based radar systems, to enhance understanding of mesoscale disturbances, gravity waves, and turbulence that influence atmospheric circulation and cloud dynamics. Discussion covered topics such as the progress in global km-scale modeling, updates on the DYnamics of the Atmospheric general circulation Modeled On Non-hydrostatic Domains (DYAMOND) project, and the development of middle-atmosphere circulation models with enhanced gravity wave statistics. Participants explored how storm-resolving analyses could provide new insights into the dynamics of clouds, convection, and precipitation systems, with a focus on understanding meso-scale circulations and turbulence, including vertical velocity structures. These efforts are built on decades of contributions by The University of Tokyo in these fields while emphasizing the potential for future international collaborations.

The workshop emphasized the importance of advancing the understanding of vertical motions in the atmosphere, with a focus on key areas such as meso-scale circulation, turbulence, convective updrafts, mass flux, gravity waves, and boundary-layer exchanges with the free troposphere. These topics are vital research frontiers in atmospheric science, offering significant potential for enhancing knowledge of extreme precipitation, sedimentation processes, and atmospheric transport mechanisms. Participants agreed to strengthen GSRM activities through coordinated efforts such as intercomparison packages under GSRM Model Intercomparison Projects (GSRMIPs) and collaborative projects that integrate observations from advanced tools such as the EarthCARE satellite, the ORCESTRA (Organized Convection and EarthCARE Studies over the Tropical Atlantic) field campaign in the Atlantic (September–October 2024), and the PANSY radar (Program of the Antarctic Syowa Mesosphere-Stratosphere-Troposphere/Incoherent Scatter Radar). Both EarthCARE and PANSY are instrumental in enhancing the understanding of vertical atmospheric motions by delivering high-resolution observational data on cloud processes and atmospheric dynamics.

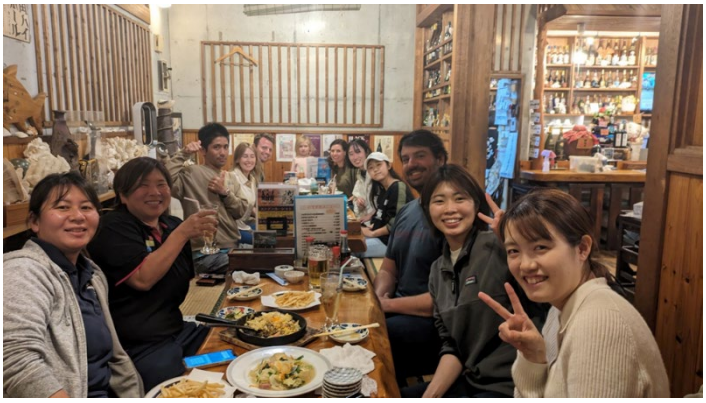
Additionally, preparations were made for upcoming initiatives, including the World Climate Research Programme global km-scale hackathon in May 2025 and the international nonhydrostatic model workshop scheduled for November 2025 in Morioka. The workshop also led to an agreement to draft a position paper on recent progress and future directions in GSRA bridging atmospheric and cloud dynamics with contributions from all attendees.

The event concluded with a shared commitment to continued collaboration through mutual visits, joint studies, and expanded international research activities. Participants left the workshop energized to pursue the ambitious goals outlined during the discussions and to make meaningful contributions to the advancement of global storm-resolving analysis.

The Poster Flash Talk Session of the workshop was held on June 17, 2024, with Prof. Masaki Satoh serving as the presenter and Mr. Koryu Yamamoto as the chair.

Visiting Professors' Report

Prof. Andreas Fahlman
Fundacion Oceanografic de la Comunitat Valenciana



The team from AORI, Okinawa Churaumi Aquarium, Okinawa Churashima Foundation, Pacific Whale Foundation and University of Hawaii having dinner after a week of data collection.

I would like to express my gratitude for being able to obtain the AORI as a visiting professor fellowship from February until the end of March 2024. During this period I was hosted by Professor Katsufumi Sato and Associate Professor Kentaro Sakamoto, at the Department of Marine Bioscience. This is my second visit to Japan, the first was in 2022, and has helped strengthen our past collaborations and also resulted in new projects. These collaborations are an amazing opportunity to participate in the cutting-edge research done on diving physiology in sea turtles done by Professor Sakamoto, and learn from him and his students. My visit to Japan also coincided with the Biologging conference that was held in Tokyo, giving me an opportunity to host a workshop on the emerging field of Physio-logging.

The research groups lead by Professors Sato and Sakamoto are at the forefront in the field of biologging, and it is a great honor to participate and learn from them. During the month of February, I had an opportunity to interact with their students and learn about their research projects that were subsequently presented at the Biologging meeting. I had several meetings with PhD students that work with Professor Sakamoto and they discussed their data on heart rate in turtles. During these discussions, Professor Sakamoto and I have initiated a new research collaboration where we aim to study the ability for turtles to sense magnetism. One student from my research group will visit Japan in July and August 2024 to learn how to measure heart rate and movement in turtles. The student will then measure if changes in the magnetic field alters heart rate variability or movement behavior.

In early March, two PhD students from Professor Sakamoto's laboratory went to Okinawa to work with international research groups from the US and the Okinawa Churaumi Aquarium and Okinawa Churashima Foundation. In this study, our aim is to determine the relationship between activity and energy use. This project will continue for a few years with collaboration with Professor Sakamoto.

The collaborations that have begun during this period have been made possible through this fellowship provided by AORI

Dr. Kentaro Sakamoto of AORI giving a lecture on heart rate function in turtles during the Physio-logging workshop.

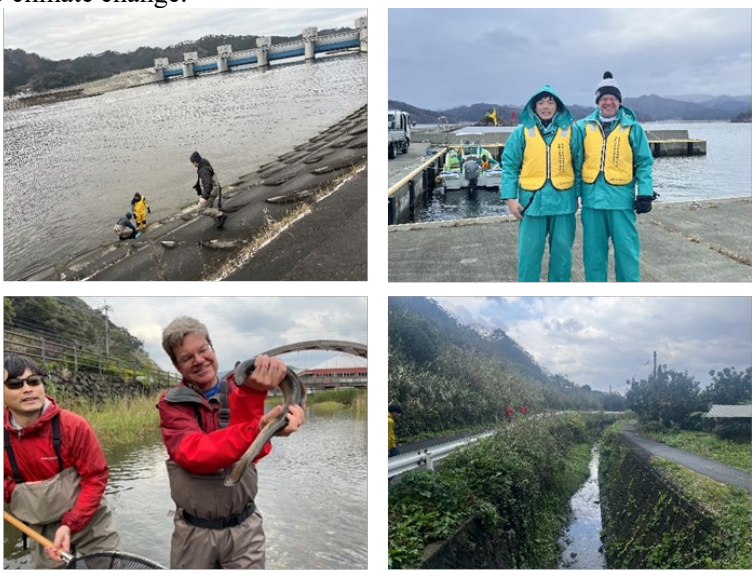
The Physio-logging workshop held before the Biologging 8 conference..

Prof. David H. Secor
University of Maryland Center for Environmental Science

It was an honor and privilege to receive a visiting Professor appointment at AORI (Nov 2023-Feb 2024) within

the Department of Living Marine Resources hosted by Professor Shingo Kimura and Assistant Professor Hikaru Itakura. AORI has a remarkable legacy in fisheries oceanography. No wonder that the research of AORI scientists K. Tsukamoto, T. Otake, S. Kimura, J. Aoyma, and K. Sato figured prominently in my book, *Migration Ecology of Marine Fishes*. So, it was a career highlight for me to participate in the fisheries oceanography program. Working on a near daily basis with H. Itakura and R. Wakiya, research addressed (1) how climate is influencing Japanese eel river and coastal ecology in transitional ecosystems at the trailing (Amami Island) and leading (Otsuchi) edges of the species range; and (2) a novel retrospective analysis to assess how marine heatwaves influence estuarine fish production.

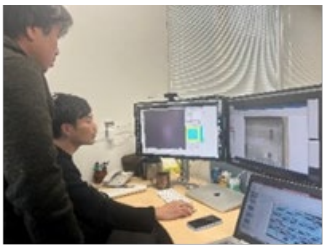
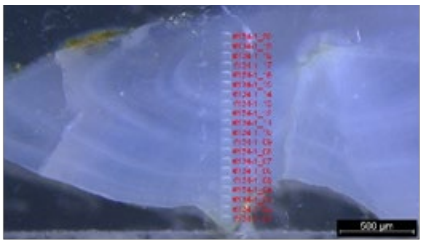
Eels in transitional ecosystems: During week-long visits, we undertook telemetry monitoring of Japanese eels and other top predators. At Otsuchi, eels overlap with chum salmon, the latter species at its southern limit; and at Amami, Japanese eels overlap with the giant mottled eel, that species at the leading edge of its range. Thus, these study sites represent great opportunities to study the response of fish communities to "tropicalization." At both locations, particularly impressive was the degree with which eels adapt to human-engineered river and coastal habitats. Mountains crowd narrow coastal regions at both Otsuchi and Amami causing a high degree of potential coastal hazards. At Otsuchi this means extreme protections following the 2011 tsunami — 15 m seawalls, tidal storm surge protection at each river mouth, and hardened and channelized rivers. At Amami, I enjoyed pristine and protected rainforests, mangroves, and riverscapes, but also observed hardened mountainsides to protect against mudslides and conversion of receiving rivers into culverts and canals. Yet eels persist and even thrive as top predators in these altered environments. Japan's engineered rivers had been ignored by generations of eel scientists, in part because >95% of eels marketed come from aquaculture. Dr.s Itakura and Wakiya are finding that these altered habitats are far from dead, show important connections to coastal ecosystems, and are sensitive to climate change.



Transitional ecosystems for Japanese eels. Top panels: retrieving telemetry receivers at Otsuchi. Bottom panels: Collection of giant mottled eels from channelized rivers in Amami. Shown are H. Itakura and D. Secor.

Biochronology and marine heatwaves. The theme of climate change was the focus of otolith research conducted with partners at AORI (H. Itakura, K. Shirai) and Kyoto University (H. Asanuma and A. Suzumura). For Hudson River (New York, US) striped bass and American eels, hundreds of otoliths were selected from a large archive of samples collected over my career. Otolith sections were digitized and annuli measured resulting in biochronology records for the last 4-5 decades. For American eel, we completed analysis showing a pervasive negative influence of marine heatwaves on growth. For striped bass, data was collected for 264 otoliths supporting ~1400 measures of yearly growth rates. Ongoing analysis is addressing the hypothesis that the Hudson River no long supports summertime growth by striped bass, owing to pervasive marine heatwaves.

Eels and striped bass have tails, so complementary microchemistry analysis was conducted to evaluate how migration patterns might influence the relationship between growth and marine heatwaves. Eels residing in freshwater or brackish water were similarly sensitive to marine heatwaves. Using a state-of-the-art LA-ICPMS at Kyoto University, we tested whether striped bass juvenile migration behaviors carryover to adult migration behaviors. Initial findings strongly support the affirmative.

Laser ablation ICPMS analysis of striped bass otolith. Shown are K. Shirai and H. Itakura.

Department engagement. Dr.s Kimura and Itakura provided ample opportunities to interact with AORI students through attendance at Division and Laboratory seminars, one-on-one student meetings, and interaction with their students in the lab and in the field. I gave seminars at the Japanese Society of Fisheries Oceanography in Sapporo, Hokkaido, where I met several colleagues from my work in Japan over the past 30 years. I presented an AORI departmental seminar and provided feedback on student manuscripts. I'm a big fan of sumo and a highlight was a trip organized by Professor Kimura to attend the January tournament. I also enjoyed Shinnenkai, which attracted over 20 Kimura-lab alumni and a retirement party for my short-lived but eventful AORI career.


Sumo outing and AORI retirement party with Professor Kimura's laboratory group.

Prof. Fei-Fei Jin
University of Hawaii

Photo at BBQ party

A Visit to AORI Recalls and Adds Wonderful Memories and More

My wife and I just enjoyed a wonderful and memorable one-month visit to AORI from May 20 to June 20, 2023, kindly hosted by Prof. Masahiro Watanabe. Our thanks for his well-organized arrangements and Ms. Kyoko Arakawa's help in every way. Our visit this year brought back many vivid memories from our first sabbatical visit at CCSR (together with our three young sons, then 13, 3, 1) in the Spring and Summer of 2000, which was also hosted by our dear friend Prof. Masahide Kimoto who had sponsored my JSPS fellow application. One of the great outcomes of that visit was to successfully persuade Prof. Watanabe, then a enthusiastic and energetic new postdoc, to visit the University of Hawaii in 2001. His visit that year began a lasting line of collaborative research that continues on to this day. Our collaboration first focused on the dynamics of so-called synoptic eddy-low frequency (SELF) feedback in the pattern formation of modes of climate variability in the middle latitude. (cf. Watanabe and Kimoto, 2000, Watanabe and Jin 2003, Jin, Pan and Watanabe 2006, Watanabe, Jin and Pan 2007).

This rejuvenating second sabbaticals visit, albeit shorter, has continued and expanded our collaborative research, which has been now further extended to understanding the dynamics of tropical climate variability including dynamics of MJO (Hayashi and Jin 2023, to be submitted), ENSO (El Nino and Southern Oscillation) and its interaction with modes in other tropical basins as well as the dynamics of global warming (Chen et al. 2023 in preparation). Thanks to Prof. Watanabe's effort in arranging the schedules, I had the opportunity to have multiple meetings with research groups of Profs

Masahiro Watanabe, Ayoko Abe-Ouchi, Kei Yoshimura, and Tomoki Miyakawa. These allow me to learn about their exceptional work on many fronts. The discussions involved certainly awakened and excited my interests in the dynamics of global warming, AMOC, tropical cyclones, and even the isotope patterns associated with climate modes and beyond. Moreover, the seminars on June 6 and 12 at AORI and NIES, respectively, gave me great opportunities to interact with wide audiences in two excellent institutions. The wonderful and fruitful Hakone workshop (June 13-15) was also very memorable, not only because of truly exciting mountain train rides, hot springs, and beautiful surrounding sceneries but more so because of the interactions with many talents from a newer generation, including Profs. Yukiko Imada, Yu Kosaka, and Tomoki Tozuka, and Drs. Michiya Hayashi, Takahito Kataoka, Takeshi Doi, Tomoki Iwakiri, Masaki Toda, Xi Cao, Suqiong Hu, among many others. The relaxing environment for scientific brainstorming, especially about the last point of the final discussions at the end of the workshop, was surely hard to forget and offered much insight into the coordination of bright minds to address the interplay of physical and social aspects of climate change scenario solutions.

We certainly echo Prof. Watanabe's remark that "this visit feels so too short" when he was very kind to give us a ride to the airport on our returning way back to Honolulu, Hawaii. Indeed, we are already looking forward to the next visit to the University of Tokyo, which will surely take place before too long. In the meantime, the wonderful collaborations begun and friendships renewed will continue and expand to the betterment of our field and of humanity.

Prof. Gregory F. Moore
University of Hawaii

Greg wit Ako Taira

I am very happy to report on a very busy two-month stay at AORI during September-October, 2023. My visit, originally scheduled for 2020 (postponed due to COVID) allowed me to catch up with many colleagues at AORI and across Japan.

The research aspects of my visit focused on similarities and differences between the Nankai Trough and Hikurangi subduction zones. I had the opportunity to make a presentation highlighting my research to faculty, staff and students at AORI (including a simultaneous Zoom broadcast to many other Japanese Universities and agencies). This presentation laid the groundwork for several fruitful discussions with Assoc. Profs Asuka Yamaguchi and Jin-Oh Park and their students about potential future joint research projects. I also visited Tsukuba University to present a more focused summary of deformational processes at the toe of the Hikurangi accretionary prism.

It was fortunate that an international meeting (Slow to Fast Earthquake Science) was convened on the Tokyo University campus during the second week of my visit. Two weeks later, I attended another international conference on IODP drilling in the Nankai subduction zone. Both meetings included spectacular field trips and allowed me to gain insights from many Japanese and foreign colleagues.

I also joined Prof. Yamaguchi on an amazing field trip to the Mino Belt near Nagoya, where he showed me classic exposures of deformed cherts and associated sedimentary rocks – ancient analogs of contemporary deformation at Nankai and Hikurangi. Such field experiences in Japan are so valuable for understanding processes in currently active subduction environments.

I also visited colleagues at JAMSTEC and ERI to discuss on-going research on seismic reflection data at the toe of the Nankai prism. They are making nice progress on understanding the relationship between slow-slip events and accretionary deformation. My
long-term colleague, Gaku Kimura (Tokyo University Emeritus Professor), asked me to join his publication on SSEs in eastern Nankai, which has been accepted by G-cubed.

I met Dr. Miho Asada, former AORI graduate student, now a staff member at GSJ to discuss past and future research cruises focused on mid volcanoes in the Nankai Trough. I first met Dr. Asada during my 2000 visit to ORI and joined her for a Nankai mud volcano cruise in 2016.

It was also nice to meet former ORI students, Dr. Shini`ichi Kuramoto, now JAMSTEC Executive Director and Dr. Toshihiro Ike (ORI MS, UH Ph.D.), now a manager at JOGMEC.

In addition, I was asked to give a short speech at the award ceremony for Emeritus Professor Asahiko Taira. I first worked with Prof. Taira in 1987 when I joined a cruise of ORI's R/V Tansei Maru to the Nankai Trough. I later joined Prof. Taira as co-chief Scientist on IODP Exp 190 and first came to ORI as a Visiting Professor in 2000, so my ties to AORI go back more than 35 years.

The AORI Visiting Professor program is among the best in the world and I am honored to have been a part of such a great program.

In addition to Greg and Prof. Taira, we can see ORI graduates Dr. Nobu Eguchi (left) and Dr. Shi`ichi Kuramoto (right) both now JAMSTEC members.

Prof. Jody Michael Webster
The University of Sydney

It has been a great pleasure and honor to be a Visiting Professor at AORI for 8 weeks (Nov-Jan) in 2023-24. This fellowship has allowed me to work closely with my colleague Professor Yusuke Yokoyama and his very active research group. I am deeply appreciative of all the kind support and opportunities I received while at the AORI.

My scientific objectives while in Japan were focused on a range new and existing collaborative projects. First, we were focused on advancing the new International Ocean Discovery Program (IODP) Expedition 389 (Hawaiian Drowned Reefs) project. This involved organising numerous information sessions via Zoom with the entire 30 member Exp. 389 Science Party, including Japanese Scientists (Yusuke Yokoyama (AORI), Naoto Fukuyo (Geological Survey of Japan), (Ryuji Asami (Tohoku University) and Marc Humblet (Nagoya University). These sessions, plus other disciplines-specific workshops centred around the main Exp. 389 scientific objectives (dating/sea level, paleoclimate and reef response), were highly effective in focusing the sample requests and establishing collaborations ahead of the Onshore Science Party (OSP) that was held successfully in February in Bremen at the MARUM core repository.

Another highlight was the opportunity to visit a fascinating archaeological site in the Kanoya region of Kagoshima where Yusuke's team is involved in a project to provide new age constraints on an excavation site. Yusuke and I then travelled to Nagano to visit Yashiro High School where I had the opportunity to talk to some very curious and engaged high school students about coral reef systems in the Great Barrier Reef and elsewhere my research group is working on. Yashiro High School is involved in an ongoing science/teaching collaboration with AORI that is now extended to the University of Sydney. In Dec 2023, about 20 high Yashiro High School students visited my research group in Sydney with another trip planned in Dec 2024.

Lecture at Yashiro High School

During the period before Christmas, we were also able to finalize and submit another key collaborative paper to the journal *Quaternary Science Reviews* focused on the use of fossil reef cores to reconstruct paleowater quality, including the influx of nutrients and land-derived sediments and their impact on the Great Barrier Reef (ie.

ecology, growth, bioerosion).

Sanborn, K.L., Webster, J.M., Erler, D., Webb, G.E., Salas-Saavedra, M., Yokoyama, Y., The impact of elevated nutrients on the Holocene evolution of the Great Barrier Reef. Quaternary Science Reviews 332. https://doi.org/10.1016/j.quascirev.2024.108636

This paper is part of an ongoing collaborative program of research involving USYD and University of Tokyo and several national partners focused on comparing changes in Holocene water quality, and other environmental parameters like sea surface temperature, with corresponding changes in reef responses in the Great Barrier Reef.
Over the Christmas and New Year period my family and I were also fortunate enough to visit Yakushima Island, including the spectacular World Heritage listed forests that were the inspiration for Hayao Miyazaki's film Princess Mononoke. This was a real highlight for my two daughters who are huge fans of the Ghibli studio films.

After returning to Tokyo, I then joined Yusuke and some of his team just after new year and headed south to Kikai-jima in the Ryukyu Islands to undertake field work to sample submarine groundwater. This is part of large ongoing project to study environmental change in the subtropical regions of Japan. For me personally, this was an incredible opportunity to return to Kikai-jima after almost 30 years! I spent over six months on the island in the mid 90s when I was a Monbusho supported student undertaking research for my PhD. It was a wonderful experience to be able to revisit some of the spectacular Holocene fossil reef outcrops that I worked on so many years ago. Overall, it was a special trip and I look forward to working with Yusuke and his team as they continue to investigate these unique fossil reef outcrops.

Returning to Tokyo, I was able to work closely again with Yusuke to advance another major project related to our collaboration on IODP Exp. 325 (Great Barrier Reef Environmental Changes). We integrated new C14-AMS ages from fossil reef cores with lithologic and coralgal information to better understand coral reef development and sea level rise during an important but poorly constrained deglacial interval called meltwater pulse 1B (~11.5 ka) and will soon submit this manuscript for publication.

In summary, AORI continues to be an amazing place, with world class scientists and facilities, combined with a warm and collegial atmosphere. My trip was both highly productive and enjoyable and one that my family and I will always cherish. I look forward to continuing to work with Yusuke and his team as we continue to strengthen the wonderful relationship between our two institutions.

Associate Prof. John Morrongiello
The University of Melbourne

In June 2023, I had the honour of visiting Professor Ito's lab at the Atmosphere and Ocean Research Institute (AORI), The University of Tokyo, supported by the Institute's generous Overseas Researcher Fellowship.
Professor Ito and I first met as co-chairs of an ICES/PICES joint working group, where we discovered our shared interest in understanding how rapid ocean warming affects fish growth, body size, and fishery productivity. I was humbled when Ito-sensei nominated me for the fellowship and excited by the opportunity to work with him and his students.

The fellowship enabled me to spend six weeks at AORI, where I was truly impressed by the quality and diversity of marine and atmospheric research. It was incredible to experience an institute dedicated to all aspects of ocean-based research. I received a warm welcome from Ito-sensei and other academics, including a memorable table tennis tournament organised by his students.

During my stay, Ito-sensei and I began work investigating the drivers of body size change in marine fish and latitudinal shifts fish distributions, making preliminary progress and exploring opportunities for additional funding. I was privileged to learn from him about running a successful lab group and enjoyed our enlightening conversations on academia in Japan and Australia.

I had the fantastic opportunity to meet with masters, PhD students, and postdoctoral fellows working in fields such as biological oceanography, marine microplastics, fisheries science, and eco-evolutionary biology. I was impressed by their depth of understanding and our engaging scientific discussions. As part of my visit, I gave a seminar on my lab group's work exploring the impacts of fishing and warming in our oceans, appreciating the opportunity to share our research and receive excellent feedback.

I was humbled by the opportunity to contribute to two PhD student projects, co-authoring manuscripts with Sk Istiaque Ahmed on novel methods to quantify eDNA in the ocean and using this technology to explore patterns of biodiversity. I have never worked on eDNA before but found I could contribute by providing advice on statistical analyses and writing of the manuscript. Zhen Lin's PhD on the impacts of warming on fish growth is highly complementary to my own research interests. We shared a series of engaging conversations about her work and explored new ways to analyse the data and interpret results. I am excited about our upcoming manuscript.

My trip was not solely academic. This was my first visit to Japan, and I was amazed by the rich culture, vibrant cities, and beautiful landscape. My family joined me for the last three weeks of my visit, and we enjoyed exploring the Kashiwa and Tokyo region, Kyoto, and Nikko, savouring the food (including my son Xavier's sushi-making experience with master itamae), visiting amazing gardens, and enjoying the peacefulness of many temples.

I enjoyed my incredible time in Japan and working with staff and students at AORI. Thank you to all who made my family and me feel so welcome. I am excited by our continuing collaborations and the excellent science AORI's students are producing. We all agree that we will be back to visit Japan very soon!

Dr. Meghan F. Cronin
National Oceanic and Atmospheric Administration/University of Washington

Thank you Eitarou Oka-san and Thank you AORI for a fabulous visit Oct 1 – Dec 10, 2023!

My visit began with a Grand Tour of Japan, which gave me an opportunity to talk about my work "Observing Air-Sea Interactions in Frontal Regions from the Tropics to Western Boundary Current Extensions" and to meet with colleagues. Using a 2-week JR shinkansen pass, the trip included visits to JAMSTEC in Yokosuka (Thank you Honda-san!), RIKEN in Kobe (Thank you Oishi-san!), and the University of Hokkaido in Sapporo (Thank you Tomita-san)! Once settled into Tokyo, I was able to also give seminars and meet up with colleagues, students and early career scientists at the University of the Tokyo Campuses of AORI (Thank you Oka-Sensei!), Hongo (Thank you Tozuka-san!), and RCAST (Thank you Nakamura-san!).

A highlight of the 2-month visit was an "Air-Sea Interaction Workshop" in Kyoto with ~ 20 of my collaborators & coauthors from the past two decades organized by Oka-san and Konda-san from University of Kyoto. I was able to hear what my friends are currently working on, discuss new climate experiments in the Tropical Pacific and the Kuroshio, and

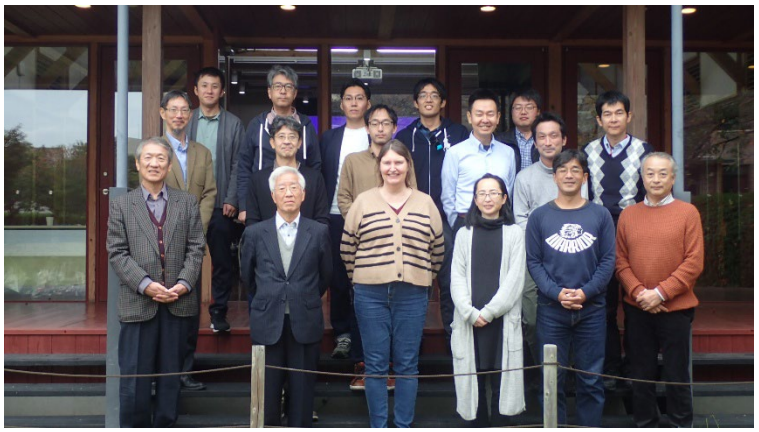
the UN Decade of Ocean Sciences for Sustainable Development programme that I co-lead (Observing Air-Sea Interactions Strategy – OASIS). I was also able to ask the group a question that I have long had -- "Where are the women in physical oceanography?". No satisfactory answer was found, although a number of hypotheses were shared. Wide ranging conversations continued over the dinners and sake each evening. Kyoto was beautiful in the rain.

Oka-san also invited me to Otsuchi to meet with Tanaka-san at the AORI Coastal Research Center following a meeting he had there. My husband and I stayed with Oka-san at an inn that was rebuilt on the hillside after the tsunami of 2011 placed a boat on its roof. Like many in this community, the inn keepers were connected to the sea: the inn keeper had a fishing boat and our breakfast and dinner were from the morning's catch. At lunch we went to a restaurant where we ate a table full of oysters! It was thus very moving to hear about and see the devastation from the tsunami in 2011. Oka-san also talked with us about the extreme summer heat and the warming waters that are shifting the fisheries, and his proposal, which has now just begun: "A habitable Japan: Sustainability of atmospheric and oceanic environment as a survival basis of island country Japan".

Following the Otsuchi visit, Oka-san invited me to meet with his Hot-Spot-2 working group that was meeting in Sendai. This then provided me and my husband an opportunity to hike up the mountain to the beautiful Yamadera temple. The fall colors were spectacular! In Sendai, I was also able to give a seminar, meet with students and colleagues, and hear about the new World Premier Institute (Thank you and Congratulations Suga-san!).

During my final week in Japan, I participated remotely in the Second Cooperative Study of the Kuroshio and its Adjacent Regions (CSK)-II symposium taking place in Qingdao, China, and in the JAMSTEC-NOAA bilateral meeting that took place at my home laboratory in Seattle, WA USA (NOAA Pacific Marine Environmental Laboratory). It was gratifying and felt very fitting to be able to personally thank both the Executive Director of JAMSTEC (Dr. Takeshi Kawano) and the Assistant Administrator of NOAA's Office of Oceanic and Atmospheric Research (Dr. Steven Thur) for being able to maintain the Kuroshio Extension Observatory for two decades now. These long time series marking the changes in the ocean and climate are vitally important. I am humbled and grateful for the many friends and collaborators I have made in Japan over these past two decades.

Thank you Oka-san for making this visit possible, and for directing me towards people and places that have opened my mind and world. I would particularly like to thank Kawamoto-san and the AORI administrative staff for handling the extensive paperwork involved in the trip, and to Kobayashi-san for finding my husband and me a wonderful apartment in Asakusa and for making me feel so welcomed in AORI.



Dr. Paul Griffiths
University of Cambridge

It has been a pleasure to be a guest professor at AORI from late September through to December. My grateful thanks to AORI for hosting me, and to Professor Ryoichi Imasu for this chance to work him and his group at Tokyo University.

I have been visiting from Cambridge where I work as a research scientist in the Yusuf Hamied Department of Chemistry of Cambridge University. I also work for the UK's National Centre for Atmospheric Science (NCAS). My interests are in atmospheric chemistry modelling, with a current focus on ozone, methane and tropospheric oxidising capacity. I also work on various international projects, having been a contributing author to WG1 of the IPCC 6th Assessment Report, and am leading contributions to the IGAC Tropospheric Ozone Assessment Report due to be published next year.

While here, I have been working on two main projects. Firstly, writing a review article about the AerChemMIP project, which was the CMIP sub-MIP addressing atmospheric chemistry and aerosol. I hope this paper will contribute to the development of the next phase of the CMIP project. Being a community-driven paper, it has involved some late nights on conference calls with colleagues in the US, but it has progressed well and we expect to submit our manuscript in the next few weeks.

During my visit, Professor Ryoichi and I have been working to use model data as priors to use in GOSAT retrievals. To this end, I spent most of November working on a second project, also involving NCAS colleagues, on setting up a high-resolution version of the UK's UKESM-1 Earth system model. Of course, 'high resolution' means different things to different people, and global atmospheric chemistry modelling is a long way from state-of-the-art storm-resolving simulations - the computational cost of chemistry calculations and tracer transport currently presents a very high barrier to working at the km-scale.

After a lot of debugging, we now achieved a chemistry configuration at an unprecedented resolution (and which would actually qualify for HighResMIP!) of 50km in the mid latitudes, and we are now producing some benchmark data for use by colleagues. This is a big step forward for us - truly a high-resolution chemistry-climate model operating with global coverage. This will be a valuable resource for model evaluation, and it will be exciting to see how chemistry models perform against the increasing coverage of high spatial resolution EO data. It will also be fascinating to investigate the chemistry-climate interactions in this model, something not possible with CTMs, and a particular focus in the future will be on the upper troposphere/lower stratosphere region where the radiative forcing of ozone is critical. I'm very glad to have worked on this new capability and it serves as a reminder of the productive research environment that AORI has provided, and of the excellence of my NCAS colleagues!

My time at Kashiwa campus has been memorable for the interesting discussions with Prof Ryoichi's group. It's been great to be able to attend group discussions, and I am very grateful to Mr Arthur Li and other group members for continuing these interesting discussions over trips for lunch and coffee.

A very stimulating aspect of my visit has been visiting colleagues in Tsukuba. In December I gave a seminar at the Japan Meteorological Research Institute, with CMIP6 colleagues in the audience, and was also able to spend a very pleasant and stimulating day at the National Institute for Environmental Studies. I visited Prof Tonokura's lab where many surprising overlaps between our research emerged, and I enjoyed the opportunity to present my recent work to his research group. At the end of my time at ToDai, I was honoured to present a short seminar in CCSR.

Working in Professor Imasu's group has provided me with many interesting insights into the use of Earth observation products, and I will be taking many new ideas for model evaluation using GOSAT products back to Cambridge with me. I will also be returning with very fond memories of my stay: Ms Ando's unstinting help both prior to and during my stay, Professor Ryoichi's unfailing kindness as a host, a memorable trip with him and group members to the Tsuchiura fireworks, the many pleasant meals with the group and, of course, the warm welcome from AORI.

Prof. Stevens Bjorn
University of Hamburg/ Max Planck Institute for Meteorology

Thinking about adaptation

I once again had the great pleasure and privilege to visit AORI for six weeks. I arrived just in time to see the cherry blossoms in Schuzenji in late march of 2023, and the brilliant blooming of the Azaleas at Nezu Shrine in April, before returning to Hamburg, via a taste of craft beer seasoned by the hops and legends of Tono, in mid May.

At AORI I shared an office with Mamiko Shimada with the pleasure of a window toward Mt Fuji. Fuji would reveal itself many times to me in passing, but not once from the window, and not when I approached it too closely. On the Kashiwanoha campus I enjoyed meetings with Abe-Ouchi-Sensei, Miyakawa-Sensei, Takayabu-Sensei and Watanabe-Sensei and their groups. I also met many colleagues more informally by joining the football game after lunch. There I had the good fortune tobe on the team that benefited from Niino-san′s quickness and ball skills that seemed to have eluded any hint of aging. With Roh-san I visited Kosetsu wholesale market to talk about EarthCARE, andthe possibilities to link it to a measurement site my team maintains on Barbados. EarthCARE, a new satellite which will finally be launched in May of this year (2024), and for which JAXA built a state of the art cloud radar, was a recurrent theme of my visit. It was the topic of the workshop with the cherry, then plum, blossoms in Schuzenji, which inaugurated my arrival, and of a mission advisory group meeting with gathered first at NICT, and later, on my birthday, in Shinjuku. EarthCARE brought me to JAXA in Tsukuba where I had the pleasure to meet Riko Oki, to whom I introduced EVE, and Takuji Kubota who told me more about GPM. I enjoyed a tour of the marvelous visitor center thanks to Toshi Tanaka who coordinated my visit. There I got my JAXA shirt, and one for my daughter. It is one of my favorites*, and over the past 1 year I have worn it for major presentations I held in Kigali, Berlin and San Francisco. For me it became a symbol of how we build great institutions to sample space, but none to sample our future, i.e., to explore climate and climate change.

I had noodles with Woosub Roh — does it seem that we were only eating lunch? — and Shuhei Matsugishi in Chohachi in Nagareyama, where I learned more about the unprecedented simulations of Earth′s atmosphere, using NICAM with a 200 m grid. NICAM, the progenitor of new generation of climate models, that came to life twenty years ago, thanks to the skill and creativity of Profs. Satoh and Tomita (and later Miura and others) was the topic of a workshop in Yamanaka, where Fuji-san remained modestly behind the clouds. Unfortunately not the clouds that Masanao Abe taught us to see. NICAM brought me to NIES where I met one of its modern developers, Hisashi Yashiro, and later to Kawasaki, where I discussed collaborations with Chihiro Kodama during a walk through Kawasaki Daishi, followed later by the chance to meet his son. NICAM took me to Riken, where I visited Prof Tomita and his group. While in Kobe I also met with Prof Shin-Ichiro Shima who had been hosting a student of mine, Clara Bayley, who had come to learn from him about super particles − as of us are wondering how to incorporate them into our new global models. My wife and I also made a small excursion to Osaka, where I visited Shitennoji temple, relived the battle of Osaka from its famous castle, and had perhaps the most magical cup of coffee in the most inconspicuous of places. Some how it summed up for me the modesty of Japan.

By now you might be wondering where Japan fits in; well that is what I learned about during my visit to the AORI Otsuchi Coastal Research Center, in the most unlikely of ways. There we had a small workshop to discuss the complex dynamics of coastal eco-systems. These ecosystems, as we learned by our walk back to the Ryokan being interrupted by a bear and its cub, are indeed complex, and sometimes dangerous. Up and down the Iwate coast we witnessed the most wonderful seascapes, haunted by sparse urban areas, rebuilding under the shadows of great walls enlarged in response to the great Tsunami of 2011. Thinking of living on the edge of, but hidden from, a sea that would periodically shed its tranquility to rise up and devour you and all that you cherish left me with enduring thoughts of what it means to adapt to natural hazards, and what it will mean to adapt to climate change. How can our science give people a more tangible sense of the threats they face, or will they be forced to metaphorically build ever larger sea-walls as they stagger from one calamity to the next. These are thoughts we developed later in the initiative of EVE, which leave me convinced that the way to do so will require technologies like NICAM, embolden by insights from satellites like. EarthCARE, and powered by computers like Fugaku. It made me rethink our approach to science, which led me to write a critical essay on CMIP, one whose first drafts I wrote in my apartment at the International Lodge in Kashiwanoha. My visit and experiences encouraged me in my thoughts that real progress might be borne of modesty, but not of complacency.

This evening, before writing this report, I watched "Perfect Days", which is graced by the brilliant performance of Kōji Yakusho. It was another reminder of what I like about Japan, and its ability to maintain a passion for perfection with an appreciation of Komorebi. It is another reason to thank Professor Masaki Satoh, AORI, and my many colleagues for so generously sharing their ideas, and time, and thoughts about the challenges for our science at a time when the seas are on the march all around us.

*: Well I still very much like my Hakuho Maru Research Vessel shirt, even if it is not as famous, and fits less to the them

of my visit.

Otsuchi, and its sea wall.

Oysters in Yamada, Iwate

Rocket, Satoh-san and me at JAXA

Images of me in the clouds at Osaka Castle

Preparing the perfect cup of coffee

With my Andrea (my wife) at Kashiwanoha campus station

Prof. Xianglei HUANG
University of Michigan at Ann Arbor

With generous sponsorship from AORI, I was fortunate to visit this world-renowned institute from May 8 to June 30, 2023. My host is Prof. Kentaroh Suzuki in the Division of Climate System Research. This is my fourth visit to Japan and my most extended stay. This is my first trip back to East Asia since the COVID era. I spent seven wonderful weeks on the Kashiwa campus.

Besides giving a seminar on recent research progress in my group, I led a series of discussions on radiative transfer, especially a hierarchical view of the subject and how to use toy models to understand the essence of radiative transfer physics. Graduate

students, research staff, and faculty members attended the discussion, and the feedback was very positive.

Research-wise, using the past NICAM simulation output produced by Prof. Suzuki and his collaborators, I examined the co-variability of temperature and humidity at different temporal and spatial scales as simulated by such a high-resolution global model and then compared such results with counterparts from satellite observations, reanalyses, and CMIP6 low-resolution model simulations. Understanding the moisture and temperature relations in the region immediately above the tropical convective boundary layer (~ 600-800 hPa) across multiple timescales has important implications, such as stability of the tropical middle troposphere, pre-moistening conditions for the MJO developments and associated precipitation events, water vapor and lapse-rate feedbacks in response to the global warmings. Two decades ago, radiosonde observations, reanalysis, and climate models tended to disagree on the co-variability between tropical averaged temperature and humidity interannual anomalies in the region mentioned above, more so than in other parts of the tropical troposphere. We showed that the most recent generations of satellite observations, reanalyses, and climate models (high-resolution and low-resolution) have this discrepancy much reduced, but still with noticeable differences in the same region. Together with some works done in my group, the analysis results highlighted the dependence of temperature and humidity co-variabilities on temporal and spatial resolutions, providing scientific justification for more accurate measurements of mid-tropospheric humidity. We presented the findings in a workshop jointly held by AORI and the Department of Atmospheric Science at the National Taiwan University and submitted an abstract to the AMS (American Meteorological Society) 2024 Conference.

I also talked with other professors and colleagues in the CCSR during my stay to learn about their cutting-edge research projects. Through these activities, I have broadened my knowledge horizon and learned more about the Japanese research community and relevant earth science observational efforts made by JAXA. I am sincerely thankful to Prof. Suzuki for being such a wonderful host and to Uchida-San for helping me settle down and handling a variety of administrative chores. This stay also gives me a precious chance to learn more about Japanese culture and adventure around Tokyo. Overall, it has been a fruitful and wonderful visit for me. どうもありがとうございました！

Prof. Yair Rosenthal
Rutgers University

During the months of May-June 2023 I was a visitor scholar at AORI, working with Prof. Yusuke Yokoyama. A main purpose of the visit was to work on collaborative papers related to a joint sea going expedition to the Chilean margin, in 2019. During the visit we completed one paper related to the expedition led by Dr. Yokoyama′s postdoc (Sproson, A.D., Yokoyama, Y., Miyairi, Y., Aze, T., Clementi., V.C., Riechelson, H., Bova, S.C., Rosenthal, Y., Childress, L.B., and the Expedition 379T Scientists. (2024). Near synchronous Northern Hemisphere and Patagonian ice sheet variability through last glacial cycle. Nature Geoscience). We also collaborated on a second paper with one of Dr. Yokoyama as a lead author, that plan to submit in the next couple of months and discussed a potential deep sea drilling proposal in the Sabrina Basin of east Antarctica.

During my visit, I also presented a paper at the JPGU meeting and gave a seminar at AORI entitled:″ “Neogene climate change: reappraisal of biogeochemical controls on atmospheric pCO2 ‟. Overall, it has been a very productive visit and I am grateful for this opportunity, and look forward for future collaborations.