

# **DOWAS NEWS**

2023

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海洋深層水利用学会

2023.10.23

Research Presentation Planning Committee

“27<sup>th</sup> National Conference Report”

The 27<sup>th</sup> National Conference of the Deep Ocean Water Applications Society (Sado Conference) was held from October 19<sup>th</sup> (Thursday) to October 20 (Friday), 2023.

This year’s conference was significantly different from the web-based format over the past three years. It became possible to hold in-person meetings with large numbers of people as COVID-19 was transitioned to a type-5 infectious disease. In addition, the event was held on Sado Island, which requires relatively long travel time, so it was held as a hybrid of in-person and web-based.

As a result, the total number of participants: 105 people (members: 73, non-members: 32), in-person participant: 80, online participants: 21, cancellations: 4, and from overseas, 3 from Taiwan, and 4 from South Korea.

Regarding the number of presentations, a total of 21 presentations were made with 20 general presentations and 1 poster presentation.

The content of the general research presentations covered themes such as energy resources, environment, utilization concepts, aquaculture, and medical care.

The allotted time for research presentations was changed from the previous 15 minutes per topic to 20 minutes, including time for preparation and questions, so the presentations went very smoothly and with plenty of time.

In addition, in the afternoon of the second day, a tour was held to see the local water intake and distribution facilities (water intake 1,200m<sup>3</sup>/day), aquaculture facilities managed by Sado City (Ezobafun sea urchin, red snow crab, blue crab), and private sector drinking water bottling factory that utilizes deep ocean water.

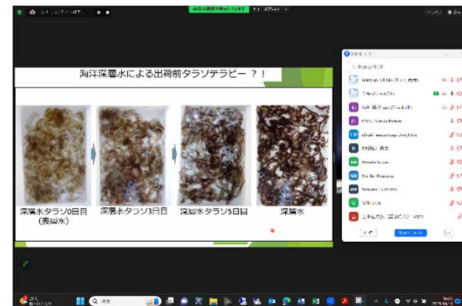
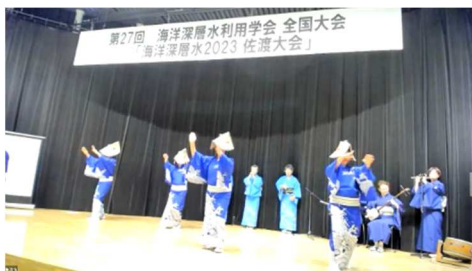
This year’s annual events included presentation of awards by the Society’s Award Selection Committee (10/19, 16:30~17:00), National Utilization Conference (by the Utilization Promotion Committee 10/18 16:00~18:00), an onsite lecture for elementary and junior high schools by the Education Promotion Committee (Hateno Elementary School 10/20 13:15~15:15), and a mini educational event for the general public (10/21 9:00~12:00).

We would like to express our gratitude to Mr. Hidekazu Igai, Deputy Mayor of Sado City and the members of the Industrial Promotion Division of the Regional Development Department for hosting this conference. In addition to providing the venue, they worked hard on everything from preparation to operation and cleanup. We would also like to thank Ramico Japan Co, a local deep ocean water company, and Niigata Prefecture Sado Deep Ocean Water Co. for providing drinking water at the conference and hosting tours. In addition, Dr. Risera Co. also provided drinking water, and we would like to express our gratitude to everyone who supported

us.



National Utilization Conference

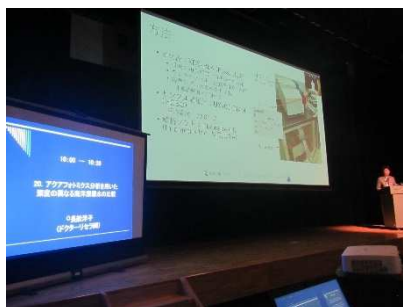


National Conference Day 1

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—SHIMIZU Katsunori (Chair of Research Presentation Planning Committee)—  
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Society Award Ceremony



National Conference 2<sup>nd</sup> Day



Site Visits



Educational Mini Event for the General Public

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## Deep Ocean Water Utilization Promotion Committee 2023 Sado Conference Report

Utilization Promotion Committee

Due to the effect of COVID, our conferences have been held remotely, but this year's Sado conference was held as a hybrid event for the first time in four years. The conference was originally held with the focus on the participation of those who utilize deep ocean water on a daily basis at water intakes across the country, however, it is not easy to travel all the way from intake sites to participate every year. Therefore, for the first time in Sado, we tried to introduce on a trial basis remote participation, which has become widespread and is one of the rare blessings from COVID. The remote conference system became an effective means from the preparatory stage of this conference. With the understanding of Sado City Hall, the event venue, we were able to make preparations after seven meetings.

The plan for this conference was elaborated through seven remote meetings, and at this time, there was a growing sense that we wanted to make this a theme that we could continue on with, rather than just conclude at Sado. Now that the COVID pandemic is coming to an end, we decided to reconsider the utilization of deep ocean water.

First, at the Sado Conference, we decided to have experts in various fields involved in deep ocean water speak about their expectations, with the theme "Revising our Expectations for Deep Ocean Water Utilization." On Wednesday October 18<sup>th</sup>, the first national utilization conference in four years was held in the event space of Ai Port Sado facing Ryotsu Port, the gateway to Sado Island in a hybrid format.

From 16:00, academia was represented by DOWAS President Professor OTSUKA Koji, and from the water intake side, Mr. Oyamatsu and Mr. Ito of Sado City Hall, the venue for this year's event. After, Mr. Yamazaki of Muroto City Hall, a pioneer in deep ocean water intake business talked, Mr. Funamoto from Nyuzen Town Hall in Toyama Prefecture, which is shining brightly with the steady progress of multi-stage high-volume utilization which is the ideal method of utilizing

DOW, spoke remotely. Finally, on behalf of utilizers, Ms. Washiashi of the Kumejima DOW Council spoke about the "Kumejima Model" as a typical example of DOW utilization. Three people with different positions spoke until the scheduled end time of 18:00 on their hopes for utilization of DOW.

This was the first time in four years that the event had been held locally and although only about 20 people gathered on-site, 15 people participated remotely. Considering that the time available to publicize the remote event was extremely short, we believe that if the information can be communicated to users at water intake sites across the country in the future, we can hope for more participants than ever before.

This conference will be developed keep the expectations of the Sado Conference in mind as we prepare for next year's event.



Finally, we would like to once again thank everyone who spoke at this year's event.

**DOW Education Promotion Committee Education Event Activity Report**

OTSUKA Koji (Osaka Public University) • OKAMURA Shin (Xenesys Inc.) • KONO Toshio (Kochi Prefecture DOW Research Institute) • TAKADA Tamae (Doctor Risera Inc.) • YASUNAGA Takeshi (Saga University)

The Deep Ocean Water Education Promotion Committee was established in October 2021 with the aim of developing educational content for children and promoting education events using that content. The committee held its first on-site lecture and event in conjunction with the national conference, which was held face to face for the first time in four years in Sado.

Sado City has 22 municipal elementary schools and 13 municipal junior high schools. The on-site classes targeted upper elementary and junior high school students. In the end, thanks to the coordination of Sado Cit, Principal IGARASHI Kazuhiko of Hateno Elementary School undertook the implementation. Hateno Elementary School is located near the center of Sado Island and has a total of 164 students. The on-site class was held during the 5<sup>th</sup> and 6<sup>th</sup> general class periods for all 33 5<sup>th</sup> grade students after the second day of the national conference on Friday, October 20<sup>th</sup>.

The on-site lecture was attended by the five authoring members of the promotion committee as instructors, and 6 attendees (Director TAKAHASHI Masayuki, ASAKURA Yoko (Japan Science Association), YAMAZAKI Hashira, HAMA Masakazu (Muroto City), HATAKEYAMA Kazuyoshi, and OYAMATSU Kenta (Sado City) also participated for a total of 11 people. The 5<sup>th</sup> graders gathered in the science room where President OTSUKA gave an opening True/False quiz, which created a great deal of excitement. Most children, which were very knowledgeable students, answered all questions correctly. Next was about water content. The children drank Muroto water with a hardness of 50mg/L and 1200mg/L. The children who drank 1200mg/L had very sour faces. After that, they learned about ocean currents and ocean floor currents through classroom lectures, then it was time for experiments. Blue water was gently poured into an aquarium with clear water creating a thermal stratification. Ice caused the blue water to flow to the bottom, which students watched with wonder. After a break and learning about sustainability including the basic properties of deep

ocean water and the products created, it was time to experiment again. This time, a large straw was used to pour blue highly concentrated saline solution to the bottom of the aquarium containing clear water, creating temperature stratification again. This time, students were given the task of taking water only from the bottom using a small tub, and after discussing it in each group, we used the principal of a siphon to move the blue water from the bottom to a plate. After that, ice was used with a heatsink and Peltier element. When students placed their hands on the Peltier it created electricity driving a wire-attached motor with attached propeller. It seemed strange to generate electricity using only one's own body temperature, but everyone warmed their hands and raised their hands to try to generate electricity. The two-hour class went by in a flash, and the energetic children were smiling and having fun from beginning to end. In addition, in consideration of the continuity of education on deep ocean water in the future, all of the experimental equipment was donated to Hateneo Elementary School.

After the on-site class, the children were asked to complete a questionnaire. From Figure 1, more than 90% of the children answered that this course was interesting or fairly interesting. There were no responses saying that it was not interesting or not very interesting, so we can assume that the children were able to learn with interest. From Figure 2, 60% of the children answered that the level of content implemented was just right, 10% said it was too easy or a little too easy, but 30% of the children found it to be moderately difficult, however, no respondents said it was too difficult. Figure 3 also shows the results of the question about whether or not the participants knew about deep ocean water before the lecture. From Figure 3, it appears that about 30% of the children knew about it in advance. They learned about deep ocean water through a variety of sources including facility tours, advertisements, YouTube, SNS, television, and their parents. During the experiment, some children said they had seen the content on YouTube, so it can be assumed that disseminating accurate information on

YouTube has a certain educational effect.

On Saturday, October 21<sup>st</sup>, an additional educational event was held using the Ai Port Sado event space. At the event, videos were shown on a large screen for visitors to learn about organisms and general ocean circulation centered on intakes of Sado City and Muroto City. There was also a poster exhibition on ocean thermal energy conversion, and production of sinkers as well as experiments similar to those conducted at Hateno Elementary School. Unfortunately, the rainy weather limited participation, but about 30 elementary school students, preschoolers, and their parents attended.

This event was the committee’s first initiative, but the program was implemented on time as planned, focusing on the content prepared by Committee Member OKAMURA based on his past experience on Kumejima. This achievement was a great opportunity for each committee member to learn new experimental methods and preparation. In the future, we hope that based on this initiative, we will increase many learning opportunities and help build a sustainable society by increasing the awareness and popularization of DOW. As for the activities of the Education Promotion Committee, it is necessary to continue collecting educational content and developing materials. We will save the slides used in the on-site classes this time, record the experimental methods, and the contents of the learning events, and create an environment where they can be implemented and improved on an ongoing basis.

Finally, we would like to express our sincere gratitude to everyone in Sado City for their cooperation in this project, as well as Hateno Elementary School’s Principal IGARASHI, Vice Principal WATANABE, and 5<sup>th</sup> Grade

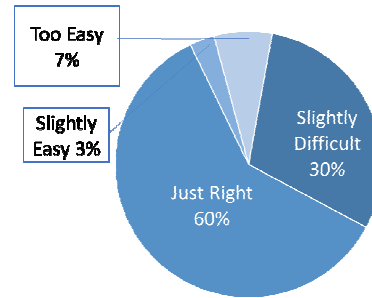


Figure 2. Was the DOW Course Difficult?  
(There were no responses saying “Too Difficult.”)

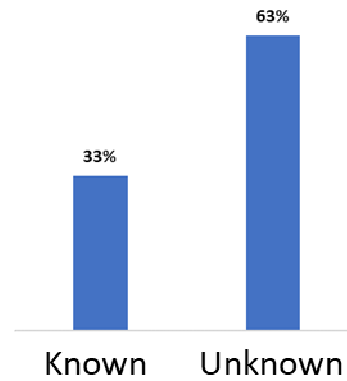
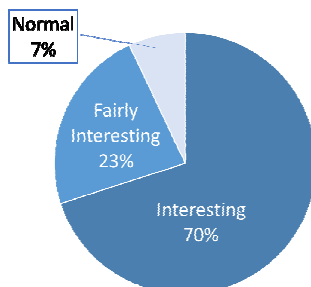


Figure 3. Did you know about DOW?  
(Including 1 no-response)



teacher HIRANO.

Figure 1. Was the DOW Course Interesting?

(No responses replying “It wasn’t interesting,” or “It wasn’t very interesting.”)



Photo 1. Class Opening

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Photo 2. Comparison of Drinking Water at Different Hardness



Photo 5. Observation of Thermal Stratification



Photo 3. Preparation for Thermohaline Circulation Experiment

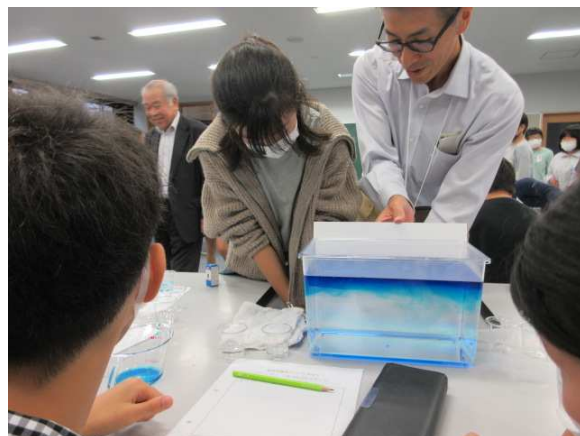


Photo 6. Observation of Thermal Stratification



Photo 4. Preparation for Thermohaline Circulation Experiment



Photo 7. Preparation for Temperature Difference Power Generation

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Photo 8. Preparation for Power Generation Utilizing Peltier



Photo 11. Poster Display of Deep Creatures at Ai Port Sado



Photo 9. Water Intake using Siphon Principal



Photo 12. Explanation at Ai Port Sado



Photo 10. Water Intake using Siphon Principal



Photo 13. Experiment at Ai Port Sado

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Photo 14. Making Floaters at Ai Port Sado