

The 29th Session of the Assembly of the Intergovernmental Oceanographic Commission (IOC-29)



Yutaka MICHIDA
Professor, Center for International Collaboration

Prof. Michida, reporting the outcome of IODE-24, on the podium at the 29th IOC Assembly.

The 29th Session of the Assembly of the Intergovernmental Oceanographic Commission (IOC) was held on June 21–29, 2017, at the UNESCO headquarters in Paris. Professor Mitsuo Uematsu, director of the Center for International Collaboration (CIC) of AORI, participated as the head of the Japanese delegation. Professors Yutaka Michida and Hiroaki Saito also attended the meeting as delegation members. The session adopted various decisions to prioritize the programs of the IOC. These decisions included the IOC’s contribution toward Agenda 2030 of the United Nations, which contains a set of Sustainable Development Goals (SDGs). In particular, SDG-14, calling to “conserve and sustainably use of the oceans, seas and marine resources for sustainable development”, is directly relevant to the work of the IOC. One of the Resolutions adopted by the Assembly proposes “an International Decade of Ocean Science for Sustainable Development,” with which the Assembly requests the IOC Executive Secretary to convey the proposal to the United Nations General Assembly for consideration at its 72th Session in 2017. After the UN General Assembly, the proposal was approved and the UN adopted the UN Decade of Ocean Science for Sustainable Development for the period 2021–2030. Professor Michida, co-chair of International Oceanographic Data and Information Exchange (IODE), reported to the IOC Assembly on the outcome from the 24th Session of IODE Committee held on March 28–31, 2017, in Kuala Lumpur, Malaysia, and recommendations adopted at the IODE Committee. IODE is one of the IOC projects with the longest history, over 50 years, and has been required to implement restructuring in its management, taking into consideration the recent developments in information technology. The proposal from the Committee on the reorganization of IODE management structure was strongly supported by the IOC Member States and approved by the IOC Assembly.



Japanese delegation at the 29th Session of the IOC Assembly. Front row from the left: Prof. Uematsu, head of the delegation; Mr. Watanabe, Ministry of Education, Culture, Sports, Science and Technology (MEXT), and Dr. Kawano (JAMSTEC). On the left end of the second row: Prof. Saito. Second from the right end of the second row: Prof. Michida.

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WESTPAC XI Intergovernmental Session

Hiroaki SAITO
Professor, Center for International Collaboration

The Eleventh Intergovernmental Session of the IOC Sub-Commission for the Western Pacific (WESTPAC-XI) was held in Qingdao, China, from April 21 to 23, 2017. Prof. Mitsuo Uematsu, director of the Center for International Collaboration of AORI, participated as the head of the Japanese delegation. Prof. Yutaka Michida and Prof. Hiroaki Saito also attended as members of the Japanese delegation. Regional projects and working group activities were reviewed, and five recommendations were adopted.



In the session, Dr. Vo Si Tuan from Vietnam was elected as Chairperson. Dr. Fangli Qiao from China, Dr. Zainal Arifin from Indonesia, and Dr. Kentaro Ando from Japan were elected as Vice-Chairpersons for the next intersessional period. Prior to the session, the 10th WESTPAC International Scientific Conference was held. The conference was quite successful and was attended by more than 800 scientists from 19 countries to advance ocean knowledge and foster sustainable development.

AORI/UTokyo Training Course 2017 “HAB Mitigation and Management in the WESTPAC Region”

Mitsunori IWATAKI
Associate Professor, Asian Natural Environmental Science Center

The AORI/UTokyo Training Course “HAB Mitigation and Management in the WESTPAC Region” was held from October 31 to November 4, 2017 at AORI, Kashiwa Campus. It was sponsored by the Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT) and supported by WESTPAC-HAB project; Asian Natural Environmental Science Center, University of Tokyo; School of Marine Science and Technology, Tokai University; Japan Agency for Marine-Earth Science and Technology (JAMSTEC); and IOC/WESTPAC.



The Course was participated by 12 trainees working mainly on monitoring and/or management of harmful algal blooms (HAB) from eight countries (Cambodia, China, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam). The Training Course aimed at sharing knowledge on HAB monitoring/management and better understanding of HAB mitigation under the concept of sustainability science, and was composed of lectures, country reports, excursions, discussions, and presentations. Lectures on sustainability science and HAB-related topics were delivered by Drs. Akimasa Sumi (University of Tokyo), Yasuwo Fukuyo (Tokai University), Lim Po Teen (University of Malaya, Malaysia), Dao Viet Ha (Institute of Oceanography, Vietnam), Kazumi Wakita (Tokai University), Toshiyuki Suzuki (National Research Institute of Fisheries Science), Mitsunori Iwataki, and Toshifumi Yamatogi (Nagasaki Prefectural Institute of Fisheries). Excursions were held at the Tsukiji Tokyo Metropolitan Central Wholesale Market and National Research Institute of Fisheries Science, Japan Fisheries Research and Education Agency at Yokohama. Each trainee had a presentation on the status of HAB monitoring and management in their respective country, and then participated in group discussions on the establishment of HAB monitoring and countermeasures, as well as the presentations and discussions among peers.



Since the monitoring and management of 1) harmful red tide species responsible for fish kills and 2) toxin-producing species causing shellfish/fish poisoning are different in HAB studies, trainees were separated into four groups, in which they discussed one of these two different topics. The trainees worked hard and engaged in discussions and presentation preparation until morning. They also prepared copies of newspaper articles related to recent HAB events in their respective country, later used for the

discussion. All local logistics of the training course had been arranged by AORI staff, Drs. Mitsuo Uematsu, Yutaka Michida, and Hiroaki Saito, with the help of Ms. Akiko Kasuya. Drs. Teruhisa Komatsu (Yokohama College of Commerce) and Kentaro Ando (JAMSTEC) supported the planning and arrangement of the training course.

Another purpose of the training course was a feasibility assessment of Regional Training and Research Center (RTRC) for Sustainability Science in Japan, taking into consideration the RTRCs already established in China and Indonesia in the WESTPAC region. This trial of a training course on sustainability science led further discussion on the establishment of an RTRC in AORI/UTokyo, Japan.



Presentation given by a participant



Prof. Uematsu gives a presentation at the workshop

International Workshop for Future RTRC (Regional Training and Research Centers) Networking in the WESTPAC Region

Yutaka MICHIDA
Professor, Center for International Collaboration

An International Workshop for Future RTRC (Regional Training and Research Centers) Networking in the WESTPAC Region was held on January 23–24, 2018, jointly organized by the Atmosphere and Ocean Research Institute (AORI) and Ministry of Education, Culture, Sports, Science and Technology (MEXT) at the MEXT building in Tokyo. The IOC Sub-Commission for the Western Pacific Region (WESTPAC) has been promoting capacity development in marine sciences and services in the Region through the establishment of Regional Training and Research Centers (RTRCs). Each RTRC is endorsed by the Sub-Commission based on the proposal of a Member State of WESTPAC. Two RTRCs are already in operation, and a couple of more RTRCs are under consideration. The workshop aimed at establishing the most effective networking of existing and planned RTRCs, based on the discussion by the experts in the region, including regional research and service requirements and the present level of regional capacity. The workshop recommended the following:

- i) It highlighted the importance of the activities of RTRCs and strongly encouraged the host institutions to continue, and leading universities and research institutes in the region to propose new RTRCs to enhance the capacity development in WESTPAC,
- ii) It recommended to establish a discussion group to identify the required targets of capacity development in WESTPAC and find the effective ways to implement,
- iii) It also recommended existing and planned RTRCs and Regional Training Center (RTC) under the International Oceanographic Data and Information Exchange (IODE) and other capacity development initiatives to communicate closely with WESTPAC Officers and Secretariat,
- iv) Emphasizing the importance of the concept of sustainability science, which well reflected the medium-term strategy of UNESCO, it expressed its strong support to the proposal of establishment of RTRC for Sustainability science (RTRC4SS) in general.



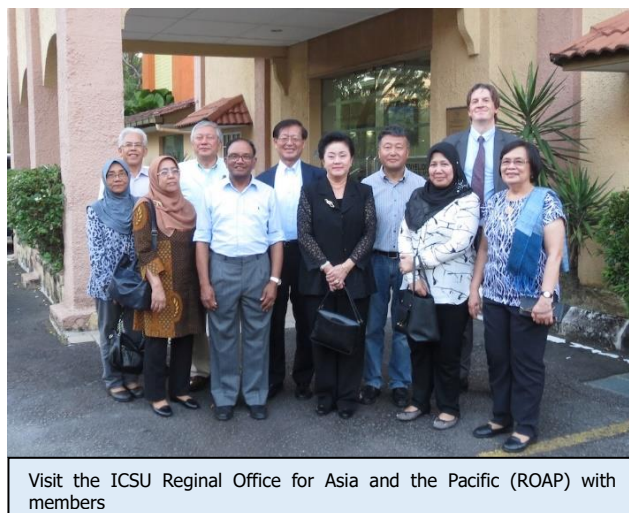
Participants in the Workshop for Future RTRC Networking in the WESTPAC region

Report from the 23rd ICSU Regional Committee Meeting for Asia and the Pacific

Mitsuo UEMATSU
Professor and Director, Center for International Collaboration

The International Council for Science (ICSU) is a non-governmental organization with a global membership of national scientific bodies (122 Members, representing 142 countries) and International Scientific Unions (31 Members). ICSU has three Regional Offices: Africa, Asia and the Pacific, and Latin America and the Caribbean. The offices support scientific networks in their regions, facilitate the participation of scientists from developing countries in the activities of ICSU and its members, and ensure that the ICSU strategy and activities are responsive to the needs of developing countries.

The 23rd ICSU Regional Committee Meeting for Asia and the Pacific (RCAP) was held in Kuala Lumpur, Malaysia, for two days on July 17–18, 2017. The event commenced with opening remarks from Chair Lourdes Cruz from the Philippines. Four new members were introduced: Dr. Gensuo Jia (Atmospheric Physics) from China, Dr. Monthip Sriratana (Strategy for Climate Change) from Thailand, Mitsuo Uematsu (Oceanography), and Dr. Stuart Carr (psychology) from New Zealand, who could only participate from the second day owing to aircraft trouble. The meeting was attended by current committee members Dr. BVR Chowdari (Singapore) and Dr. Aswatini Raharto (Indonesia), and previous committee members Dr. Ahmad Faizal Mohd Zain (Science Council of Malaysia, as observer), Prof. Kazuyuki Tatsumi (ICSU liaison from Japan), and Charles Erkelens (Operations Director from the ICSU Paris headquarters). Jung-Hye Roe (South Korea) and Togtokh Chuluun (Mongolia) were absent.



Visit the ICSU Regional Office for Asia and the Pacific (ROAP) with members

After confirming the minutes of the previous meeting, there was a report on the progress status of activities on three priority issues. Regarding “danger and disaster,” there were reports of four related meetings. The ten countries participating advocated raising the recognition of these activities and strengthening the cooperation of all countries. On “health and good life in urban areas,” the 3rd ICSU Regional Office for Asia and the Pacific (ROAP) Science Planning Group on Epigenetics (SPGE) workshop was held in Phnom Penh in June 2017 and the science plan will be compiled at the next meeting. Regarding “ecosystem (SIMSEA project),” an international symposium was held in Diliman, Quezon City, Philippines, in September 2017, and there was a report that it has been approved as Future Earth’s regional activity project. With the renewal of the memorandum of understanding between the government of Malaysia and ICSU in April 2017, the Malaysian government will issue 1,000,000 MYR (approximately 26 million JPY) from September 2016 to September 2021, and 75,000 EUR (9.7 million JPY) in activity funds from ICSU will be contributed to ROAP.

The merger of the International Social Science Council (ISSC) and ICSU was approved by the 32nd ICSU General Assembly, and an extraordinary ISSC General Assembly was held in Taipei in October 2017. Subsequently, it was confirmed that there is no reduction in the current number of members of both sides of the merger of ISSC and ICSU, and no particular impact on ICSU/RCAP management. Further, discussions were made as to whether or not the cooperation of academic conferences among Asia Pacific countries is sufficient, involving the social sciences members as members of a new organization, International Science Council (ISC). From the view of the Secretariat, there was no problem in the budget for some members’ increase in number.

Dr. Sriratana delivered a lecture on Future Earth’s efforts in Thailand. The lecture touched on the active collaborative research and human resources exchange with China, including the budget size. However, there was doubt whether the regional secretariat of Future Earth grasped and supported such activities. The 24th meeting, with a new Director, Professor Emeritus Mazlan Othman, was held in Hong Kong in December 2017.

PICES-2017 Annual Meeting

Hiroaki SAITO
Professor, Center for International Collaboration

The North Pacific Marine Science Organization (PICES) is an intergovernmental scientific organization promoting and coordinating marine research in the North Pacific and adjacent seas. Its members are Canada, Japan, China, Korea, Russia, and the USA. The 26th Annual Meeting entitled “Environmental Changes in the North Pacific and Impacts on Biological Resources and Ecosystem Services” was held in Vladivostok, Russia, on September 22 and October 1, 2017. The venue was a new campus of Far Eastern Federal University that faces the beautiful Golden Horn Bay.

At the Opening Ceremony, Prof. Hiroaki Saito, chair of PICES Science Board, summarized the annual PICES activities, which included publications, collaboration with international organizations/projects, and capacity development activities. More than 300 scientists from 11 countries attended and presented recent advancements on North Pacific marine sciences. Many session topics targeted the complex responses of marine ecosystems to multiple anthropogenic forcing and/or the impact on human society. PICES established the new Scientific Committee of Human Dimension (SC-HD) in November 2017. This proceeded from the collaboration between natural and social scientists to tackle a variety of social issues induced by environmental change and the degradation of marine ecosystem services.



Prof. Saito (right) celebrated the 2017 Wooster Award winner.

At the closing session, Prof. Saito announced that a study from the PICES ADRIFT project was highlighted on the cover page of Science magazine's September 29, 2017, issue. Japan's Ministry of Environment is supporting the PICES ADRIFT project to monitor marine debris induced by the Great East Japan Earthquake and tsunami and to assess potential impacts from marine debris and associated non-indigenous species on coastal ecosystems in Pacific North America. This paper is the fruit of the collaborative work of scientists from both sides of the North Pacific and addresses concerns from the general public on environmental and human health impacts of the marine debris. The next annual meetings will be held in Yokohama, Japan, on October 25 and November 4, 2018.



Far Eastern Federal University Campus

Progress of the Ocean KAN activity

Mitsuo UEMATSU
Professor and Director, Center for International Collaboration

The Ocean Knowledge-Action Network (Ocean KAN) is supported by the international programs Future Earth and its marine core projects, WCRP-CLIVAR, IOC-UNESCO, and ICSU-SCOR, and aims at advancing integrated ocean research globally to chart a course from knowledge of ocean systems to changes in policies, practices, governance, and behaviors that will assist in sustaining those systems. In a bottom-up process, the Ocean KAN facilitates the formation of transdisciplinary teams and new integrative initiatives that will address these challenges by co-designing scalable and integrated systems-approaches, in collaboration with users of knowledge and decision-makers worldwide.

After the workshop on the development of Future Earth's "Oceans KAN" in Kiel, Germany, in December 2016, a process was set in place to launch an open call for the Ocean KAN Development Team. The primary role of the Development Team (DT) is to mobilize the scientific and stakeholder community into designing and implementing activities aligned with the vision of KAN and then engaging in the more specific planning of the Ocean KAN ambition. Anna Zivian (Ocean Conservancy, USA) and Rachel Cavanagh (British Antarctic Survey, UK) have been elected as co-chairs of the DT among 20 members from various fields. A webinar has been held monthly since September 2017. The DT will finalize the research plan of Ocean KAN by September 2018.

Core-to-core RENSEA Seminar on Coastal Ecosystems in Southeast Asia

Hiroaki SAITO
Professor, Center for International Collaboration

Southeast Asia is a marine-biological-diversity hotspot. However, the richness of biological diversity and marine ecosystem services in Southeast Asia is in crisis because of increasing human activity and demand for marine ecosystem services. In spite of their importance, our knowledge of the structure and dynamics of the ecosystems is seriously limited. Building an international network to advance marine ecosystem studies in this region is an emergent issue.

To enhance multilateral collaboration on research and education on coastal ecosystems among five Southeast Asian countries (Indonesia, Malaysia, Philippines, Thailand and Vietnam) and Japan, a new project, "Research and Education Network on Coastal Ecosystems in Southeast Asia (RENSEA)," was started in April 2016 and is supported by the Core-to-Core Program of the Japan Society for the Promotion of Science (JSPS). RENSEA succeeded the previous 5-year JSPS project "Establishment of Research and Education Network on Coastal Marine Science in Southeast Asia (Asian CORE-COMSEA:2011-2015)." There are three research groups in RENSEA; each group focuses on physical processes, biodiversity, and environmental pollution, respectively.

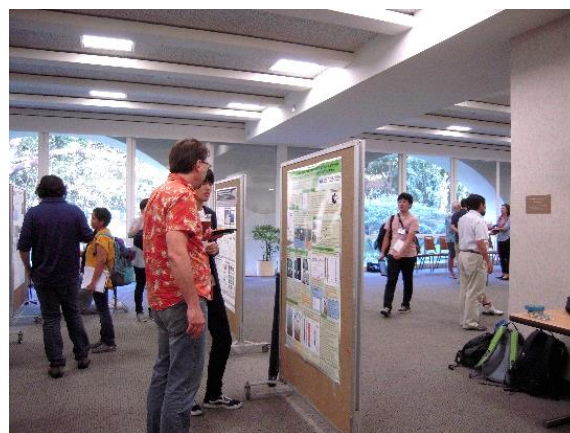
The 1st RENSEA seminar was held at Universiti Putra Malaysia, Selangor, from March 14 to 16, 2017. In the seminar, recent research highlights were presented, along with scientific results of Integrative Ecosystem Research (IER) focusing on the seagrass ecosystem in the Merambong shoal, Johor, Malaysia. Attendees discussed marine ecosystems, as well as the scientific contributions to societal issues, since decision-making processes vary in member countries. Exchanging best practices on making scientific contributions to marine ecosystem issues was also beneficial to attendees. The 2nd RENSEA seminar will be held at the University of the Philippines, Visayas, Iloilo, in February 2018.

University of Tokyo and University of Hawai‘i The 4th Joint Symposium on Ocean, Coastal, and Atmospheric Sciences

Susumu HYODO
Professor, Department of Marine Bioscience

The 4th Joint Symposium on Ocean, Coastal, and Atmospheric Sciences was held on September 7–8, 2017 at the East-West Center in the University of Hawai‘i at Manoa campus in Honolulu, Hawai‘i. Support for the symposium was provided by the Uchida Ocean Science Scholarship at AORI and the University of Hawai‘i Sea Grant College Program. AORI and the School of Ocean and Earth Science and Technology (SOEST) at the University of Hawai‘i established an academic exchange agreement and have been conducting collaborative research in various fields in ocean and atmospheric sciences.

To facilitate further exchange and promote new collaborations, joint symposiums were held in 2008 and 2015 in Japan and in 2012 in Hawai‘i. For the 4th symposium, nearly 60 researchers participated, including young scientists and graduate students; two plenary lectures by Profs. Mitsuo Uematsu and Kazuhiro Kogure, as well as 27 oral and 13 poster papers, were presented. The *RV Hakuho-maru* was in port at the Honolulu harbor on the half way point of research cruise KH-17-4. Therefore, the event invited four researchers, including the chief researcher of KH-17-4, Prof. Ken Furuya, to participate in a special symposium session on the transdisciplinary project “New Ocean Paradigm on its Biogeochemistry, Ecosystem and Sustainable Use” (NEOPS). It is highly expected that the partnership will continue to contribute to further promotion of new academic exchanges and collaborations between Japanese and U.S. scientists.



ANU–UTokyo students joint short course “International Seminar”

Yusuke YOKOYAMA
Professor, Analytical Center for environmental Study

A joint short course, “International Seminar and Field Excursion, Earth and Planetary Environment Studies,” for students from the University of Tokyo (UTokyo) and Australian National University (ANU) under the strategic partnership program was held from September 5 to 15, 2017. Fifteen students from both ANU and UTokyo as well as more than a dozen academic staff from the two universities attended. The class began with lab tours at the Atmosphere and Ocean Research Institute (AORI), including a visit to a fish culture facility guided by Professor S. Hyodo. As the students varied in terms of background, from the sciences, engineering, environmental sciences, and law, as well as in years of study, from second year of undergraduate study to PhD study, two days of classes were conducted on the different aspects of the geosciences, including seismology, volcanology, tsunami, fishery, climatology, and even philosophy (“*Some arguments why you should think the planet Earth is conscious*”); these sessions familiarized the students to the topics they learned in the field trip.

The trip consisted of a visit to three different regions in Japan: 2011 tsunami sites in Tohoku, including Onagawa (Tohoku Univ), to study the recent devastating event; cultural and geomorphological sites in Zushi; volcanic and fluvial environmental studies sites in Mt. Fuji; a field station at Lake Hamana (hosted by Profs. Kikuchi and Hirase), to study the biological and environmental changes and its surroundings, as well as the historical and cultural aspects of Nankai trough earthquakes; and Fujitsu Research Institute (hosted by Dr. Oishi, an alumna of UTokyo), to learn recent IT technologies and so forth.

Throughout the course, students were divided into five groups that had a mix of UTokyo and ANU students. They submitted daily reflection reports. The students worked hard collectively, and the reports were uploaded to designated social networking service sites. The final presentation was given by each group at AORI. The success of the course was readily observed during the preparation of presentation materials in English. The course was marked officially closed with the Director and Professor A. Tsuda's remarks. All of the attendees moved to "Hama" for the farewell party. The students learned many things not only from visiting fields around Japan but working together in international environments.

More information can be found at the following websites and Twitter. The second tour is going to be held in 2018.

<http://lams-yokoyama.blogspot.jp/search/label/17%27withANU>
#GeoHazardsNCP



At Nakahama elementary school, the participants listened to a discussion by the then-school principal of the situation when the tsunami struck.



At Onagawa Hospital on a hill, Prof. Kijima explained that the red line on the pillar indicates the height of the tsunami wave at this location.



Discussion to write reflection report, conducted each night



Farewell Party at Hama, a sushi restaurant in AORI

University Allied Workshop 2017: Workshop for Typhoon, Cloud and Climate Study, August 22–24, 2017

Masaki SATOH

Professor, Center for Earth Surface System Dynamics

The University Allied Workshop 2017 was organized for the period of August 22–24, 2017 by the Department of Atmospheric Sciences, National Taiwan University (NTU), held at GIS NTU Convention Center. Students and post-doc researchers, as well as faculty members were invited to participate in the workshop to share recent research results and synthesize jointly outstanding research issues to promote communication and collaboration. The focus of this workshop was to discuss the recent advances in theories, observations, and high resolution modeling, which provide great opportunities for basic research on convection and water cycle and their interaction with weather and climate. In addition, the complex nature of the relevant scientific issues and huge amount of data pose great challenges for synthesizing all information to make breakthroughs in such studies.



Group photo at the Cape Fuguei Lighthouse during the field trip to the northern tip of Taiwan, August 23, 2017.

This workshop was a follow-up of the previous workshop held at the Atmosphere and Ocean Research Institute (AORI), The University of Tokyo, last September 29–October 1, 2015, in the spirits of the previous University Allied Workshop (UAW). UAW had been held almost every year until 2009 to encourage communication and collaboration among students and young career researchers of Taiwan, Korea, China, and Japan. UAW was terminated after that, but in 2015, it was renewed as a more focused workshop mainly between NTU and AORI. Atmospheric numerical modeling studies and collaborative studies with observations, particularly on typhoon, cloud, and climate, are the main focus of the workshop.

More than 60 scholars participated in the workshop, with about 20 from AORI. Three students also participated from Seoul National University this time. In the workshop, the representative students from NTU and AORI formed a convener team and formulated the program. Ms. Iwasaki and Mr. Takasuka were in charge of the AORI side. In the afternoon of August 23, a field trip was scheduled: participants visited the observation site at the northernmost tip of Taiwan, Cape Fuguei Research Station, Academia Sinica. This was a great opportunity to learn observations at NTU on atmospheric chemical constituents and aerosol transports.

The next UAW will be held in AORI in 2019. Apart from the workshops, students are encouraged to visit mutual universities either for short- or long-term stay. In addition, the meeting confirmed the advantage of UAW in enabling mutual faculties to observe continuously the progress of research by students. There was also a proposal for holding student-based small sessions as a future improvement plan in the next workshop.



Group photo at the Workshop for Typhoon, cloud and climate study, August 22, 2017. GIS NTU Convention Center.



The student convener team (three from the right) and Prof. Chung-Hsiung Sui (NTU) (second from left) and Prof. Masaki Satoh (AORI) (far left). Mr. Daisuke Takasuka (AORI) stands in the middle.

Looking back on my life until now, my retirement age

Mitsuo UEMATSU

Professor and Director, Center for International Collaboration

-There are two ways to live: you can live as if nothing is a miracle; you can live as if everything is a miracle.-

My life has been fulfilling since birth, thanks to the endless array of miracles to date.

The Center for International Cooperation was established in the Ocean Research Institute in June 1994, and I was appointed as an associate professor under Prof. Makoto Terasaki in the Research Cooperation Division in April 1997. I was promoted to a professor in April 2004, and I have served as center director since April 2006. In April 2010, the Ocean Research Institute was reorganized into the Atmosphere and Ocean Research Institute, and at the same time, the Center for International Cooperation was reorganized into the Center for International Collaboration. I took office as the director of the center and became a professor of the Division of International Advanced Research.



I have worked mainly on marine atmospheric chemistry as a principal investigator of the Core Research for Evolutionary Science and Technology (CREST/JST) project “Variability of Marine Aerosol Properties and Its Impact on Climate Change (VMAP)” (1998–2003). We developed the “Self Cruising Ocean Observation Platform (SCOOP),” determined marine air quality, and established a Chemical weather FOREcasting System (CFORS).

Under the Advancing the New Century Priority Research Creation Plan (RR 2002), “Advanced Carbon Cycle Modeling in the Pacific (BIOCARBON)” (2005–2007), an eddy correlation method on shipboard was evolved. By the Grant-in-Aid for Scientific Research on Priority Areas, “Linkages in Biogeochemical Cycles between the Surface Ocean and the Lower Atmosphere; Western Pacific Air-Sea Interaction Study (W-PASS)” (2006–2010), we developed a marine atmospheric observation system for ship observation, through which we grasped the spatial-temporal variation of marine atmospheric composition. To this end, a new research field of air–sea exchange was established.

During my tenure, I received the 2004 Geochemical Society of Japan Award, 2009 Oceanographic Society of Japan Award, PICES 2011 Science Board Best Presentation Award, and 9th Prime Minister’s Commendations for Contributors to Promote the Country as a “Maritime Nation.” In education, I acquired 19 master’s degrees and 7 doctoral degrees in 21 years. Eight postdoctoral fellows and six foreign researchers, as well as members from eight countries, including students, have shared time with me in the laboratory.

I have been a small cloud nucleus drifting and growing in the air, as miracles of encountering the surroundings and forming a part of big clouds shaped me. It seems the time has come to be a raindrop about to return to the sea.

Visiting Professors

Name / Affiliation	Nationality	Length of stay	Subject for study
OLSON, Kenneth R. <i>Indiana University Emeritus professor</i>	USA	2017/2/6-2017/3/6	Role of hormones in cardiovascular regulation in fish
TODD, Christopher David <i>School of Biology, University of St Andrews Professor</i>	UK	2016/9/12-2016/10/11	Effects of global warming on homing migration in salmonids
CURCHITSER, Enrique <i>Rutgers University Associate Professor</i>	USA	2016/7/1-2016/8/31	Coupled biophysical modeling in the Kuroshio-Oyashio Current System
MOHTADI, Mahyar Hamadani <i>MARUM-Center for Marine Environmental Sciences, University of Bremen Senior/principal scientist and team leader</i>	Germany	2016/7/1-2016/10/10	Climate reconstruction in Indo-Asian Monsoon region
SCHULLER, Kathryn <i>Flinders University of South Australia Associate Professor</i>	Australia	2016/7/1-2016/8/31	Investigating the development of red muscle endothermy in young juvenile Pacific bluefin tuna
SUI, Chung-Hsiung <i>Department of Atmospheric Sciences, National Taiwan University Professor</i>	Taiwan	2016/6/1-2016/7/31	Observation and modeling hierarchical convection organization in the MJO
SHIAO, Jen-Chieh <i>National Taiwan University Professor</i>	Taiwan	2017/1/9-2017/2/12	Fish migration ecology by otolith geochemical analysis
BRIL, Andrey <i>Institute of Physics of National Academy of Sciences of Belarus (IPNASB) Senior Researcher</i>	Belarus	2016/11/14-2017/3/31	Development of analytical method for retrieving carbon dioxide and methane concentrations from satellite measurements
ROKOTYAN, Nikita <i>Ural Federal University Researcher</i>	Russia	2016/12/19-2017/3/10	Estimation of methane emission from wetland in West Siberia

*Visiting professors' reports of Division of Climate System Research are included in the CCSR NEWS

Visiting professors' reports



Kenneth R. Olson

*Emeritus Professor of Physiology, Indiana University School of Medicine South Bend
Adjunct Professor of Biological Science, University of Notre Dame
Concurrent Professor of Chemical and Biomedical Engineering, University of Notre Dame*

It is a great honor and privilege to be invited by Professor Yoshio Takei as a Visiting Professor at The Atmospheric and Ocean Research Institute from February 6 to March 6, 2017. My stay here comes 20 years and three months after my previous visit to AORI and brings the illustrious and productive research career of Yoshio and my association with him full circle.

I knew of Yoshio's early work on volume regulation in birds and fish, as a comparative cardiovascular physiologist, and was eager to initiate collaboration with him. This resulted in our first paper 23 years ago in which we described the sequence and physiological effects of the first natriuretic peptide isolated from the rainbow trout heart. This was followed by a number of papers in the ensuing years that identified related natriuretic peptides from this fish. In 2008 I had the privilege of writing a review article in tribute to Yoshio's career.

My work with fish has changed directions in the past 10 years and we have begun focusing on a novel signaling mechanism that uses the noxious smelling gas hydrogen sulfide (H₂S) as the signaling transmitter that allows cells to detect hypoxia. This work has extended into the role of H₂S and other sulfur molecules in evolution and in redox regulation. Yoshio invited me to AORI to discuss my recent work on sulfur metabolism with his group and interested colleagues. As a result, I have given three lectures, "Design and Endocrine/Paracrine Regulation of the Fish Cardiovascular System", "The Role of Hydrogen Sulfide in Evolution, Oxygen Sensing and Redox Signaling" and "Geochemical and Biological Features of Sulfur Cycling and Signaling."

I have already had the opportunity, as a result of these talks, to initiate further dialogue with Dr. Tomihiko Higuchi regarding his work with sulfur utilization in coral and symbiotic algae. I hope to continue to pursue this as well as my long-standing association with Prof. Takei for many more years and I am ever grateful to AORI for this opportunity.

Christopher Todd

*Professor
Oceans Institute, University of St Andrews*



It has been an honour and a privilege to be able to visit colleagues at AORI this autumn (2016), and to have had the opportunity of visiting Iwate Prefecture to see the AORI research activities associated with chum salmon in Otsuchi. Personal research contacts and collaborations between St Andrews University and AORI (and previously ORI) date back to the 1980s and continue to this day. For me, personally, the most rewarding parts of my visit were threefold: first, the opportunity of discussing research problems of mutual interest with colleagues; second, the chance to visit Iwate Prefecture with Shigenori Nobata and to see the chum salmon hatchery operations and continuing developments and reconstruction work; third, the opportunity of discussing with the graduate students

and postdocs their research and future aspirations. The latter persons are the future, and it is my sincere hope that a formalised agreement between St Andrews and AORI might encourage mutual exchanges of personnel and research collaborations for many years to come. Certainly, when I return to Scotland I will do my utmost to ensure that AORI visitors achieve all their aspirations, and receive from us the high level of help and hospitality that I have received here.



Adult male chum salmon successfully returned to Otsuchi river, October 9 2016

I am especially grateful to Professor Yoshio Takei for hosting my visit. I hope to develop shared interests with Professors Toshi Nagata and Susumu Hyodo, and to perhaps to facilitate development of collaborations between postdocs in St Andrews and AORI who have complementary skills and interests in applying stable isotope techniques to marine environmental challenges and responses for Pacific and Atlantic salmon at sea.



In Kyoto, I saw a poster intimating that a koi carp is a dragon in heaven. Having watched adult salmon having successfully returned to the Otsuchi river after their journey to Gulf of Alaska I shall have to reflect on how that metaphor might extend to salmon and their incredible sojourns across the World Ocean.

Chum salmon sculpture, Kamaishi



Mahyar Mohtadi

*Principal Scientist
MARUM-Center for Marine Environmental Sciences
University of Bremen, Germany*

I was very honored and delighted to be a visiting professor at the Atmosphere and Ocean Research Institute of the University of Tokyo for 3 months in 2016. I joined the Analytical Center for Environmental Study group directed by Prof. Yusuke Yokoyama from July 1 until October 8 that included a one-week interruption for attending and speaking at the 12th International Conference on Paleoceanography in Utrecht, the Netherlands. I really enjoyed working at the Center for Environmental Study group of AORI and deeply appreciate the excellent hospitality and support of the entire group particularly of Mrs. Megumi Ikeda.

One of my primary objectives during my visit to AORI was to discuss and reach an agreement between AORI and MARUM to implement, on a regular basis, the exchange of faculty staff and students ideally based on collaborative research projects. Fortunately, this idea was well received and we were able to draft a departmental agreement on academic exchange ready to be signed by the respective directors. Once established, this program will facilitate and maintain the collaborative research and exchange of academic information and material between the two institutions.

Upon my arrival at the AORI, I started to discuss and consult my upcoming expedition with the German research vessel R/V SONNE to the Great Barrier Reef in April-May 2017 with Prof. Yokoyama. He

is a well-respected expert in this region and was the co-chief scientist of the International Ocean Discovery Program (IODP) Expedition 325 to the Great Barrier Reef and I am now fortunate that three scientists from Japan including Prof. Yokoyama will be participating in the R/V SONNE expedition SO-256. During my stay at the AORI I was able to collect and finalize the necessary information and documents for the research permit and submit them to the Australian authorities. Sample material collected during this expedition enables us to reconstruct past circulation of the East Australian Current and the eastern Australian climate. Moreover, this joint endeavor serves as a promising start of successful collaboration and exchange of material and expertise between the two institutions in the coming years.

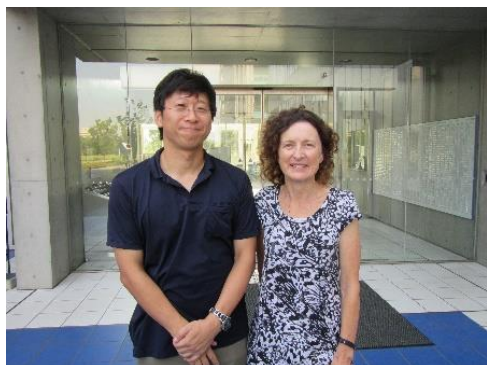
We will also start collaborating in two other projects related to the history of the South Asian and the East Asian monsoon systems and their relation to the Indo-Pacific Warm Pool climate. The former will start in the coming years whereas the latter two projects have already started and will benefit greatly from the available expertise and facilities at the AORI. In another project, we are investigating the history of the storage and release of atmospheric carbon dioxide on glacial-interglacial timescales, as recorded in marine archives from the Pacific Ocean. We will join our efforts with those at the Center for Environmental Study group of AORI and improve the reliability and consistency of the existing data sets, and aim to publish the results in the most prestigious scientific journals.

During my stay in Japan, I attended the annual meeting of Japan Association for Quaternary Research that was held at the University of Chiba in September and had the privilege of being a keynote speaker and presenting my latest research about the forcing and response of monsoon rainfall. During this meeting, I had the opportunity to meet a number of colleagues and learn about the ongoing Quaternary research in Japan, and fortunate enough to meet with emeritus professor Tadamichi Oba from the Hokkaido University after a long while. In addition, I was honored to give two talks at the AORI in September, for the Analytical Center for Environmental Study group on my ongoing research in the South China Sea, and at the OFGS seminar by presenting the latest results from our research in the eastern Indian Ocean.

I attended also a field trip to Kumamoto Prefecture to sample seawater at a long-term coral-monitoring site in Shimoshima Island, combined with an outreach program at a high school and a visit to the Geo-Park in Goshoura-Jima Island, hosted by Dr. Yoshitaka Hase and his group from the Goshoura Cretaceous Museum. Another highlight of my trip was visiting R/V CHIKYU at the port of Shizuoka, arranged by Dr. Steven Obrochta from the Akita University. We received a detailed guidance through different labs and decks of this impressive vessel for the entire afternoon and gained valuable insights into the different drilling techniques, opportunities and pitfalls.



My family arrived in the first month of my stay in Japan and greatly enjoyed their first visit to Japan. We were fortunate to experience a beautiful country, delightful people and great scientists making this stay in Japan unforgettable and filled with many wonderful memories. In summary, I had a great time during my stay at AORI and had numerous stimulating discussions along with exchanging ideas and experiences. I am looking forward to implement, together with my Japanese colleagues, a long-lasting and fruitful collaboration and an efficient capacity-building program between MARUM and AORI.



Kathryn Schuller

*Associate Professor
School of Biological Sciences, Faculty of Science and Engineering
Flinders University, Adelaide, South Australia*

It has been a great pleasure and an honour to have been a Visiting Professor at the Atmosphere and Ocean Research Institute (AORI) of the University of Tokyo for the 8-week period from July 11 to September 2, 2016, and I am deeply indebted to my host, Associate Professor Takashi Kitagawa, for his seemingly limitless generosity with his time, advice and support both before and during my visit. I was accompanied by my PhD student, Arif

Malik, and we would both like to thank the many staff and students at the institute who helped us with our work. In particular, we would like to single out for special mention Dr Shigenori Nobata, Dr Minoru Ijichi, Professor Yoshio Takei (Department of Marine Bioscience), Professor Kazuhiro Kogure (Director of the Center for Earth Surface System Dynamics), Dr Marty Wong, Dr Taro Watanabe and Dr Naoya Otsuchi. These people generously provided us with access to AORI's state of the art equipment and facilities and assisted us with training on the equipment and other support. Last, but not least, we would like to thank Mr Yoshinori Aoki, a graduate student with Dr Kitagawa, who not only helped us with our research but also assisted us immensely with negotiating our way around the Japanese culture and language.

The purpose of my visit was to initiate a collaboration with Dr Kitagawa to investigate the ontogeny of endothermy in Pacific bluefin tuna. Endothermy, the ability to warm the body by conserving metabolically-generated heat, is unusual in fishes. It is found only in tunas, certain shark species, and a limited number of other fish species. Proposed advantages include thermal niche expansion into cooler waters at deeper depths or higher latitudes where prey are more abundant and improved sustainable swimming performance which would increase the volume of water able to be scanned in search of prey. Both of these could potentially improve access to prey and thereby accelerate growth and development. I was inspired by Dr Kitagawa's previous research on the migration and thermal biology of tunas and this was the impetus for my request to work with him.

Endothermy in tunas has been well described in older/larger individuals where it is well-developed but not in younger/smaller individuals where it is still developing. Research from Kindai University suggests that Pacific bluefin tunas develop the anatomical/physiological characteristics required for endothermy during the first year of their life at a body size of approximately 55 cm fork length. However, the exact timing and the precise sequence of events involved is unknown. It is important to understand when young tunas develop the capacity for endothermy because this may affect their distribution in relation to the flow of warm ocean currents. This in turn may affect the results of surveys to estimate population sizes which in turn may impact the setting of fishing quotas and conservation measures. In other words, small, pre-endothermic individuals may be restricted to warm ocean currents where prey are generally less abundant whereas larger individuals (with well-developed endothermy) may be able to forage more widely because they are more independent of environmental temperatures. Thus, variations in ocean current flows and consequently water temperatures may interact with the stage of development of endothermy to affect the distribution of young tunas.

Overall, the aim of our project is to use anatomical, physiological and molecular methods to investigate the ontogeny of endothermy in young Pacific bluefin tuna juveniles of various sizes around the size we predict for the onset of endothermy in this species. The three size classes we are targeting are: (1) pre-endothermic (approximately 20 cm fork length and 3 months of age), (2) developing endothermy (approximately 35 to 60 cm fork length and 5 to 7 months of age) and well-developed endothermy (>80 cm fork length and >12 months of age). Specifically our aims are to determine how the following parameters change with fish size/age: (1) red locomotor muscle, visceral and cranial temperature elevation above ambient water temperature; (2) red locomotor muscle mass as % of total body mass; (3) elaboration of the specialised heat-exchanging blood vessels that retain the heat generated by the red locomotor muscle, viscera and cranium; (4) activity of mitochondrial enzymes that are involved in supplying ATP to

the red locomotor muscle to power its repeated contraction (a major source of metabolic heat); (5) expression of transcription factors and transcriptional co-activators that might be involved in regulating the development of endothermy.

During this my first research trip to Japan, our plan was to capture and analyse the smallest of the three Pacific bluefin tuna size classes mentioned above. To do this, Dr Kitagawa, my student and I made a field trip to Nakatosa in Kochi Prefecture where we worked with Dr Ko Fujioka from the National Research Institute of Far Seas Fisheries, Bluefin Tuna Resources Division. Dr Fujioka and his team were undertaking a large tagging program to investigate the migration of young Pacific bluefin tuna juveniles across the Pacific Ocean. The fishes we sampled fell within the first size class, i.e., approximately 20 cm fork length and 3 months of age. We expected them to be pre-endothermic which we subsequently confirmed. For this work, we were joined by Professor Kathryn Dickson from the Department of Biological Science, California State University Fullerton, U.S.A. Professor Dickson is a world leading researcher in the physiology of endothermy in fishes and one of the few scientists to have thoroughly documented its development in young individuals. Her most impressive work has been done with the small tropical tuna, black skipjack (*Euthynnus lineatus*) but this was the first time that she, or anyone, had worked with the much larger temperate species Pacific bluefin tuna.

Following on from the success of our field trip to Nakatosa, we now have plans to sample the next size class (developing endothermy; approximately 35 to 60 cm fork length and 5 to 7 months of age) of Pacific bluefin juveniles from Tsushima Island (Nagasaki prefecture) in late November 2016. We also hope to access the largest of the three size classes (>80 cm fork length and >12 months of age) with the help of Mr Chuck Farwell, Curator of the Pelagic Fishes Research Program and Co-Director for the Tuna Conservation and Research Center at the Monterey Bay Aquarium in California. By an enormous piece of good luck, Mr Farwell was also present during our sampling trip to Nakatosa. Thus, what began as an 8-week visit to AORI for my student and I has spawned an international collaboration between Japanese, Australian and American scientists that we hope will long outlast our initial contact and generate fascinating insights into the ontogeny of endothermy in tunas.

Chung-Hsiung Sui

Professor

Department of Atmospheric Sciences, National Taiwan University

As a professor in atmospheric sciences at National Taiwan University, my major research interest is cloud and climate related research in tropical meteorology that are originated from my PhD study guided by Prof. Michio Yanai at UCLA. After my PhD study, I worked in Goddard Space Flight Center (GSFC), NASA for about 15 years before returning to Taiwan in 2001. During the years in GSFC, I met Dr. Teruyuki Nakajima and Dr. Yukari Takayabu during our early career years. We have remained good friends since that time.

I first met Mr. Masaki Satoh in CCSR at the Komaba campus in 1992 when I took a leave from GSFC to spend six months as a visiting scholar at CCSR. Satoh san was a graduate student under Prof. Matsuno. I remember vividly one of the conversations between Prof. Matsuno and Prof. Arakawa (visiting from UCLA) about treating effect of cumulus in tropical circulation: Prof. Arakawa regarded parameterization of cumulus necessary while Prof. Matsuno preferred resolving cumulus explicitly in global models. This was a few years before the Frontier project started. Then I heard about the Japanese proposal to develop a new general circulation model based on non-hydrostatic dynamic framework to utilize the super computing power of the Earth Simulator. My understanding is that Dr. Satoh was one of the key developers of the new model since 2000. It is a really impressive story for the Nonhydrostatic Icosahedral Atmospheric Model (NICAM) to be developed so systematically and efficiently from that time on.

Since cloud and climate is my major research interest, I have worked with students and colleagues

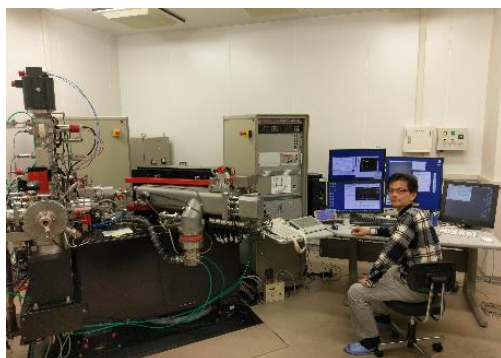
on the subject using cloud resolving models. Therefore, I have read reports of NICAM simulations of mesoscale systems embedding in multiscale tropical circulation ranging from tropical cyclones to intraseasonal oscillations. I have also noticed climate simulations from NICAM. These simulations provide important bench marks for the next generation weather and climate prediction. I am fully appreciative of the tremendous efforts involved in producing the results in about 10 years after the developing phase of NICAM.

Therefore, I decided to take the opportunity of my sabbatical leave to visit Prof. Satoh to better understand his modeling activities. In the beginning of my current visit, Prof. Satoh kindly arranged a meeting for me with his project members. From the ongoing research activities, I learned many interesting issues in cloud microphysics, satellite data applications, topographical representation schemes, TC dynamics, and MJO dynamics. I am most impressed by an overview of NICAM researches provided by Prof. Satoh's presentation and his review article.

The visit results in the following joint efforts. One is to work out a review article of precipitation efficiency and its role in cloud-radiative feedbacks to climate variability. We also plan to hold future workshops between students and colleagues in my department and the climate group here to enhance communications and collaborations.

SHIAO, Jen-Chieh

Full professor in the Institute of Oceanography, College of Science, National Taiwan University



It is my great honor to visit Atmosphere and Ocean Research Institute (AORI) and to make use of the state-of-the-art instruments with the distinguished scientists here. I knew Professor Yuji Sano from his pioneering works on the analysis of otolith Sr isotopes by NanoSIMS several years ago. Then I had some chances to meet him in person in Japan, USA and Taiwan. During the conversations with him, I found that he is a generous and warm-hearted person and I were always welcome to use the NanoSIMS when I visited AORI.

My cooperation with the assistant Professor Kotaro Shirai has started from two years ago when we wrote a chapter in the book "Biology & Ecology of Bluefin Tuna". Last year, Dr. Shirai visited my lab and we had some stimulating discussions on various projects. By discussions, I was inspired with a new cooperative study on the analysis of nitrogen isotopes in the fish otoliths. Afterward, we planned to study the mechanism of nitrogen incorporation in the calcified otolith located in fish inner ear. To the best of my knowledge, no one ever investigates this topic; therefore, we may be the first team to disclose the mysterious route through the nitrogen deposition in the otolith. We set up the experimental designs and arranged the research works in Taiwan and also in Japan respectively. We cultured the algae with ^{13}C and ^{15}N labeled chemicals and fed the spiked algae to tilapia fish for a period of time in Taiwan. Then, the otoliths were extracted from the fish and I brought the otoliths to AORI where the nitrogen and carbon isotopes were analyzed by using NanoSIMS, which was kindly provided by Professor Sano.

I am grateful and pleasurable to work with such an active team directed by Professor Sano and Professor Shirai. Also, Dr. Satoko Motai and Dr. Shirai help me embed the otolith with a new resin that I have never used. They also showed me the different methods and instruments to grind and to polish the otolith samples. The whole process for sample preparation is very efficient and reliable and it leads the results to a high-quality achievement, which is essential for the analysis by NanoSIMS. Assistant Professor Naoto Takahata and Dr. Kentaro Tanaka help me tune NanoSIMS to optimal condition and they also assist

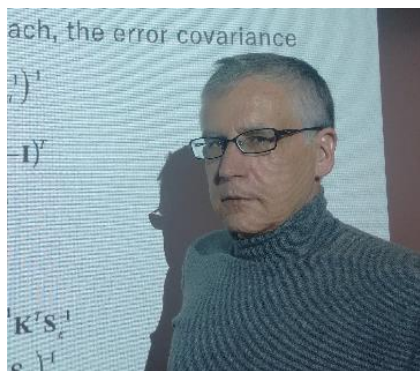
me to measure the nitrogen and carbon isotopes. Frankly speaking, it is very difficult to manipulate NanoSIMS but they can hand this machine smoothly and tightly to produce useful data. I am lucky to get the excellent data from four otoliths spiked with ^{13}C and ^{15}N before the filament of the electron gun was broken on the 3rd day after the analysis of my samples. I am surprised that the filament of the electron gun had been used for more than 10 years without replacement. This record represents the world-class expertise of NanoSIMS operators in AORI. The data measured in AORI together with other data which will be incorporated into a new publication planned for this year.

During the last week in Japan, we have a chance to visit the fishery scientist, Dr. Nobuaki Suzuki, who works at National Research Institute of Far Seas Fisheries and the director Dr. Masaya Katoh of the Research Center for Bioinformatics and Biosciences, National Research Institute of Fisheries Science. They showed me various instruments included the next generation DNA sequencers, which are used to do the genome typing of Pacific bluefin tuna. We also shared our experiences and experimental results of the genome typing on the Pacific bluefin tuna to each other. Based on the agreement made in this meeting, a solid cooperation on the close-kin analysis of Pacific bluefin tuna will be developed later this year.

To summary, I enjoy my study life in Japan and our cooperation in AORI is very successful. The scientists in AORI show their expertise, team works and warm hospitality to visitors. I am grateful to have this unforgettable experience to work here in AORI.

Andrey Bril

*Leading researcher of Centre "Optical Remote Sensing",
Institute of Physics of the National Academy of Sciences of Belarus (IPNASB)*



It has been a great pleasure and honor to be a Visiting professor at Atmosphere and Ocean Research Institute of the University of Tokyo for 4 month from December 2016. I joined the Atmospheric System Modeling stuff directed by Associate Prof. Ryoichi Imasu.

This is not my first visit to Japan. For more than nine years I worked at the National Institute for Environmental Studies (NIES) in Tsukuba within the GOSAT (Greenhouse gases Observing SATellite) project. My task in NIES was the development of the algorithm to retrieve concentrations of the atmospheric greenhouse gases, carbon dioxide and methane. The main difficulty we tried to overcome was inevitable impact of light scattering by clouds and aerosols on the measured signals. My colleague Sergey Oshchepkov and I had proposed to account for atmospheric light scattering effects in terms of optical path statistics and we implemented this idea as PPDF-based algorithm (PPDF is abbreviation for Photon path-length –Probability Density Function) . This algorithm is run now in NIES in parallel with operational algorithm in similar operational mode. The Atmospheric System Modeling stuff and students analyze and validate PPDF-retrievals before their release for general users. I joined this validation activity. I hope that my experience and understanding of the algorithm advantages and weaknesses were helpful to my AORI colleagues.

Another joint study aimed on the improvements and further development of PPDF-based algorithms having in mind its possible applications in future missions such as GOSAT-2. We focused on the development of the numerical simulator for the algorithm testing.

I am also thankful for the possibility to continue during my stay in AORI the study within Joint Research Agreement between IPNASB and GOSAT project parties (JAXA, NIES and Ministry of Environment). It aims on using the synergy of satellite and ground-based observations of the greenhouse gases to improve the quality of GOSAT retrievals. The problem I focused on was the extrapolation of

limited information from collocated GOSAT and ground-based observations onto global scale using EOF (Empirical Orthogonal Function)-based regressions. I had useful meetings and discussions with my collaborators in Japan. During my stay in AORI, our joint paper with first results on EOF-based regression algorithm for GOSAT data processing was accepted for publication in Journal of Quantitative spectroscopy and Radiative Transfer. I was offered the possibility to present these results at the seminar within GOSAT-2 Science Team meeting.

I also had nice time beyond AORI. I had many favorite places (gardens, museums, shrines) in Tokyo, Tsukuba, Kamakura and I used the opportunity to visit them. I hope I'm lucky to catch the beginning of the sakura blossom before my departure.

Nikita Rokotyan

Researcher, Ural Federal University

Dr. Nikita Rokotyan from the Climate and Environmental Physics Laboratory, Ural Federal University (CEPL URFU, Russia), have visited AORI from the 26th of December 2016 to the 16th of March 2017 in frame of scientific collaboration between UrFU and UTokyo. Collaboration between the two universities has started more than 17 years ago when the head of CEPL Prof. Vyacheslav Zakharov together with R. Imasu-sensei started analyzing IMG ADEOS spectral measurements in order to retrieve water vapour isotopic distribution HDO/H₂O in the atmosphere firstly.

Dr. Rokotyan is a research scientist at CEPL focusing on ground- and satellite-based Remote Sensing applications to study Climate Change, mainly through isotopic measurements. Monitoring isotopic concentration ratios in atmosphere can provide important information about sources and sinks of greenhouse gases. During his stay in Japan, Dr. Rokotyan has analyzed TANSO-FTS/GOSAT spectra and performed a feasibility study of retrieval of $\delta^{13}\text{C}$ ($^{13}\text{CO}_2/^{12}\text{CO}_2$) from satellite measurements. The ratio of $^{13}\text{CO}_2/^{12}\text{CO}_2$ can be used to characterize carbon cycle of an ecosystem because plants absorb heavier CO₂ isotopologues less efficiently. In turn, anthropogenic CO₂ emissions have a different isotopic signature than natural carbon dioxide, and information about CO₂ sources and sinks can be obtained through isotopic analysis.

Also Dr. Rokotyan has participated in the 25th IIS forum "Earth observation, disaster monitoring and risk assessment from space" which was held in UTokyo at Komaba research campus on the 2nd of March 2017. In his presentation Dr. Rokotyan has described joint research activities between UrFU and AORI in the field of atmospheric Remote Sensing and gave an overview of the Ural Atmospheric Station in Kourovka, which is located in Western Siberia and operated by CEPL.

UrFU and Dr. Rokotyan would like to thank AORI and R. Imasu-sensei for organizing this visit and they look forward to continue fruitful collaboration between the institutes.



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