

Ocean Newsletter

Selected Papers

No. **19**
October 2015

Director's Message

As mankind moves into the 21st century, integrated policies of ocean governance are necessary for the sustainable development and use of our oceans and their resources and for the protection of the marine environment.

Towards this end, the Ocean Policy Research Institute, Sasakawa Peace Foundation (formerly: Ocean Policy Research Foundation until March 31st, 2015) orients its research on ocean issues in line with the mission statement "Living in Harmony with the Oceans".

The Ocean Policy Research Institute, Sasakawa Peace Foundation aims to conduct cross-sectoral research in ocean related issues in order to initiate debate on marine topics and to formulate both domestic and international policy proposals.

We publish a Japanese-language newsletter titled the "Ocean Newsletter" (previously known as "Ship & Ocean Newsletter") twice a month. "Ocean Newsletter Selected Papers No.19" contains English-language versions of papers from the Japanese Newsletter edition, published from No.331(2014.5.20) to No.350(2015.3.5).

The Ocean Newsletter seeks to provide people of diverse viewpoints and backgrounds with a forum for discussion and to contribute to the formulation of maritime policies conducive to coexistence between mankind and the ocean.

Our Foundation believes that the newsletter can expand effective communication on these issues by introducing timely research abroad to an informed readership. It also welcomes responses from readers, some of which appear in the Newsletter.

It is our sincere hope that these Selected Papers will provide useful insights on policy debate in Japan and help to foster global policy dialogue on various ocean issues.

Hiroshi TERASHIMA
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The Only Country in the World with a “Marine Day” National Holiday: Specifying “Ocean Education in the National Curriculum Guidelines”

[KEYWORDS] ocean education / role of politicians / capacity development

Yohei SASAKAWA

Chairman, The Nippon Foundation

(Ocean Newsletter No.335, July 20, 2014)

A better understanding is needed that we are now in an age when the impact of mankind on the ocean has reached unprecedented levels, provoking changes in the marine environment with immediate consequences for human survival. As it is important that a wide range of knowledge, skills, and judgment concerning the ocean is acquired by children as part of their schooling, I believe “ocean education” deserves to be recognized as an official part of the Curriculum Guidelines.

Proper management of the oceans is the key to human survival

The world has 193 UN member states but only one continuous ocean. Recently, a number of problems have come to the fore in connection with this ocean, including the problem of EEZ management. Today, in the 21st century, I think that how we manage the ocean will hold the key to human survival.

The global population has already topped 7 billion. It will surely not be long before it reaches 10 billion. So what size of population can the water planet –planet earth – sustain? Growth in the world’s population is already manifest in a variety of impacts. The problem of global warming. Marine pollution. On fisheries, too, some experts say that if we continue internationally uncontrolled overfishing at the current rate, the only thing left before three decades have passed will be deep-sea species. Meanwhile, exploration for seabed resources is now being carried out hundreds of kilometers from land, at depths reaching up to thousands of meters. Man’s impact on the oceans is now greater than ever. We need to be seriously aware that this is an age when the resultant changes in marine environments will immediately have consequences for the problem of human survival.

Inclusion of “education on the oceans” in the National Curriculum Guidelines in order to promote ocean education

All living things originated in the sea. The sea has been called “mother ocean”, while the phrases “maritime nation” and “Japan, a nation surrounded by sea” are often heard. But I would not be exaggerating if I said that most people in Japan know next to nothing about what the sea is, what state it is in, and how it affects human life. It is a major problem that there is no proper teaching about this important subject in Japanese school education.

Japan is the only country in the world to celebrate “Marine Day” as a national holiday. When the Basic Act on Ocean Policy was enacted in 2007, “to promote school education and social education with regard to the oceans” was clearly set out as one of its basic aims. But the present reality is that ocean education is hardly undertaken at all. If



our beautiful water planet is to be inherited by the children of the future, I think it is an urgent and important task to teach them various knowledge, skills, powers of judgment and others about the oceans in their school education. This should be based on the present situation, in which the use of the oceans has expanded and risks have become progressively diverse as a result, rather than simply the level of marine transportation or observing living organisms on the shore when bathing in the sea.

To this end, it is very important that ocean education should be given a place in the National Curriculum Guide-

■ The importance of including “ocean education” in the National Curriculum Guidelines

In March 2014, the Nippon Foundation’s “Ocean Education Strategy Council”^{*} made the following proposals for including ocean education in the next National Curriculum Guidelines. (Brief outline only)

1. “Education on the oceans” or just “Oceans” should be clearly specified in the general provisions of the National Curriculum Guidelines.
2. “Education on the oceans” or “Environment (including oceans)” should be clearly specified in examples of learning activity in the “Period for Integrated Study” in National Curriculum Guidelines.

^{*} Ocean Education Strategy Council: An expert council launched by the Nippon Foundation in 2013 as a vehicle for discussing measures to promote ocean education in Japanese schools. Yohei Sasakawa serves as the chair.

The Only Country in the World with a “Marine Day” National Holiday: Specifying “Ocean Education in the National Curriculum Guidelines”

lines. I understand that the Minister of Education, Culture, Sports, Science and Technology will soon be entering consultation with the Central Council for Education on revising the curriculum guidelines. Therefore, it is important that we strongly demand that the importance of ocean education should be understood by politicians, the Ministry of Education, Culture, Sports, Science and Technology, educators, experts and others, so that ocean education can be explicitly included in the National Curriculum Guidelines and taken up in school textbooks. Above all, I myself am currently working flat out to make sure that ocean education is incorporated in the Central Council’s report.

Expectations of leadership by the Prime Minister and the Headquarters for Ocean Policy

The Basic Act on Ocean Policy has been enacted and Headquarters for Ocean Policy have been established in the Prime Minister’s Office. The Prime Minister is in fact the Director-General of the Headquarters. Since Japan is the only country in the world to celebrate “Marine Day” as a national holiday, I strongly expect Prime Minister Abe to make safe management of the oceans one mainstay of proactive peace diplomacy. On Marine Day, moreover, I hope he will make a Prime Minister’s statement on the relationship between the Japanese and the seas, including the promotion of ocean education. In the USA, National Maritime Day is not a public holiday, yet the President still makes a statement to raise awareness of the oceans at national citizen level every year. I would also like the Headquarters for Ocean Policy to grow into a body that has a strong presence, by reconfirming the process and reasons behind its establishment for central and comprehensive promotion of measures related to the oceans.

We ourselves should also take action

On the other hand, rather than just having expectations of the government, we also need to take positive action ourselves. It is important that we make our demands known not only to politicians and the Ministry of Education, Culture, Sports, Science and Technology, but also to educators and the media. Many people and organizations are connected with the oceans, including shipping, shipbuilding, ports and harbors, fisheries and other marine industries, marine surveys, marine environments and other research centers, aquariums, museums, NPOs and others. We also need to complement ocean education in schools through activities to help children understand this special field in everyday language. It goes without saying that human resources will need to be developed. For children to have a broader interest in the oceans, I would like there to be an accumulation



Learning about the oceans in a mountainous area school / Sagami-hara Municipal Uchigo Elementary School (photo source: The University of Tokyo Research Center for Marine Education)

of practical teaching concerning the oceans, and for this to play its part in creating a groundswell of action.

On the subject of human resource development related to the oceans, university education and initiatives by industry in Japan cannot be described as satisfactory. Besides shipbuilding, shipping and other maritime industries, Japan is lagging far behind in drilling technology for seabed resources, including oil exploration and methane hydrate. In future, I would hope to see a more cooperative arrangement between public and private sectors in this respect. ■

A Fisheries Department for the Region, Not Just to Promote Cooperation

— Japan's only inland waters fisheries department —

[KEYWORDS] fisheries department / small academic department / region

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(Ocean Newsletter No.339, September 20, 2014)

Tochigi prefecture's Bato High School is home to the country's only inland waters fisheries department. Through its extremely varied activities, the Bato Fisheries Department has developed a unique local flavor as the "region's fisheries department." It is not an exaggeration to say that rather than just promoting cooperation in the region, the fisheries department's educational activities are incorporated in the region itself. The Bato High School Fisheries Department hopes to continue to be an indispensable element for building up the region in the future.

Introduction

Bato Senior High School Fisheries Department is extremely unique – not only in comparison to the 46 or so fisheries and marine high schools throughout Japan, but also when seen simply as a public senior high school. Since an explanation of its uniqueness would probably take up the whole of this issue, I will mention just a few points while focusing on the tentative title "Rivers, seas and local communities as a stage for education in fisheries".



Bato Senior High School Fisheries Training Station from the air

An outline of Bato Senior High School Fisheries Department

Bato Senior High School offers 3 classes in its General Studies Department (capacity 40 students) and 1 class in its stock enhancement-based Fisheries Department (capacity 25 students). There are 7 members of staff, comprising 4 teachers, 1 lecturer and 2 training assistants. The main subjects taught are "Resource Propagation", "Basic Fisheries and Oceans", "Marine Species", "Topical Research" and "Food Manufacture". Besides these, "River Study" is included as a school set subject. The school has a Fisheries Training Station located some 4km from the main buildings where the students normally have their lessons. At the Training Station, species including catfish, smelt, dace, loach, sturgeon, pejerrey, eel, and *honmoroko* (*Gnathopogon caeruleus*) are reared for breeding or research purposes.

Uniqueness of Bato Senior High School Fisheries Department

First, to answer the question we hear most often – "Why a Fisheries Department in Tochigi Prefecture?" Actually, there is no particular reason that would satisfy everyone. According to sources when the Department was first created, it originated because the Naka River is well known for *ayu* (smelt) fishing, and there a vigorous local drive to train

human resources for smelt farming. This led to the addition of a Fisheries Department to the existing Agriculture Department, General Studies Department and Home Economics Department of Bato Senior High School in 1972. From its very inception, it was unique.

A major and radical difference compared to other fisheries and marine high schools in Japan is that, ever since its establishment, it has not been a "fisheries (marine) senior high school" but a "Fisheries Department". This difference is by no means small in significance. Permitting myself to speak bluntly in awareness of certain criticisms, ours may be the only senior high school in Japan that has a "Fisheries Department" in the pure sense. This is because "fisheries and marine high schools" elsewhere in Japan are in reality segmented into different courses and categories on account of their scale, even if they go under the name of a "Fisheries Department".

Our "Fisheries Department" has two chief aspects. The first is the depth of meaning inherent in the word "fisheries", which could be said to derive from Japan's globally pre-eminent fish-based diet and maritime culture. Now that fisheries high schools all over Japan are being reorganized as "marine high schools" in response to the demands of the times, Bato Senior High School Fisheries Department must remain a "Fisheries Department", as its focus is on inland waters. "Freshwater", seen as a counterpart to "ocean", is not quite right, either. If we measure the field of study and education known as freshwater or inland waters against the yardstick of the ocean, our teaching material is really just a reduced version of the ocean. Our main topics are aquaculture, physiology and ecology of freshwater species, and their use as food and river environments; our themes include natural experience activities and people's livelihoods. This is a wide-ranging field, but we only reach a reduced version. That's why it's covered by a single department.

Turning to our graduates, the ratio of those taking up employment in fisheries inside and outside the prefecture is around 20 to 30% of the intake every year, and the majority of workers in freshwater aquaculture and wholesale markets inside the prefecture are graduates of our school. In



Newspaper article reporting on the artificial hatching of eel eggs (from the "Shimotsuke Shimbun", December 23, 2011 (Fri.))

A Fisheries Department for the Region, Not Just to Promote Cooperation

— Japan's only inland waters fisheries department —

other words, if we consider the content of our learning and our production of human resources for the industry, no word other than “fisheries” would be adequate.

The second aspect is the high level of freedom in the

Fisheries Department. For this, we have to look back at the history of Bato Senior High School Fisheries Department. The progress of the Department can be categorized according to changes in educational requirements in each era. After its launch in 1972 and a gestation period taken up with the development of the Fisheries Training Station, we entered a period of gradual progression, when seeding production technology was established for catfish, loach and pejerrey. The period of about 15 years from the end of the 1980s is seen as a time of dramatic growth. Various PR activities were developed via the activities of pupils in the Fisheries Department, most notably featuring a visit from their Imperial Highnesses the Prince and Princess Akishino in connection with our catfish farming.

From around this time, the development of the Fisheries Department came to be marked by broad-ranging activities not limited to the framework of stock enhancement, taking advantage of the characteristics of an “Inland Water Fisheries Department”. A good example of this was the start of canoeing expeditions down the Naka River by all pupils in the 3rd year. Then, in 2003, we served as Secretariat School for the National Stock Enhancement Technology Examinations (hosted by the National Association of Fisheries High School Principals). From that time until the present day, we can be said to have boosted our standing as a “local Fisheries Department”.

The majority of the Department’s activities are now more linked to the local area than they used to be. Long years of PR activity have borne fruit, and the attitudes of the prefecture and local community seem to have changed. Our success in artificially hatching eel eggs was given massive media coverage inside the prefecture, and it seems to have given a huge boost of vitality to the local area; for example, we hosted a facility inspection tour by the incumbent prefectural governor, an exceptionally unusual event for a school. The activities of the Fisheries Department are now extremely broad in scope. They range from what could be seen as innovations that directly bring positive effects to local industry – such as the establishment of inland water aquaculture technology for the tiger puffer, technology for local dissemination of the honmoroko and technology for the manufacture of salmon fish sauce – to registration of the

trademark “Nakagawa no Megumi” (Bounty of the Naka River) for food products, contribution of articles for six months to the local Shimono Shimbun newspaper for publication in “Nakagawa Hyakkei” (100 Views of the Naka River) by teaching staff in our Fisheries Department, and contributions to improvement works on rivers in the Naka basin. I feel it by no means an exaggeration to say that, rather than merely promoting collaboration, the educational activities of the Fisheries Department have been incorporated into the local area.

So what strengths of our Fisheries Department have generated such a positive evolution? In terms of the internal environment, it must be because, being a small-scale Fisheries Department, it excels in mobility and has a high level of freedom in its activity. I could even say that we have challenged anything to do with water, particularly on request from the local community. The breadth of meaning of “fisheries” has made that possible. In terms of external elements, we have no ships or other large-scale facilities, and a major factor is that our cost effectiveness has been highly praised.

Future image of Bato Senior High School

What should Bato Senior High School Fisheries Department be like in future? I would say the key point lies after all in its local activity. We follow a model whereby “The pupils learn a sense of sociality and responsibility by being active at various opportunities, including survey research that contributes to the local area, and exhibiting and making presentations of their activities and research outcomes in public places. They cultivate creative ideas and communication skills, and a love of learning. Above all, their self-esteem and sense of their own usefulness blossom from the experience of being valued and thanked by local people through their activities; their sense of belonging to the school and local community is enhanced, and they develop an affection for the local area. In the community, a sense of reassurance spreads, as a school in which the pupils’ faces are visible. Whenever they see a report in the newspapers or other media, they rejoice as if it were something of their own, as a source of local pride”. I want the existence of Bato Senior High School Fisheries Department to remain at the center of the virtuous cycle seen in this model; I want the graduates we produce to be people who support the local community while also being supporters of Bato Senior High School. Rather than just collaboration with the local community, I think our ideal future image is one in which we continue to be an indispensable presence for creating the communities of both today and tomorrow. ■

Japan and the Third International Conference on Small Island Developing States(SIDS)

[KEYWORDS] Third International Conference on Small Island Developing States(SIDS) / Islands and Oceans Net / Pacific Island States

Hiroshi TERASHIMA

Executive Director, Ocean Policy Research Foundation
(Ocean Newsletter No.343, November 20, 2014)

The Third International Conference on Small Island Developing States, held in September in Samoa, adopted the Samoa Pathway action plan for the sustainable development of small island States over the next 10 years. As a conference participant, OPRF, in cooperation with interested parties from the Pacific region, hosted a side event in which it launched the Islands and Oceans Net, an international collaborative network composed of a wide variety of partners. We hope to make this network a basis for promoting the implementation of policies concerning islands and oceans, especially in the Pacific region.

The 3rd International Conference on SIDS

The Third International Conference on Small Island Developing States (SIDS), hosted by the United Nations, was held from September 1st to 4th in the South Pacific state of Samoa. This was in response to a decision made at the “Rio+20” Conference in 2012 that a third International Conference on SIDS would be held to enable stakeholders to cooperate and collaborate in promoting the “Barbados Programme of Action” (adopted in 1994) and the “Mauritius Strategy” (adopted in 2005) for sustainable development of SIDS.

The Conference was attended by some 3,500 participants, including representatives of the UN and heads of SIDS and other states as well as member states, international agencies, etc., local governments, science and technology, industry, women and youth, under the awareness that broad international solidarity is needed in order to achieve sustainable development. On the final day of the Conference, “SIDS Accelerated Modalities Of Action [S.A.M.O.A.] Pathways” was adopted as a plan of action for the next 10 years.

Ocean Policy Research Foundation hosts a Side Event

At the Conference, as well as holding Plenary Meetings with UN full members and “multi-stakeholder partnership dialogues” with the participation of governments, international agencies and NGO groups on a daily basis, Side Events and others were also held in parallel. The Ocean Policy Research Foundation, which has NGO Special Consultative Status to the United Nations, also took part in this

Conference as a member of a UN major group. As well as attending multi-stakeholder partnership dialogues and others every day, on September 3 we hosted the Side Event “Towards a new dialogue for the better conservation and management of islands and their surrounding ocean areas”, in cooperation with the Australian National Centre for Ocean Resources and Security at the University of Wollongong (ANCORS) and relevant organizations from Pacific island states.

The SIDS dotted around our oceans face a variety of problems. These include the impact of globalization on the islands’ economies and way of life, management of Economic Exclusive Zones (EEZ) around the islands based on the United Nations Convention on the Law of the Sea, and the impact of rising sea levels and other climate change. In response to these, SIDS are attempting to develop, utilize, protect and manage their islands and surrounding sea areas, but this is not proving so easy. It is also hard to say that support and cooperation for SIDS from the international community is having sufficient effect under present circumstances.

In view of this harsh situation facing island states, for the last 5 years the Ocean Policy Research Foundation has been conducting research, together with ANCORS and relevant organizations from Pacific island states, with focus on sustainable development, utilization, protection and management of islands and surrounding sea areas by Pacific island states. We have compiled policies that should be pursued by island states and the international community, respectively, and have made policy proposals to the UN and others. Many of our policy proposals were also incorporated in the action plan adopted by this SIDS Conference. A task for the future is to ensure that these proposals are steadily implemented.

Thus, we hosted this event with the aim of holding a dialog on how to promote the implementation of policies cooperatively in future, with a view to sustainable development and utilization as well as appropriate protection and management of islands and surrounding seas by various stakeholders. Luckily, this event was attended by many par-



Participants at the Side Event, from left: Co-Chairs Prof. Richard Kenchington and Hiroshi Terashima; President Remengesau; Joji Miyamori, Senior Deputy Director, Global Environment Division, Ministry of Foreign Affairs, Japan

ticipants with an interest in this problem, including President Remengesau of the Republic of Palau.

Establishment of “Island Ocean Net”

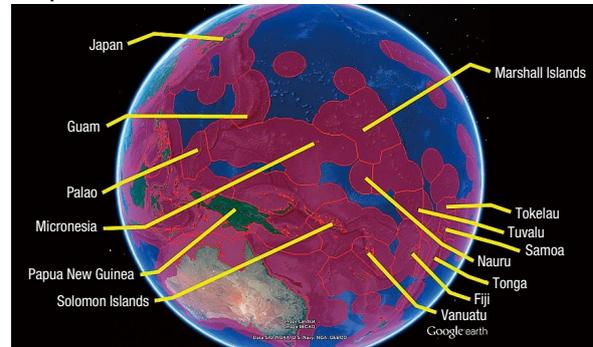
At the Event, the opening address was followed by participants’ presentations and a discussion. In response, the organizers proposed that an international cooperative network be established with a view to achieving sustainable development and utilization of islands and the surrounding oceans, as well as better protection and management. This prompted statements of support from the University of the South Pacific (USP), the Secretariat of the Pacific Regional Environment Programme (SPREP), the Pacific Youth Council (PYC), and others. As a result, a declaration on the establishment of an “Island Ocean Net” was adopted with the agreement of all the Event participants. The stakeholders have great expectations of the establishment of “Island Ocean Net”, in which the international community and the various stakeholders of island states will collaborate and cooperate beyond their respective standpoints, special fields, etc., to tackle the implementation of policies related to islands and oceans. The Ocean Policy Research Foundation, serving as the Secretariat, is currently lobbying various organizations and groups that agree with these principles, in the hope that they will also participate in “Island Ocean Net”. We are currently awaiting contact from interested parties.

Changes in the Pacific region

In the process of attending the International Conference on SIDS, I reinforced my view that Japan should place more emphasis on the Pacific region south of the Japanese archipelago and the island states dotted around there. In the past, Micronesia and other Pacific islands were more familiar to the Japanese, but amid the harrowing experiences of the Pacific war, Japan’s subsequent economic growth and the advance of globalization, Japanese people’s interest in the Pacific region has undeniably grown weaker. As a result, I feel that we have not fully recognized the huge changes that have occurred in the Pacific region over the last five decades or so.

One change that has occurred in the Pacific region involves the independence of Pacific islands. Until the second half of the 20th century, the islands dotted around the Pacific Ocean were either part of the UN Trust Territory or overseas territories of industrialized nations. Then, one by one, these islands gained independence and became members of the international community. Specifically, Samoa was the first to win independence in 1962, and by 1994 it had been followed by the Republic of Nauru, the

■ Map of EEZs in the South Pacific



Kingdom of Tonga, the Republic of Fiji, the Independent State of Papua New Guinea, the Solomon Islands, Tuvalu, the Republic of Kiribati, the Republic of Vanuatu, the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau. These new nations are now stepping up activities aimed at solidarity as Pacific island states, and Japan should properly perceive the South Pacific island states as partners in international politics.

Another major change in the Pacific region results from the United Nations Convention on the Law of the Sea. When the Convention came into force in 1994, these island states found themselves managing vast EEZs covering 200 nautical miles around their coasts. If we take a world map and draw each country’s EEZ on it, we see that these countries’ EEZs cover most of the west and south of the vast Pacific Ocean. In particular, the area of the Pacific from Japan to Australia is almost completely occupied by the EEZs of island states.

Proposal for priority on the Pacific region

Over the last half-century or so, Pacific islands have greatly enhanced their international standing as island states (or groups), and are now partners that deserve priority attention from Japan as well.

Most of these island states, consisting of small islands dotted around the ocean, are small countries with populations in tens or hundreds of thousands. They are working hard to develop, utilize, protect and manage their islands and the seas around them, but it is not so easy for them to manage their EEZs unaided. For Japan, as a fellow island state, a neighbor that shares the blessings of the Pacific Ocean, and a country with advanced knowledge and technology concerning the oceans, to collaborate and cooperate with Pacific island states and tackle these issues will benefit both sides, as well as the human race in general. I would like to propose that Japan places greater priority on the Pacific region and Pacific island states as partners in its diplomatic efforts and private-sector exchanges in future. ■

Handing on the Bountiful Seas of the Ogasawara Islands to Future Generations

— Joint Japan-China counter-measures to effectively address illegal operations by precious coral fishers —

[KEYWORDS] Precious coral fisher / illegal operations / Ogasawara Islands

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(Ocean Newsletter No.343, November 20, 2014)

There has been a rapid increase in the number of Chinese fishing vessels conducting illegal precious coral fishing operations in the territorial waters and EEZ of the Ogasawara Islands. The Ogasawara fishing industry has already suffered serious damage, and there are worries of catastrophic destruction of it as well the marine environment. In order to pass on the bountiful Ogasawara seas to future generations, urgent coordination by the Japanese and Chinese governments on countermeasures for illegal fishing vessels is indispensable.

Seas and industries of the Ogasawara Islands

In the murky depths of the seabed around the Ogasawara Islands, crimson branches of precious coral grow just 3 centimeters in a hundred years. To us in our clamorous daily lives, this seems an unthinkable distant span of time. But perhaps because of that, people have been attracted to the beautiful red color of these marine creatures. In 2011, the Ogasawara Islands were registered as a World Natural Heritage site because of their rich and unique ecosystem. This precious coral, these rich seas and the lives of people who depend on the sea for their livelihoods are now facing a crisis caused by frequent illegal operations by Chinese vessels.



Precious coral of the Ogasawara Islands

The seas around Ogasawara Village occupy about 30% of Japan's Economic Exclusive Zone (EEZ), and the village has been supported by the fishery and tourism industries that go hand-in-hand with these seas. Fisheries supported by rich seas directly employ 83 villagers and bring in annual catches worth about 500 million yen. With the addition of employees in peripheral industries and economic effects, this is the most valuable industry for a village with around 2,500 inhabitants. Meanwhile, tourism produces an economic effect of around 2 billion yen per year from visitors coming to the islands in search of beautiful seas.

Frequent sightings of Chinese fishing boats

In April 2014, a Japan Coast Guard patrol boat seized a Chinese fishing boat that was illegally harvesting precious coral in seas around the Ogasawara Islands. Again, at the end of July, a fishery research training ship discovered two Chinese fishing boats there. From mid-September, the

number of Chinese fishing boats frequenting Japanese territorial waters and the EEZ rose sharply to 10-20 vessels, and the impact on fishing operations by Ogasawara villagers started to increase. In early October, the Ogasawara Village Council made an urgent request to the Japan Coast Guard, which then immediately stepped up surveillance by patrol boats and aircraft. Patrol vessels of the Fisheries Agency were also mobilized. On October 23rd, a total of 113 Chinese fishing boats were discovered around the Ogasawara Islands (4 in territorial waters, 109 inside the EEZ). Just one week later on October 30th, another 48 Chinese fishing boats were discovered in the territorial waters and EEZ of the Ogasawara Islands, as well as 164 in the territorial waters and EEZ around Torishima and Smith Island in the Izu Islands. The total of 212 vessels was the highest ever recorded. The captains of five Chinese fishing boats have been detained for illegal operations or unauthorized fishing since September, although four of them were soon released under the early release system.

Level of damage

The damage to Ogasawara fisheries is acute. Chinese fishing boats of 100 tonnes or more navigate wantonly in areas where local fishing boats of less than 10 tonnes have set swordfish buoy-line fishing gear, causing immense financial damage due to frequent breakage or loss of the gear. With their numerical superiority, Chinese fishing boats monopolize the fishing grounds and continue to obstruct demersal pole and line fishing, swordfish buoy-line fishing, Precious coral harvesting and other operations by local fishing boats. There have been numerous reports of Chinese fishing boats obstructing their movements, chasing, stalking, approaching at close range, etc., including causing a sense of physical danger in some cases. There have also been cases of Chinese fishing boats navigating without lights at night. This is dangerous for fishermen who operate in the hours before dawn, and even makes them reluctant to



A fishing boat thought to be engaged in illegal operations near Ogasawara

approach the fishing grounds.

Precious coral resources inside the territorial waters and EEZ of the Ogasawara Islands are thought to have suffered catastrophic damage as a result of coral fishing across the seabed by large fleets of Chinese fishing boats, both day and night, since late September. According to a report by the Yomiuri Shimbun newspaper, each Chinese vessel operating illegally around the Ogasawara Islands lands Precious coral worth around 350 million yen per month. Assuming that there are currently at least 200 Chinese fishing boats making similar catches in seas around the Ogasawara and Izu Islands, the total damage in Japan's territorial waters and EEZ is estimated to be at least in the scale of tens of billions of yen.

For Ogasawara Village, even greater losses have clearly been suffered. Precious coral takes a long time to grow, the diametric hypertrophic growth rate of the axial skeleton being 0.3mm per year. In other words, it takes 100 years for the skeleton to grow 3 centimeters. Sustainable use of Precious coral depends on a moratorium of at least 10 to 20 years after harvesting. This devastating wanton harvesting of mature corals in just a single month is expected to cause a dramatic decrease in larval production. As a result, it will take at least several decades for the fishing grounds to recover. The huge damage inflicted on the seabed by the reckless coral nets of Chinese vessels, as well as the resultant devastating damage to marine ecosystems and fisheries, will become clear from now on. More than 15 years ago, damage was caused by large-scale poaching of Precious coral by several Taiwanese fishing boats around the Ogasawara Islands. After that, there were reports of a decline in demersal fish and others in the damaged sea areas. Unregulated coral nets had laid waste to fishing grounds and marine ecosystems even more than to the precious coral itself.

There are also concerns over an adverse impact on tourism. Since late September, Chinese fishing boats have been operating in seas just a few hundred meters from Chichijima Island, causing incidents in which they have obstructed the navigation of diving and sightseeing boats, among others. Meanwhile, more than 100 Chinese vessels

have been discovered, and the frequency of media reports is increasing. The damage to the tourism industry, supported until now by tourists who come in search of the beautiful and peaceful Ogasawara seas, will also surely become clear.

Future countermeasures

To stop illegal operations by Chinese fishing boats inside the territorial waters and EEZ around the Ogasawara Islands, both short- and medium-to-long-term countermeasures are being discussed inside Ogasawara Village. In the short term, measures would involve toughening legislation, strengthening maritime policing by mobilizing sea patrols with the Self-Defense Forces acting on behalf of the Japan Coast Guard, and seizing Chinese fishing boats. Meanwhile, since harvesting of Precious coral is prohibited by law in China, other measures under discussion include intensified lobbying of the Chinese authorities, stopping Chinese fishing boats from setting off at their point of departure, and having China and other third-party countries intensify their policing of landings.

In the medium to long term, an increased budget for the Japan Coast Guard and strengthening of security around the Ogasawara Islands are under discussion. In the long term, we need to promote the creation of international trading rules for Precious coral. This would involve introducing a system of eco-labels giving international guarantees that precious coral from the Ogasawara Islands is a marine product sourced from appropriately managed sustainable resources (MSC certification, etc.). Better use should also be made of systems such as certificates of origin confirming and certifying that Precious coral has been harvested legally.

Conclusion

In the space of just over one month, Precious coral nurtured by the Ogasawara seas for hundreds of years could be lost, along with marine ecosystems. The lives of people who depend on the sea will also be hugely impacted from now on. But even if it takes hundreds of years to revive this Precious coral and marine environment, the islanders still have to live with the Ogasawara seas. What we need now is not blanket criticism of China. We need to eliminate illegal catches by Chinese vessels that are irreversibly destroying the beautiful seas of the Ogasawara Islands and the fisheries that provide for people's lives, and to preserve Ogasawara's rich seas for future generations. It is vital that the Japanese and Chinese governments collaborate urgently to expedite effective measures against illegal fishing boats, which also violate Chinese laws designed to protect the marine environment. ■

Japan's Inherent Territory and Overseas Communications Capability

[KEYWORDS] sovereignty / international law / national strategy

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(Ocean Newsletter No.344, December 5, 2014)

Japan has consistently complied with international law and walked the path of peace. Korea and China are insisting on their territorial claims to Takeshima and Senkaku Island without accurate facts pertaining to their respective situations and the observance of international law. These issues are not solely matters of interpretation of international law, but are closely integrated into the national strategies of these two countries. As Takeshima and Senkaku Island issues are extremely important matters of national sovereignty, Japan has to strengthen its overseas communications capability based on national strategy.

Japan's inherent territory and international law

International law can be traced back to common rules shared by the Christian states of Europe. These rules were later drawn up between sovereign states in the Peace of Westphalia after the Thirty Years' War (1648), and remain in place today. Japan took the opportunity of the 1868 Meiji Restoration to build a modern nation state, and introduced international law as being the common rules in place among world powers at that time. After the Meiji Restoration, Japan honored the treaties it had contracted with other countries, and, even if they were unequal, negotiated their terms over time and amended them in agreement with the other contracting party.

Japan has maintained relations with the international community based on international law, and has established its standing as a sovereign state. Since problems related to territory and sovereignty are extremely international in nature and tend to escalate into diplomatic problems, Japan has handled these problems carefully to ensure there is no violation of international law. This is because Japan needs to have territorial title in accordance with international law in order to assert towards other countries that the territory belongs to it. Concerning the present hot issues of the Senkaku Islands and Takeshima, Japan reached Cabinet decisions on the Senkakus in 1895 and Takeshima in 1905. The reason for this was that, although these were firmly believed to be Japanese territories at the time, there had been requests for development of the islands from the Japanese private sector. As a result, measures in accordance with international law were formally adopted.

Takeshima and the Senkaku Islands

Much to Japan's surprise as a defeated nation after World War II, South Korea suddenly claimed that Takeshima had been Korean territory called Dokdo since olden times. Japan argued that the South Korean claim to Takeshima had no basis in international law, and proposed that steps be taken to resolve the problem through diplomacy. However, South Korea took Takeshima by force, and remains in control of the island today. According to an investiga-



A patrol boat protecting a Japanese fishing boat from a South Korean patrol boat (Source: Japan Coast Guard Report 2006)

tion by the Japan-Korea Fisheries Commission, until 1965, when the Treaty on Basic Relations between Japan and the Republic of Korea and a Fisheries Agreement were signed, 328 Japanese fishing boats had been seized, 3,929 fishing boat crew members had been detained, and there had been 44 fatalities or injuries in the seas around Takeshima.

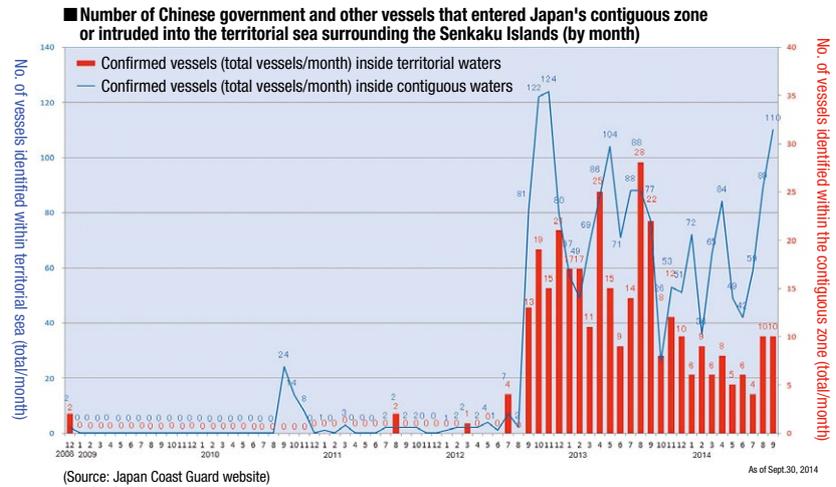
For 75 years after Japan acquired territorial ownership based on international law, China made no claim to sovereignty over the Senkaku Islands. However, as soon as it was known that there could be vast reserves of oil in subsoil of the East China Sea seabed, China suddenly claimed that the Senkaku Islands were an historically inherent part of China's territory. China's territorial claim was based on descriptions in old Chinese books, but this was a far cry from territorial ownership in accordance with international law. Nevertheless, China has stipulated that the Senkaku Islands are part of its own territory in domestic legislation. On that basis, it claims that the islands' surrounding seas are its contiguous zone and territorial waters, ignoring Japan's protests made through diplomatic channels, and continues to carry out domestic law enforcement activities using government ships.

Self-assertion by South Korea and China

South Korea has been issuing statements asserting its position on the problem of sovereignty over Takeshima, entwined with problems of historical consciousness. In 2006, the South Korean government set up the Northeast Asian History Foundation to handle issues such as "comfort women," history textbooks, Yasukuni Shrine visits, and



Chinese government ships under surveillance by a Japanese patrol vessel (Source: Japan Coast Guard Report 2013)



the renaming of the Sea of Japan. The Foundation has held seminars in other countries and supported foreign researchers, including researchers from Japan. In 2008, a “Dokdo Research Institute” specializing in developing strategies and policies regarding the Takeshima problem was established within the Foundation, and a “Dokdo Museum” was set up for children, school pupils and tourists. Huge amounts of government money are being invested in this effort to strengthen self-assertion activities both inside and outside South Korea.

In China, a one-party state guided by the Communist Party, the government itself continues to issue powerful statements on its territorial claims to the Senkaku Islands both inside and outside China, through the People’s Daily, Central China Television and other government media. China’s economic growth is an important policy underscoring the legitimacy of the Communist Party, and securing economic resources and freedom of activities in the East and South China Seas is one of the government’s core policy issues. In the past, as soon as the possibility of oil reserves existing under the seabed around the Senkaku Islands was reported, China wasted no time in claiming sovereignty over the islands. And still today, it pursues a near seas defense strategy aimed at making the East and South China Seas the “Chinese Sea” (A2/AD: Anti-Access/ Area Denial strategy). The problem of the Senkaku Islands can be seen as inextricably linked to China’s long-term national strategy.

Necessity for strategic approach on islands issue

Article 1 of the “Seventeen Article Constitution”, thought to have been authored by Prince Shotoku in the year 604,

includes the phrases “以和為貴 / 無忤為宗”. These have been interpreted as meaning that “Harmony should be valued above all and quarrels should be fundamentally avoided.” We also have the phrase “至誠通天” in Japanese. This is interpreted as meaning that “If we go about things with sincerity, we will always be understood by others in the end.” This, together with the purport of Article 1 above, is a concept that strikes a chord in many Japanese minds and so has been seen as a basic principle for action in daily life.

The Preamble to Japan’s present Constitution includes the words “...trusting in the justice and faith of the peace-loving peoples of the world...” On the problems of Takeshima and the Senkaku Islands, Japan has surely acted in the belief that if we act with sincerity throughout – even towards South Korea and China, with their differing customs and values – both countries will naturally understand our position and will endeavor to find a solution. But South Korea and China, quite to the contrary, have treated this problem in long-term and comprehensive terms based on their national strategies.

Until now, the Ministry of Foreign Affairs has been solely responsible for gathering and issuing materials related to the problems concerning the inherent part of Japan’s territory. Compared to the efforts by South Korea and China, this could be described as very modest indeed. Now, the Center for Island Studies of the Sasakawa Peace Foundation (<http://islandstudies.oprf-info.org/jp/>), the Takeshima Museum in Shimane Prefecture and the Senkaku Islands Document Material Compilation Association in Okinawa Prefecture are each continuing to research and gather “facts & figures” and make them public inside and outside Japan. However, these organizations have only

limited powers of self-assertion, as they are not government bodies. The problem of territorial title to these islands is closely linked to the issue of sovereignty, and as such, there have been calls for Japan to handle them comprehensively in connection with its national strategy.

With the birth of the Abe administration, the importance of self-assertion concerning territory and sovereignty has been extolled, and an Office of Policy Planning and Coordination on Territory and Sovereignty was established within the Cabinet Secretariat in 2013. That signaled the start of overseas and domestic communications activities on territory and sovereignty, and in the current fiscal year (FY2015) a government budget was allocated to projects necessary for gathering and issuing information, etc.

In future, I expect the fact that Takeshima and the Senkaku Islands are part of Japan's inherent territory, territorial sovereignty having been duly acquired over them in accordance with international law, to be vigorously asserted on the basis of national strategy. ■

Initiatives by the Councilors Meeting of the Headquarters for Ocean Policy

[KEYWORDS] Project Team(PT) / marine resources development / capacity development

Koji MIYAHARA

Chairman, Councilors Meeting, Headquarters for Ocean Policy
(Ocean Newsletter No.346, January 5, 2015)

Since the establishment of the Headquarters for Ocean Policy, it has made many advances in Japan's ocean policy, but many issues remain. The Councilors Meeting of the Headquarters for Ocean Policy, in order to advise the Headquarters' Head, the Prime Minister, established four Project Teams in July 2014 and is now proceeding with discussions on important issues for ocean policy.

Role of the Headquarters for Ocean Policy Advisory Board

The Headquarters for Ocean Policy is a government body for central and comprehensive promotion of policy measures concerning the ocean, based on the Basic Act on Ocean Policy enacted in 2007. Its Director-General is the Prime Minister and its members are all of the Cabinet Ministers. An Advisory Board has been set up inside the Headquarters to deliberate on important matters concerning measures related to the ocean, and to state opinions to the Director-General of the Headquarters for Ocean Policy (the Prime Minister).

As noted elsewhere, the author was appointed an adviser in June 2014 and was elected Chairman. Japan's ocean policy has made considerable progress since the Headquarters for Ocean Policy were established, but there are still issues to be resolved. As a result, while aware of the need for public and private sectors to take concerted action in resolving issues, I would like to promote discussion on the measures raised in the Basic Plan on Ocean Policy from various angles together with the other advisers. On this basis, we will compile an opinion with which to advise the Director-General of the Headquarters for Ocean Policy.

■ List of Headquarters for Ocean Policy Advisors (as of September 1, 2014)

(Chair)	Koji Miyahara / Vice Chairman, Keidanren (Japan Business Federation)
(Deputy Chairman)	Hirobumi Kawano / President, Japan Oil, Gas and Metals National Corporation (JOGMEC)
	Tamaki Ura / Director, Center for Socio-Robotic Synthesis, Kyushu Institute of Technology
	Mariko Kawano / Professor, Faculty of Law, Waseda University
	Shinji Sato / Professor, The University of Tokyo Graduate School
	Masayuki Takashima / President, Yokohama Port Corporation
	Koichi Furusho / Former Marine Chief of Staff Maritime Self Defence
	Yuko Maeda / Auditor, JAMSTEC; Fellow, Intellectual Property Division and Global Innovation, Bridgestone Corporation
	Tetsuo Yuhara / Research Director, The Canon Institute for Global Studies (CIGS)
	Keiji Washio / President, National Fisheries University

Trends related to offshore resource development

Japan's energy sources are diversifying. For crude oil, natural gas and other fossil fuels, fields of new business are expanding to areas other than the Middle East, including Brazilian offshore oil and North American shale gas. For

oil and gas fields, in particular, the ratio of marine sources is expected to rise.

Japanese shipbuilding companies are actively tackling the marine development sector through collaboration with local Brazilian companies and others, and this is expected to produce results. In future, the expectation is that this will help to form a solid foundation for new business development, not only in Brazil but also inside Japan.

New sectors of marine development are challenging fields in which companies are expected to invest large management resources and take risks. To overcome competition on a global level, it is indispensable to have government backing, such as assistance with technology development and financial support, in addition to self-help efforts by industry. When the Prime Minister visited Brazil in August 2014, a joint statement on the establishment of a Japan-Brazil Strategic and Global Partnership was announced. This kind of government support by "the No.1 salesman" is also important.

Creation of four Project Teams (PT) in the Advisory Board

As business opportunities for Japanese industry expand in this way, the importance of cross-sector cooperation in tackling issues related to the ocean is growing in importance. In July 2014, the Headquarters for Ocean Policy Advisory Board set up four project teams to study specific areas of interest. They are (1) the PT on New Marine Industry Promotion and Creation, (2) the PT on Ways of Encouraging Use of Ocean Areas, etc., (3) the PT on Ways of Protecting Marine Environments, etc., and (4) the PT on Human Resource Development and Education in Marine Industries). Each PT is now engaged in studies towards a target of March 2015, and all are promoting discussion in conjunction with space exploration policies.

The first of these, the PT on New Marine Industry Promotion and Creation, is examining the issue of how to explore, develop and industrialize offshore resources such as oil, gas and methane hydrate. The main themes of this PT are threefold. The first is the development of resources

and energy in Japan's coastal waters. Although methane hydrate, sea-floor hydrothermal deposits and other resources exist in Japan's Economic Exclusive Zone and elsewhere, the issue is how the public and private sectors should cooperate to promote efficient exploration and development and link them to future commercialization. The second theme involves promoting the use of offshore wind power and other marine renewable energies. And the third is to study how to raise the international competitiveness of Japanese manufacturing with regard to rigs, plant and other marine structures used in offshore resource development, and how Japan's maritime industries can participate in international operations using these.

The second group, the **PT on Ways of Encouraging Use of Ocean Areas, etc.**, is examining efficient and effective ways of utilizing sea areas by studying issues that should be tackled by Japan to promote marine industries (including the marine renewable energy industry). This might include carrying out exhaustive comparative studies on the enactment, application and implementation of legislation and systems related to the development and use of marine renewable energies by other countries and Japan, clarifying the background and reasons for differences between these, etc. In the process of this, the PT will pay heed to the instruction given by the Director-General (the Prime Minister) at a meeting of the Headquarters for Ocean Policy in July 2014, when he said that "On the management of territorial waters and the EEZ, we need to create a smooth system for adjustment of use, giving full consideration to the users and environments of ocean areas, in order to promote marine industries. With this in mind, I would like the relevant ministries and agencies to collaborate in efforts such as studying changes to legislation if necessary."

The third PT is involved in the protection of marine environments. In this connection, there are many issues of a global nature that cannot be resolved by Japan alone. When protecting marine environments, it is important to promote various initiatives while taking steps for international collaboration. The **PT on Ways of Protecting Marine Environments, etc.**, focuses on future issues and the response to them. Examples include protecting marine biodiversity, reducing pollution load on coastal areas and closed waters, changes in marine environments caused by global warming, and the problem of ocean acidification. A key prerequisite is to refute the notion that marine development and environmental protection are incompatible concepts; another is to ascertain the factual situation of environmental protection in the Economic Exclusive Zone, including coastal

"Joint Statement of the Official Working Visit of Prime Minister Shinzo Abe to Brazil on the Establishment of the Strategic and Global Partnership between Japan and Brazil"

(August 1, 2014, Brasilia) (excerpt)

"The two leaders ...concurred in promoting cooperation on industries related to offshore resource development."



Prime Minister Abe with President Rousseff

areas, as well as international trends on the protection of marine environments. In this way, harmony between development and environmental protection can be achieved. It is hoped that discussion by this PT will eventually lead to the establishment and overseas dissemination of eco-friendly development technology.

The fourth group is concerned with the acute shortage of human resources for marine development engineers, given the expected increase in business opportunities connected with the ocean. The **PT on Human Resource Development and Education in Marine Industries** discusses and studies the creation of specific schemes aimed at developing the human resources who will support marine development. In the fields of shipbuilding and marine transport, know-how has been accumulated in universities. As such, they need to brush up existing methods of human resource development and serve as drivers of human resource development in response to new needs. For example, Tokyo University of Marine Science and Technology attracted attention when it announced that it would create a Marine Environment and Energy Faculty in 2017. Besides the enhancement of university education, ocean education for the generation of children and pupils who will shoulder Japan's future is a theme directly linked to human resource development. To encourage them to show an interest in the maritime field as a career, it will be necessary to construct an enhanced educational curriculum that will convey Japan's nature as a maritime nation to pupils.

Japan has long been a "maritime nation," and the utilization of the oceans has always been a thriving activity. But now, with new marine industries expanding rapidly, I feel it essential that we think of Japan's national interests while considering harmony between development and the environment and collaborating with other countries. ■

About the Zipangu in the Ocean Program

[KEYWORDS] deep seabed mineral resources / marine resources survey / Zipangu in the Ocean Program

Tetsuro URABE

Professor Emeritus, The University of Tokyo / Program Director, Cross-Ministerial Strategic Innovation Promotion Program (SIP)
(Ocean Newsletter No.346, January 5, 2015)

Recently, countries in Europe and Asia, as if in competition, have been launching initiatives on seabed mineral resource development. Those countries whose continental shelf does not contain seabed resources are now turning eyes towards the high seas and the continental shelves of Pacific island States. Japan, however, being blessed with rich deposits of seabed mineral resources, has begun its Zipangu in the Ocean Program to carry out resource surveys, as one of the country's Cross-Ministerial Strategic Innovation Promotion Programs (SIP).

When will seabed mineral resources be developed?

Modern oil drilling is thought to have started in Pennsylvania, USA, in 1859. But now, exploration not only targets land but also reaches down to the deep sea floor at depths of more than 3,000 meters. 150 years after that first attempt, some 40% of oil production comes not from dry land, nor from shallow waters, but from deep-sea oil fields¹⁾. On the other hand, modern mining was established as a system in what is now Germany in around the 16th century, but still remains restricted to land or shallow waters. So when will mineral resources in the form of base metals such as copper, lead and zinc, precious metals like gold, silver and platinum, and rare metals like cobalt and rare-earth elements be mined from the deep seabed?

Different people give very different answers to this question.

If someone were to say “within the next 2 or 3 years,” they could rightly be seen as having no knowledge of the realities of the ocean, or else as a dreamer. That is to say, technology for mining on the deep seabed is globally uncharted territory, and is still only at the R&D stage. Moreover, research on the impact of seabed mining on surrounding environments and ecosystems is also still in progress.

At the other end of the scale, there are some who say it won't happen any time soon. To support this position, they say that no terrestrial metal resource is actually at risk of running out yet, seabed mining is still more expensive than mining on land, and besides, there is opposition (mainly in Europe) on grounds that the impact of seabed mining on the environment is unknown.

The rapid rise of resource exploration programs

Amid these varying viewpoints, there has recently been a surge of interest in deep seabed mineral resource development among European and Asian countries. The targets are threefold – manganese nodules, cobalt-rich crust, and sea-floor hydrothermal deposits. Resource exploration licenses

in international waters beyond the reach of individual sovereignty are granted by the International Seabed Authority (ISA). Until 2010, eight of these licenses had been issued, and there was no great change from year to year. After that, however, there was a sharp increase; including those due to be granted, 26 exploration licenses were scheduled for issue at the end of 2014. Collectively, these cover an area of around 1.2 million square kilometers – the same as the areas of Portugal, Spain and France combined²⁾. Next, let's look at the situation of countries' continental shelves. According to the European “Study to investigate the state of knowledge of deep-sea mining”³⁾, 26 exploration licenses for deep seabed mineral resources have been granted within various countries' Economic Exclusive Zones, and those are only the identified ones. Many of these licenses have been granted by Pacific island states to developed countries or private companies from developed countries. The EU supports these moves, and, in collaboration with the Secretariat of the Pacific Community (SPC), has implemented a project to study legal and fiscal systems for sustainable management of deep seabed resources. As such, there are very high expectations of industrialization in South Pacific countries.

The Ocean Zipangu Program (SIP Next-generation technology for ocean resources exploration)

Amazingly, of these European and Asian countries showing willingness to develop deep-sea mineral resource development, Japan is the only one that possesses the above-mentioned resources on its own continental shelf (except overseas territories). In 2009, the government drew up a 10-Year Plan for Marine Energy and Mineral Resource Development. With the aim of developing sea-floor hydrothermal deposits, it has promoted development of the necessary technology under the leadership of the Ministry of Economy, Trade and Industry and the Japan Oil, Gas and Metals National Corporation (JOGMEC). Many positive outcomes have been obtained as a result, including the confirmation of a medium-scale deposit of 3.7 million tons of ores in seas around Okinawa. On the other hand, mining

companies and others have expressed the reservation that about another ten or so deposits of similar size would need to be discovered before commercialization could be considered.

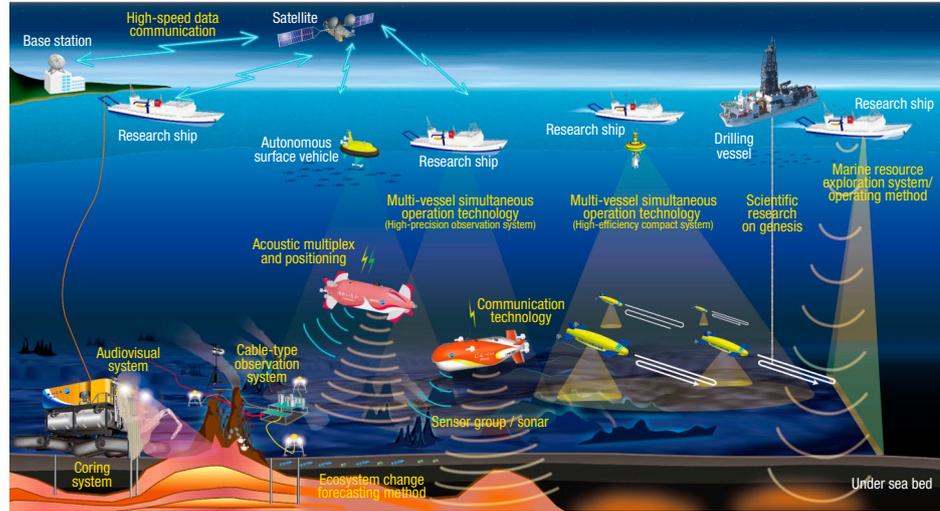
Given this situation, the Ocean Zipangu Program (Next-generation technology for ocean resources exploration) was newly adopted in FY2014 as part of the cross-ministerial Strategic Innovation Promotion Program (SIP). While JOGMEC is in charge of determining the volume of mineral reserves in known deposits and the technology for resource development, the aim of this Program is to develop the latest exploration machinery and to use it for efficient exploration of Japan's continental shelf. The Program consists of three main elements, namely genesis research for knowing the actual situation of deposits, development of technology for exploring them, and research on methods of monitoring the environmental impact over the long term. For detailed scientific and technical information, see the website (<http://www.jamtec.go.jp/sip/>) (*in Japanese only).

Although this Program is mainly concerned with sea-floor hydrothermal deposits and cobalt-rich crust, other targets are not ruled out. The reason why these two types of deposit are highlighted as priority targets is that, in theory, they can more or less cover the rare metals, precious metals and base metals needed to support Japan's advanced technology. This is not only for Japan's security, but also an attempt by our generation, which has consumed resources in such great quantities, to bequeath an inventory of assets to the next generation; it is a 100-year state plan.

The significance of deep seabed mineral resources

In Europe, the primary significance of deep seabed mineral resource development lies in security of the resource supply, an awareness shared by Japan. Even the report mentioned above reveals the perception that "With China claiming ownership over a large quantity of terrestrial mineral

■ Concept diagram of the Ocean Zipangu Program. For more detail, see the website <http://www.jamtec.go.jp/sip/> (*in Japanese only).



reserves for specific critical raw materials, ensuring access to ores of sufficient quality and maintaining a predictable price level with acceptable ranges of volatility becomes a challenge.” In fact, there is a strong sense of wariness over China in Europe; more than 60% of important metal elements determined as supply risks by the EU in 2010 had China as their priority supply source.

China's "resource nationalism," stemming from an embargo on movements of Chinese rare earth elements, is now spreading across the world. The government of Indonesia announced that it would ban exports of ores from 2014, while the South African government is studying measures to promote domestic industries, including regulation on exports of platinum. As these examples show, the trend shows no sign of abating. Behind the attraction of European nations and companies to resource development in international waters, beyond the reach of government regulation, must lie the fact that the future of resource security has become opaque.

At present, deep seabed mineral resources do not have the scale of economy to replace terrestrial resources. However, several rare metals with low supply elasticity and high supply risk are expected to play a role in diversifying supply sources and preventing price inflation, among others. I hope readers will understand and support the Ocean Zipangu Program. ■

1) Data from BP website, M. Daly (2013) "Future trend in oil and gas exploration."

2) ECORYS (28 August 2014), "Study to investigate the state of knowledge of deep-sea mining," Final Report under FWC MARE/2012/06 - SC E1/2013/04, to European Commission - DG Maritime Affairs and Fisheries.

Cooperation with Aquariums and Classes at a Special Needs School for the Visually Impaired

[KEYWORDS] visual impairment / science education / “classes to go”

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(Ocean Newsletter No.348, February 5, 2015)

In order to develop tactile inspection programs and tactile displays using actual specimens for the visually impaired, Okinawa Churaumi Aquarium and Tokyo Sea Life Park are cooperating on a “classes to go” program with a Special Needs School for the Visually Impaired. Beginning with this coordination, the aquariums have also gone on to cooperate in the Jump to Science, a hands-on learning event for visually impaired children. This article reports on some of the contents of these activities.

On the collaboration with “Jump to Science”

“Jump to Science” has been run by the Science Accessibility Net NPO since 2008. This event gives visually impaired children the chance to feel the extent of new possibilities through the use of IT, as well as practical experiences for discovering the fascination of science. Run entirely on public donations so far, it is held in Tokyo and eight other locations across the nation every year.

“In Tokyo” is a participatory science learning event for visually impaired children and pupils. It is held as a collaboration between teachers at schools for the blind, universities, museums, aquariums, and corporate volunteers from the Kanto-Koshinetsu region. Some 60 children and pupils, divided into groups of 3 to 6, take part in two 90-minute workshops (one in the morning, one in the afternoon) based on use of the five senses. There are 15-20 different workshops in all, overseen by 100 instructors and staff members, with a total of 200 people taking part. Churaumi Aquarium held workshops at the 2012 “In Osaka” and the 2014 “In Kyoto”, and loaned educational materials in 2013. Tokyo Sea Life Park has held workshops every year since the 2012 “In Tokyo”.

Besides this, the aquariums also give external instructor classes for special needs education schools for the visually impaired (blind schools). Tokyo Sea Life Park gave classes using tuna at the junior high school department of the Spe-

cial Needs Education School for the Visually Impaired, University of Tsukuba in 2003, and using eels at the elementary department in 2013. In 2011, Churaumi Aquarium gave classes mainly for observation of sharks at the Special Needs Education School for the Visually Impaired, University of Tsukuba, and five SNE schools for the visually impaired in Kansai (including Osaka Prefectural Special Needs Education School for the Visually Impaired).

Visual impairment and the shape of fish

Visually impaired children and pupils have little awareness of the morphological features of fish. When a whole fish is grilled for dinner, they may use chopsticks to eat it, but of course it is bad manners to touch the fish with their hands. Therefore, they never really have a chance to know the shape of the fish by touch. If they go to an aquarium without any kind of guidance, those with weak vision may just catch the outline of fish in large tanks using visual aids, but they cannot see detailed shapes. Completely blind pupils cannot even do that, and just walk around the aquarium. Recently, “touching pools” and other facilities for touching have been developed, giving the visually impaired a better chance to enjoy their visit. But in terms of scientific learning, I feel it is not enough just to know the surface texture by merely “touching”; it needs to be “felt” properly. It is hard for visually impaired children and pupils to grasp the whole picture at a single glance; they need more time to observe by touching.

While learning about vertebrates in a junior high school science class, one pupil said, “Fish are not vertebrates because they don’t have bones.” This is only to be expected, if fish are only ever eaten with the bones taken out. In fact, we found a surprisingly large number of pupils who knew nothing about whole fish. Therefore, we started giving science classes in which the pupils observe by deliberately and carefully touching the external form of a fish bought from a fishmonger’s, understand its morphological features and consider how it lived when it was still alive (not dissection, but observation of morphological features from the outside).

Every year, in Term 1 science classes in our junior high



Tactile observation of tuna

school department, Year 2 pupils observe horse mackerel and two or three other types of fish. By doing so, they learn about the basic shape of fish. After carefully observing horse mackerel (which is reasonably priced and readily available) as the basic shape, they often observe flying fish with their well-developed pectoral and pelvic fins, or flounder, in which the basic form is flattened so that the right side is on the top and the left side on the bottom. As there is a limit to the fish that can be provided at the school, we were very grateful for the opportunity to depend on the help of experts, using fish brought in from the Aquarium.

A shark observation class in partnership with Churaumi Aquarium

If it's Okinawa, there must be sharks! After several meetings with staff of the Churaumi Aquarium, they agreed to give lessons on sharks for one school period (50 minutes) each to a completely blind class and a weak vision class of Year 2 pupils in our junior high school department. The samples used as educational materials were immersed specimens. As these specimens are fixed in formaline, they cannot normally be touched, but Churaumi Aquarium kindly prepared enough "touchable immersed specimens" to match the number of pupils. The samples were alcohol-fixed specimens of baby sharks with a body length of around 40cm, soaked in water for about half a day to remove the alcohol before observation. They had no strong smell, and did not make the pupils' fingers wrinkly even when touched carefully for observation. The fish felt almost the same as they would do if they were alive. We felt that these "touchable immersed specimens" were suitable for children and pupils who knew nothing about sharks, as the surface texture was closer to the real living thing than would have been the case with hard specimens.

The class basically consisted of a dialog between instruc-



Touching an immersed specimen



A plastinated shark's head with other specimens

tor and pupils. Rather than giving answers first, the instructor asked questions inductively and encouraged the pupils to discover facts by observing for themselves. These external instructor classes were hugely successful, enabling the pupils to realize, through fish, that there are diverse living species on our planet.

Meanwhile, for pupils in other years who did not attend these classes, and visually impaired staff who are interested in fish, we set up an after-school "Mobile Museum Corner". The specimens used here include mako shark heads, whole-body plastination of a type of stingray, dried specimens of great white shark jaws, the plastinated heart of a whale shark, and dried specimens of porcupine fish (with the spines both extended and contracted). We have turned this into a mini-mobile museum, where pupils can observe by touch while talking to museum experts.

Plastination is a special process for preparing specimens of real sharks and other fish. The texture when touched is hard and quite different from the real thing, but it has the same sense of weight as the real thing, while its shape is just as large and detailed. We felt that anyone with an interest in or previous knowledge of sharks and other fish could confirm factual details by touching the plastinations, thus expanding their image of the real thing.

Although I have omitted many instances of collaboration with aquariums in this paper, I would like to think of ideas for expanding ocean education for visually impaired children and pupils in partnership with Churaumi Aquarium and Tokyo Sea Life Park in future. ■

Today's Sakura-ebi (a Sergestid Shrimp) Fishing Industry in Suruga Bay

[KEYWORDS] Sakura-ebi (Sergestid Shrimp) / Suruga Bay / pool system

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(Ocean Newsletter No.349, February 20, 2015)

The Sakura-ebi (a sergestid shrimp)¹⁾ fishing industry, aiming at sustainability, has for the last 50 years operated on a pool system in which all of the boats set out together daily and then the proceeds from their catch are distributed equally among them, based on an agreement. Nevertheless, the catch has been decreasing compared to earlier levels. While one of the reasons for the decline in resources has been the rapid progress in fishing technology, there also seems to be a deep connection with dramatic coastal development such as trunk roads, breakwaters, and industries in the last 50 years.

Recent situation of fisheries

It was not so long ago that the sakura-ebi (a sergestid shrimp*) fisheries started in Suruga Bay. One night in December 1894, two Yui fishermen took their boats to trawl for horse mackerel off the mouth of the Fuji River, when the float attached to the mouth of their net came adrift and the net sank deep into the sea. When they pulled the net back up, they found just over a *koku* (180 liters) of the sakura-ebi in it. Ever since this discovery of the shrimp schooling in deep waters, sakura-ebi fishing has thrived in the local areas of Yui and Kambara. The sakura-ebi often form schools off the Fuji River at the back of the bay, and off Oigawa River in the west of the bay, where the topography is steep and complex. They stay at depths of around 200-350m in the daytime, then rise to 20-50m when it grows dark. Fishing takes place at night, using the paired trawling system, whereby two boats trawl with a single net stretched between them.

The shrimps spawn 7-8 times between May and November, and most of them die after a year and a few months. Fishing is divided into the spring season from late March to early June and the autumn season from late October to late December. As a result, the shrimps are caught between the autumn of their first year and the winter of the following year. Fishing is currently being undertaken by 120 boats (60 pairs) belonging to the Association of Shizuoka Prefecture Sakura-ebi Fisheries (divided into the three districts of Yui, Kambara and Oigawa), which consists of the Yui Port Fishery Cooperative Association and Oigawa Port Fishery Cooperative Association. Annual catches in recent years have totaled around 1,000-2,500 tons, with a market value



Suruga-wan sakura-ebi (Suruga Bay sergestid shrimp) is now known across the country as a local brand (photo source: Yui Port Fishery Cooperative Association).

of around 2.3-5.5 billion Japanese yen (US\$18.9-45.1MM). The captured shrimps are purchased by processors at the ports the following morning, then processed by traditional sun-drying, or else boiled or processed into quick-frozen raw shrimp before being sent to market. In 2006, *Suruga-wan sakura-ebi* (Suruga Bay sergestid shrimp) was registered as a trademark, and now the name “sakura-ebi” is known across the country as a local brand.

Introduction of the pool system

Fishing grounds for the sakura-ebi are limited. If all the fishing boats were crammed into the narrow fishing grounds, it would lead to fierce competition for catches, and this could easily cause disputes between fishing boats and overfishing, among other problems. Meanwhile, processing of shrimps by sun-drying is affected by the weather, and there was previously only a limited quantity that could be processed in one day. As a result, the catch would sometimes exceed this quantity, while continuous rainy weather would vastly reduce the price. The 1960s was a time when boatowners were suffering from excessive competition coupled with the cost of upgrading fishing boats and fishing gear. To make things worse, shrimp fishing grounds were polluted by effluent from paper mills in Fuji City and large volumes of sludge discharged from Tagonoura Port. Under these circumstances, there was growing anxiety that, if fishing operations were to continue as before, fisheries could eventually go into decline.

This was when the idea of pooling fisheries was hatched. Under this system, all fishing boats would go out to fish together, regulate their catches, and pool the catch revenue equally among all boatowners, thus sharing the profits. After a two-year trial period, the pool system was launched in autumn 1968, divided into three districts. From around this time, fishermen joined forces to launch a movement in opposition to sludge pollution from Tagonoura Port. This movement went beyond local awareness to generate a strong sense of solidarity among the fishermen. Eventually, a shift was made to a comprehensive pool system involving all boats from the three districts in 1977, and this remains



Mount Fuji and the sakura-ebi spread out like a red carpet (photo source: Yui Port Fishery Cooperative Association)



Scene of traditional sun-drying (photographed by the author)

Today's Sakura-ebi (a Sergestid Shrimp) Fishing Industry in Suruga Bay

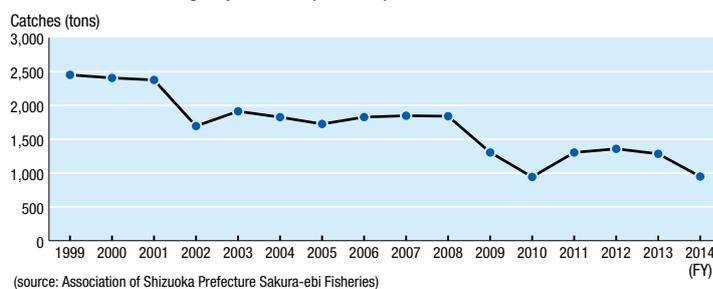
in force today. In this system, created by the boatowners themselves with the main aim of protecting resources and coordinating prices, details such as fishing ground, departure times, operating hours, and target catches are decided every day by a committee of 21 members representing the three districts. All fishermen comply with these when they trawl their nets.

This example of fishermen listening to the advice of the author, who explained the latent value of a collective fisheries system, seeing the sakura-ebi resources as a collective asset that should be conserved for their descendants, and maintaining a pool system for nearly half a century, is an exceedingly rare case in the world of Japanese fisheries.

Fishing boats have improved but catches are down

According to research until then, it had been estimated some time previously that catches of the sakura-ebi were often almost at the limit of “appropriate catches” that would enable sustainable resources to be maintained. In around 1983, therefore, the leaders of the fishery cooperatives added a precautionary principle, and agreed that annual catches would be kept at the level of 2,000-3,000 tons. The author pointed out in 1973 that CPUE²⁾ (catch per unit effort) was closely related to water temperature at depths of 50m in summer fishing grounds (in the larval and juvenile shrimp growth phase). As a result, the fishermen themselves started monitoring movements in resources by measuring water temperature and conducting spawning surveys. Fur-

■ Trends in catches of Suruga Bay sakura-ebi (1999-2014)



(source: Association of Shizuoka Prefecture Sakura-ebi Fisheries)

1) *Sergia lucens* (Hansen)

2) CPUE: Catch Per Unit Effort. Catches per unit of effort (the volume of fishing activity measured by the number of fishing boats, number of days, number of fixed nets set, etc.). An indicator of the abundance of fishery resources.

thermore, recently, they carried out test trawls in the fishing grounds during each operation, measured the shrimps' body length, and took steps to avoid schools of juvenile shrimps.

Despite these efforts to protect resources, however, sakura-ebi fisheries are beginning to face a new test – a decline in resources. Up to around 2002, excluding the poor catches in 1979-81, annual catches of more than 2,000 tons had been maintained. But this has fallen to the 1,000-ton range in recent years. Fishing capacity has dramatically improved thanks to the modernization and enlargement of fishing gear and fishing methods. Although this has served to boost catches in poor catch years, the amount of catches are continuing to fall from previous levels. One reason for this reduction in resources is thought to be that catches in excess of “appropriate catches” have been unintentionally made by fishing boats equipped with advanced technology, such as high-precision fishfinders, net sonde and powerful winches. Incidentally, up to around 1968, pre-spawning shrimps caught in the spring fishing season accounted for about 70% of total resources, but this has risen to 79-92% every year since 1998. While resources are declining, catches must be reduced in order to leave more spawning schools behind. Because of the pool system, there is a good chance that this fishing control will be made.

Changes on land

Until now, we have only focused on environmental changes inside Suruga Bay and adjacent waters when considering the decline in resources. However, changes in the environment around the fishing grounds over the last 50 years have actually been more pronounced on land than in the sea. Large quantities of seabed springwater sourced from Mount Fuji should be welling up at the back of the bay, the main spawning grounds of the sakura-ebi. Who can tell how this unseen source of springwater is affected by the construction of trunk roads and massive breakwaters that separate land from sea? On land, rich springwater is used for the operation of a group of paper mills and other industries, while numerous irrigation dams and erosion control dams have been built on the Fuji River and elsewhere. As such, groundwater and rivers flowing into Suruga Bay are thought to have changed considerably in both quantity and quality. We may need to shift our focus from sea to land when considering the impact of this kind of dramatic coastal development on the sakura-ebi habitats.

Monitoring of Sunken Marine Tsunami Debris Following the 2011 off the Pacific Coast of Tohoku Earthquake : debris mapping for use by the fishing industry

[KEYWORDS] habitat map / sustainable use of marine biological resources / conservation of marine ecosystems

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4 years after the earthquake and tsunami, it appears that conditions in the ocean are settling down. However, most of the more than 300 tons of debris washed out onto the sea floor is still there and affecting ecosystems as well as the fishing industry. Under the Tohoku Ecosystem-Associated Marine Sciences project, JAMSTEC is conducting deep-sea surveys using remotely operated vehicles and other devices to assess current conditions of the seafloor debris and its effects on surrounding ecosystems, aiming at the mapping of seafloor debris and marine life in the offshore waters of the Tohoku region.

Introduction

Following the Great East Japan Earthquake on March 11th, 2011, large quantities of land-derived material including houses, automobiles and firebreak forests were swept out to sea. According to estimates by the Ministry of the Environment, the total volume of disaster waste (disaster debris) discharged from Iwate, Miyagi and Fukushima Prefectures was around five million tons. Of this, about 30% drifted out to sea while the remaining 70% is thought to have sunk to the bottom of the ocean (from the Ministry of the Environment “Press Release Materials”, March 9th, 2012 edition). The three aforementioned prefectures started tackling the work of removing disaster debris at a relatively early stage after the disaster occurred, and as of March 31, 2012, some 710,000 tons had been recovered (from the FY2011 “White Paper on Fisheries”). Because water depths in coastal areas are shallow and the targeted sea area is relatively small, it is easier to search for and recover debris. As such, these are areas where the debris removal work is progressing efficiently. In offshore areas, conversely, large quantities of debris still get caught in trawl nets, continually causing damage both to the nets and to the catches inside them.

To clarify the present situation of this offshore debris and assess its impact on surrounding ecosystems and fisheries, JAMSTEC started a comprehensive survey off Sanriku in FY2011, based on the Tohoku Ecosystem-Associated Marine Sciences (TEAMS) Project. This Project for “Survey research on marine ecosystems” is led by Tohoku University, the Atmosphere and Ocean Research Institute of the University of Tokyo, and JAMSTEC, based on a subsidy from the Ministry of Education, Culture, Sports, Science and Technology. This is a ten-year project that aims to assess the impact of earthquakes and tsunamis on marine ecosystems and elucidate the mechanism of change, while supporting the promotion of fisheries based on scientific data. As part of this, we are tackling the creation of debris maps that will be of use to fisheries.

First, seabed topography maps

The first step was to prepare topographical maps of the

seabed. Some may question the usefulness of such maps at this point in time, but the seabed topography changed considerably as a result of the earthquake. Near the epicenter, the seabed moved about 50 meters east-southeast, as well as rising by 7 meters. However, at depths of up to 1,000 meters, where fishing activity is concentrated, it was unknown what sort of change had occurred in the seabed. Therefore, we conducted topographical exploration using a number of vessels, including our own oceanographic research vessel “Mirai”, deep-sea submersible support vessel “Yokosuka”, and research vessel “Natsushima”, together with the “Shinsei-Maru”, newly built as a research vessel for Tohoku marine ecosystems to implement the TEAMS Project. So far, we have completed seabed topography maps for about 70% of the targeted sea areas off Miyagi and Iwate Prefectures.

Searching for debris

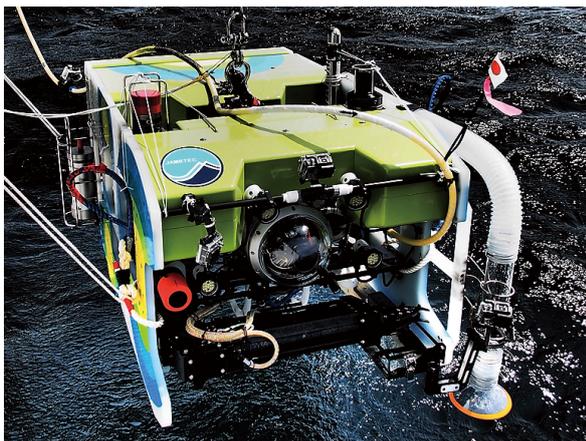
The next task to be tackled was debris exploration. Broadly speaking, we use two methods of searching for debris. The targeted sea area is a vast area exceeding 20,000 square kilometers. In the sea, light very quickly dims and visibility is limited. Therefore, we explored the state of the seabed using a device called side scan sonar, which uses sound waves to “observe” broad areas. As a result of these surveys, we found that various structural objects of different sizes were scattered about on the flat ocean floor.

With sound wave exploration, we could not know whether the structures we had found were really debris or not. Therefore, we also conducted visual surveys. This enabled us to confirm the structures discovered in sound wave exploration using direct video images, and to search for small debris not found in sound wave exploration. For visual surveys, we conducted towing surveys in which we made observations while pulling a camera connected to the support vessel by a cable, and diving surveys in which remotely operated vehicles (ROVs) were operated from the support vessel. As towing surveys are suited to observation over a comparatively wide area, they are useful in ascertaining general trends of debris distribution. In the diving

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surveys, we can finely observe and collect debris, take environmental measurements around the debris, and so on. ROV could be seen as a trump card for debris exploration, but its operation demanded a large-scale support vessel and a dedicated operation team. This made it difficult to meet the requests of local people quickly enough.

In this project, therefore, we developed an ROV that was compact and light, did not require a dedicated support vessel, and could be operated with a small number of personnel. To make it capable of conducting adequate surveys despite its compact size, we identified the equipment that would be necessary. As a result, the ROV was mounted with various equipment including a hi-vision camera that could provide high-definition images, a digital camera for seabed observation to enable quantitative mapping of seabed debris and bioresources, a manipulator (robot arm) and slurp gun (underwater suction sampler) for collecting samples, a CTD/DO probe for measuring salinity, temperature, depth and dissolved oxygen concentrations, all-round exploration sonar for exploring nearby obstacles, and a line laser for measuring length of objects. These were housed in a package with a total length of about 1.5 meters and a weight of 255 kilograms. We set the maximum dive depth at 1,000 meters, i.e. the maximum depth of offshore fisheries. This ROV was named “Crambon” after a word coined in the children’s short story “Yamanashi” by Iwate-born Kenji Miyazawa.



The compact ROV (remotely operated vehicle) “Crambon”

Present state of debris

Thanks to sound wave exploration and visual surveys conducted so far, we know that there are several trends in the distribution of debris. The density of debris decreases as we go further out to sea, and has accumulated in submarine valleys rather than on flat seabed. We also found that concentrations of organisms were greater around the debris,



Various pieces of debris gathered in a submarine valley (depth 546m)

and that different quantities and types of organisms gathered around different types of debris. We have even discovered driftwood in lengths exceeding 10 meters as well as sunken boats and other large structures measuring up to 70 meters.

In addition to these marine surveys, we are also engaged in analysis of offshore dragnet fishing ground cleaning data provided by Miyagi Prefecture. The aim in doing so is to clarify the distribution of and changes in debris distribution over a wider area. These data include quantities and types of seabed debris collected and recorded by offshore dragnet fishing boats, taken from more than 9,200 dragnet operations as of February 2014. The volume of debris collected in each net has fallen to less than one-third of the level immediately after the disaster, but is still considerably large. As well as this, we have also found that the proportion of wooden debris has decreased from the high level immediately after the disaster, while conversely the proportion of plastic and metal debris has increased.

Creating maps to make ecosystems “visible”

We are currently engaged in producing maps (habitat maps) for visualizing the Sanriku offshore area. These are created by overlaying seawater temperature, currents, surface layer primary production, and the distribution of debris and organisms on seabed topography maps, making it possible to grasp what has happened where and when. Using this kind of map, it should be possible to make bigger catches while avoiding debris. But our ultimate aim in creating these maps is to make sustainable use of marine bioresources into the future and protect marine ecosystems, while maintaining the rich productivity of the Sanriku seas as far as possible. Although this project was started in response to the catastrophic event of the Great East Japan Earthquake, we aim to continue it so that our activities here will become a model for marine utilization measures in Japan. ■