# DOWAS NEWS

## 2019

## Vol.22 No.3




海洋深層水利用学会

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# International Deep Ocean Water Symposium and 18th Conference of Korea Deep Ocean Water Applications Society

**Masayuki Takahashi (DOWAS, President)**

**Jesun Uh（Korea Deep Ocean Water Applications Society, President）**

On Thursday, November 14 and Friday, November 15th 2019, the international symposium and conference were held in Korea at the National Assembly Member's training Center in Gaesong, Gangwon-do, Korea (where the 2018 DOWAS annual conference was held). It was held under the auspices and organized by Korea DOWAS, Korea Ministry of Marine and Fisheries (equivalent to Japan's national ministry), Gangwon-do Province (equivalent to a Japanese Prefecture), Gangwon-do Assembly, Geoseong-gun Council, Deep Ocean Water Research Center of Kyungdong University, Pacific Rim Marine Bio-Industry Research Institute, and the Korea Deep Ocean Fisheries Association. At the international symposium, two people from the United States, two from Taiwan, and one from Japan were invited, along with participants and sponsoring organizations and their representatives, deep seawater related companies, universities and research institutes involved in research and technology development, there were approximately 250 people and students. Approximately 40 students from Kyungdong University's Department of Deep Ocean Water attended the lectures and listened eagerly. The presentations were given in native languages and simultaneously interpreted into English, Chinese, Japanese, and Korean.

The international seminar started at 13:30, chaired by Yong-Hwan Kim (金庸桓), secretary general of the Korean Deep Ocean Water Applications Society moderated and opening remarks were provided by Jesun Uh, president of the Korean Deep Ocean Water Applications Society, Sung-Yong Chun, president of Kyungdong University, the governor of Gangwon-do, Geoseong-gun County Councilor, a member of parliament, and minister of Marine and Fisheries of South Korea.

The international symposium started from 14:00 with each presentation scheduled for 25 minutes. The first two were chaired by Jul Dal Hwan, president of a company within NELHA, with Jan War, operations manager of the Hawaii Ocean Science and Technology Park (HOST) within NELHA, talking on the topic "The use of deep ocean water resources to date in research and technology development," followed by Michael Eldred, director of Heat Exchanger Development at Makai Ocean Engineering, who presented "40 years of ocean thermal energy conversion." Next, Dr. Hee-Do Ahn , former researcher at the Korea Institute of Marine Science and Technology (KORDI) chaired professor Jin-Yuan Liu, former chairman of the Taiwan Deep Ocean Water Resource Use Society, presentation on "The future of deep ocean water in Taiwan," and Dr. Ping-Yi Huang, director of Resources, Stone and Resources Research Center, "Project for promotion of small-scale multi-stage use of deep ocean water in Taiwan." Then, Dr. Seongdae Song, professor emeritus of Kyungpook National University of Korea, chaired Masayuki Takahashi's "Deep ocean water; new resources for energy, water, fertilizers, and metals" and Dr. Lee Soo Jae of the Korea Institute for Environmental Studies', "Regional certification of deep ocean water."

Following the above international symposium, there were 10 presentations by members of the Korea Deep Ocean Water Applications Society. These presentations included "Addition of minerals derived from deep ocean water to food and drink," "Use of deep ocean water for husk-free chicken embryo culture," "Certification system for industrial use and expansion of deep ocean water," "Effects of deep ocean water on growth rate, sugar content, and yield of mini-tomato," "Effects of deep ocean water on lung cancer cells," "Antiplatelet activity of mineral balanced deep ocean water through regulation of Akt and ERK pathways," "Water quality and stability of deep ocean water," "Culture of mcroalgae (*Arthrospira maxima*) using deep ocean water," "Effects of treated deep ocean water on changes in green coffee beans," and "Thalassotherapy pilot program utilizing deep ocean water."

After the lectures, the speakers and chairs of the international symposium sat at tables on the stage and lively discussions were held in response to questions from the venue (Figure 1).


Figure 1: General discussion with speakers and moderators

After the lectures, participants were helped to relax from studying with a professional (solo) hula from a dancer living in Geoseong (Figure 2), and Solo song by young female musician (Figure 3).


Figure 2: Solo performance by professional hula dancer


Figure 3: Solo singing performance by professional female musician

The next day, Friday the 15th, we toured deep ocean water intake and utilization facilities throughout the day. After observing the deep ocean water information and experiencing facilities at Kyungdong University, we saw cultivation of Alaska pollack fry and recently completed low water temperature fish breeding intake facilities at the Gangwon-do Low Water Temperature Fisheries Resources Research Center, toured the Gangwon Ocean Deep Water Company (Geoseong-gun) and the Global Deep Water Company (Sokcho City) which are intake facilities, as well as Seigo Marine Co. (a farm facility) and Deep Sea Fisheries Complex (I and currently on sale II), etc.

## Report on the Deep Ocean Water Use Promotion Committee's 2019 Kagoshima Meeting

**Katsuhisa Yamada (Chairman of the Promotion Committee)**

This year's user's conference was held on the eve of the annual DOWAS conference at 15:15 on Wednesday, October 9th, with over 60 participants gathered at the Kagoshima University Learning Exchange Plaza 2F Hall.

Under the chair of Dr. Hiroyuki Arikawa of Kagoshima University, Professor Hiroyuki Maeda (Chairman of Kagoshima University's Industry-Academia Regional Co-Creation Center) opened the event with a welcoming speech. Originally assigned as a keynote, a kick-off lecture was given by the Society's Use Promotion Committee with the premise: "The Industrial Value of Deep Ocean Water, the last Resources left on Earth." Next, Mr. Nobuyuki Yamamoto, Chairman of the Kagoshima Deep Ocean Water Association, coordinated the discussion on a theme within the meeting "utilization in the field of fisheries," by three panelists who also presented.

First, Prof. Hiroyuki Maeda, mentioned above, gave a lecture on the study of Deep Ocean Water Utilization on Koshiki Island. As the only lab in Kyushu that demonstrates the advanced utilization of local products on Koshiki Island, which has Deep Ocean Water Intake Facility, it was said that experimental equipment for advanced complex aquaculture facilities utilizing Deep Ocean Water were set up as a project to promote regional revitalization through social implementation utilizing the Ministry of Education, Culture, Sports, Science, and Technology's National University Corporation Promotion Program to Enhance the Function of Research and Development that responds to regional issues in the southern Kyushu and Nansei Islands regions. In the aquaculture test at this facility, no other food was given, and abalone grew sufficiently with the attached algae grown in the nutrients contained in the DOW as feed, showing the potential of Deep Ocean Water.

Next, Mr. Hiroyuki Noda (Chief of Deep Ocean Water Department, Shizuoka Prefectural Fisheries Research Institute) gave a lecture entitled "Utilization of Deep Ocean Water at Shizuoka Prefectural Fisheries Research Institute," in which he talked about applied research on aquaculture. Especially in fisheries use, taking advantage of the characteristics of Suruga Bay Deep Ocean Water, with 'high nutrients,' which is rich in nutrients such as nitrogen and phosphorus, 'cleanliness,' with little bacteria, and 'low temperature stability,' with stable low temperature year round, as a measure against the disappearance of seaweed beds due to sea temperature rise phenomenon and the disappearance of useful algae-eating animals such as abalone, they are involved in the research of culturing large seaweeds of the family *Laminariaceae* such as *Ecklonia cava* and *Eisenia arborea*, and has contributed to the development of technology that efficiently produces seeds and seedlings. At present, the depth of the growing water is shallow, and the institute is working on the development of transplantation methods and aquaculture techniques that are suitable for *E. arborea* which is susceptible to damage by algae-eating fish.

Finally, Ms. Kyoko Washiashi (COO of GO Farm Co.) provided a very attractive lecture from a wide range of perspectives, from the background of the initiative, which as a group company of General Oyster Co. that has 28 oyster bars nationwide (as of September 2019), has been since 2012, working a challenge to create the world's first complete onshore aquaculture of oysters using Deep Ocean Water in Kumejima, Okinawa, to its social significance. In the future, they will continue to utilize Deep Ocean Water for the oyster business and further evolve and develop the current fisheries technology that have been inherited and continue to develop for the children who will lead the next generation as marine environmental pollution is becoming more serious every year with direct observation of the damage to oysters and other marine products.

In the panel discussion that followed, many opinions and questions were raised form the venue, and it was an extremely meaningful round-table discussion in which each participant at the venue equally provided the origin and significance of the conference.

Although this is only a short note, thank you very much to everyone at Kagoshima University and Kagoshima Deep Ocean Water Council, who set up a wonderful venue this time, and to the panelists who came to give lectures from long distances and participated in the round-table during their busy schedules.

(DOWAS Use Promotion Committee Katsuhisa Yamada)

Kagoshima Deep Ocean Water Council Chairman

Nobuyuki Yamato

Kick-off Lecture Author

DHC Co.

Panelists

From Left: Hiroyuki Noda (Shizuoka pref.)
Kyoko Washiashi, (GO Farm), Coordinator
Nobuyuki Yamato (Kagoshima Deep Ocean Water Council)

Director of Industry/Academia Regional Co-Creation Center, Kagoshima University

Professor Hiroto Maeda

Participants interested in the lectures

**Report on the 10th Okinawa Hawaii Ocean Energy and Economic Development Symposium and Workshop**

**Shin Okamura (Global Ocean reSource and Energy Association Institute Secretariat / Xenesys Inc.)**

This time was the tenth anniversary of the "Okinawa Hawaii Ocean Energy and Economic Development Symposium and Workshop."

This event is one of the activities that takes place under the "The Hawaii-Okinawa Partnership on Clean and Efficient Energy Development and Deployment" formed by an agreement signed in 2010 by the US Department of Energy, the Japan Ministry of Economy, Trade, and Industry, the State of Hawaii, and Okinawa Prefecture, and under the Okinawa Prefecture project for this partnership it takes place every year alternatively on Kumejima in Okinawa and Kona on the Island of Hawaii.

This year was held in Kona, where a tour of the Natural Energy Laboratory of Hawaii Authority (NELHA) took place on November 7, 2019, followed by symposium and workshop on the 8th and 9th. There were about 70 participants.

On the tour on the 7th, NELHA's recent activities, including a mobile hydrogen station by the Hawaii Natural Energy Institute (HNEI), coral cultivation by Legacy Reef Foundation, and seaweed cultivation by Kampachi Farms LCC was were introduced. NELHA is currently promoting aquaculture and an office for a program called "HATCH" (*1) that supports startups and incubation for emerging companies in this field has also begun.

On the 8th and 9th of the Symposium and Workshop, in addition to the main themes so far (ocean thermal energy conversion, deep ocean water utilization in industry, the environment, and human resource development and education), in response to requests form the Hawaiian-side, "Energy Resilience, Security, and Sustainability," was also included. On this theme, Vice President of Okinawa Electric Power Company Kiyohito Shimabukuro gave a lecture for the Okinawa-side, while Sharon M. Suzuki, CEO of Hawaiian Electric Company (HELCO) and Maui Electric Company (MECO) presented for the Hawaiian side. Both also participated in a panel discussion. Scott Glenn, Chief Energy Officer of the Hawaii State Energy Office (HSEO), which is responsible for Hawaii's energy policy, also poke on energy sustainability and participated in discussions.

In addition, this time to commemorate the 10th anniversary, a Talk Story panel was held by participants who had been involved since the beginning. Details and photos of the program can be found on the event's website (*2).

Over the past 10 events, the content has changed little by little as the circumstances surrounding "clean Energy" change. In particular, this time it was said that "climate change measures" and "sustainability" are rapidly increasing in importance, including the promotion of renewable energy, environmental protection, and aquaculture projects within NELHA. In Hawaii, the effects of climate change, such as sea level rise, hurricanes, and weather anomalies, are becoming visible and heightening alertness. Deep Ocean Water is also increasing its value as a renewable resource in terms of sustainable use of fishery resources and renewable energy, as well as in terms of industrial development… We saw this as the feeling of this event.

(*1) HATCH Aquaculture Accelerator, https://www.hatch.blue/

(*2) http://okinawahawaii-oews.com/photos.html

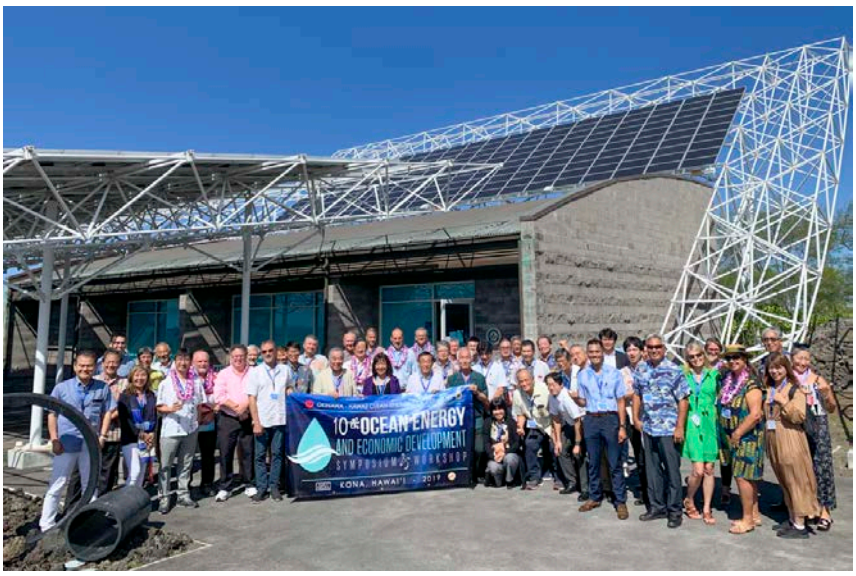


Photo 1: Participant Commemorative Photo


Photo 2: Mobile Hydrogen Station
(in NELHA)

Photo 3: Group Discussion