

Ship & Ocean Newsletter

Selected Papers

No. **7**
October 2006

Ocean Policy Research Foundation

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 the protection of the marine environment.

Towards this end, the Ocean Policy Research Foundation (formerly: Ship & Ocean Foundation) has started an "Ocean Policy Research", with the mission statement "Living in Harmony with the Oceans".

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

We publish a Japanese-language newsletter called the "Ship & Ocean Newsletter" twice a month. The "Ship & 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 to achieve coexistence between mankind and the ocean.

Our Foundation believes that the Newsletter can expand effective communication on these issues through its function as editor, publishing timely research and welcoming responses from readers, which might then be published in turn.

"Ship & Ocean Newsletter Selected Papers No.7" contains English-language versions of papers from the Japanese Newsletter edition, published from No.91(2004.5.20) to No.110(2005.3.5).

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 issues.

Hiroshi TERASHIMA
Executive Director

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■ Publisher

Hiroshi TERASHIMA
Executive Director, Ocean Policy Research Foundation

Ocean Policy Research Foundation

Kaiyo Senpaku Building, 1-15-16 Toranomon, Minato-ku, Tokyo, JAPAN 105-0001
Tel. 81-3-3502-1828/Fax. 81-3-3502-2033
URL. <http://www.sof.or.jp/english>
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October 2006

Formation of an Asian Network for Maritime Technology Education Is a Matter of Urgency

Hiroaki Kobayashi

*Professor, Faculty of Marine Technology, Tokyo University of Marine Science and Technology
(Ship & Ocean Newsletter No.91 May 20, 2004)*

The need to educate seafarers and evaluate their skills properly has been pointed out in order to assure the conservation of the marine environment and the safety of ship management. In this study, current education conditions in Asia, where many seafarers are from, as well as the roles which Japan should play, are examined.

Introduction

It is said that more than half of the seafarers currently working for commercial ocean fleets in the world come from developing countries. About 80% of the vessels controlled by Japan are manned by seafarers from Asia. As a matter of course, they receive training from educational institutions for seafarers in their countries, and acquire their respective qualifications before boarding the vessels. However, problems with regard to the content of their education and to the assessment of their qualifications have occurred. The problems have resulted from the ambiguous descriptions to be found in international conventions.

World's current maritime technology education

As an international guideline for maritime technology*, there is the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW); and each educational institution, as one of its goals, aims to conform to this international convention. But there have been major issues. To be specific, the STCW provides a list of skills required under the various conditions that vessels may encounter. However, as there are only general descriptions for conditions and skills, as well as qualification assessments, training methods for each item are left to the judgment of each educational institution. For instance, in the section on use of electronics for position measuring, which is an important skill for shipping control, it defines "an ability to measure a ship's position with the use of equipment" as a skill to be acquired, and prescribes that qualifications should be assessed based on a judgment whether "the manufacturer's guidelines and actual navigational conditions are followed." As a prescription for specific training, such wording is extremely ambiguous. As a result, each educational institution implements differently what is prescribed, so it is hard to say that trained seafarers' qualifications are uniform.

The EU also took this problem seriously, and established a large-scale exploratory committee called the Maritime Education and Training Network (METNET) with a fund from the EC, and activities aiming at the EU standardization of the quality of education for seafarers have begun.

Current Asian maritime technology education

In order to attempt an appropriate homogenization of seafarers' qualifications, it is necessary to understand correctly the fundamental concept of the STCW, to incorporate its required skills precisely with education and training, and implement qualification assessments. However, educational institutions in Asia have a tendency to set practical training situations directly from the content of the STCW. It is therefore difficult to analyze the skills necessary to achieve safe navigation, the basic concept of the STCW, to provide education and training, and to proceed with qualification assessments. When there is sufficient time for training, it can be provided for all the conditions assumed from the description of the STCW. However, unlike nautical educational institutions with improved curricula in advanced maritime countries, a recently increasing number of training institutions in developing countries often ends up failing to provide training for necessary skills. Faculties at the institutions also see this as a serious problem.

Future maritime technology education

European countries have recently formulated rules for various matters regarding safe navigation and are working towards a standardized navigational system. The European countries also think it is difficult to secure seafarers from

■Photo 1: View of a ship handling simulator



■Table 1: Qualification assessments for basic skills

Basic skill types	Content
Watch	Skill to identify and recognize targets, and project future actions
Position measuring	Skill to measure a ship's position with the use of recognized and selected targets
Steering	Skill to control a ship's course, speed, position, etc., through the operation of the rudder, the engine, etc.
Equipment handling	Skill to appropriately use equipment used for watchkeeping, position measuring, steering, and others
Information exchange	Skill to exchange information with sources inside and outside a ship, and obtain information necessary for operation
Legal compliance	Skill to act according to the rules of the sea
Planning	Skill to collect information necessary for navigation, and draw up a navigation plan and a ship handling plan
Emergency	Skill to handle appropriately one's own ship's abnormality caused by the breakdown of the rudder, etc.; sea rescue; and others
Management	Skill to manage the crew in order to enhance its ability as a team

their own countries for marine transportation and are concerned that the skills of less expensive seafarers will decline, prompting their desire for appropriate qualification assessments and formulation of standard procedures for ship management. However, the argument in Europe with regard to maritime technology is rather restricted by their own tradition, which places the highest emphasis on experience, a view, as regards navigational safety, that seems far from a rational approach based on scientific analysis. Under these circumstances, although most of the crews of the world's commercial ocean fleets are Asian manned, it is expected that the unified stance of the EU, as typified by METNET, will become stronger and their influence will increase enormously in the future.

The STCW recommends the use of effective means for training and gives particular importance to training with the use of simulators. However, although the use of simulators is advantageous in that environmental conditions can be set for carefully selected skills to be acquired through training, simulators are actually often used to replicate conditions similar to those of conventional on-ship training. This is due to the fact that conventional maritime technology education is simply being carried forward without modification.

Photo 1 shows a ship-handling simulator made in Japan and rated at the top of world standards.

Future direction for Japan

In order to enhance the safety of the world's and Japan's maritime transport, it is important to improve the quality of seafarers in Asia, and Asian countries are anxious to

receive technological support, especially for education and training, from Japan. Japan's maritime technology education has long been highly regarded internationally, and recent education and qualification assessment methods proposed by Japan have also been evaluated highly in Europe. The proposed education and qualification assessment methods are characterized by the concretized content of the nine skills to be objects of training, as indicated in table 1. With the concretized content of the skills, efficient educational curricula were formulated, skills applicable for qualification assessment were clarified, and a systematic educational system was established.

Asian countries are not powerful enough to take action individually, and they expect Japan to take a leading role. It is now considered necessary to respond immediately. As an organizer, Japan will need to ask the individual Asian countries that now work separately to establish a network for education and training. Alliance with the respective Asian countries and Japan will be strengthened through technological cooperation with them, and it might become possible to establish an international influence equal to that of the EU. Through these efforts, the standardization of navigation systems can be carried out under the lead of Asian countries, rather than European, thus being more reflective of current conditions. ■

* Maritime technology is "technology related to maritime affairs." In a restricted sense, maritime technology includes vessels (equipment) and the navigation technology to achieve marine transportation.

Toward the Practical Application of Oceanic Forecasts

Toshio Yamagata

Professor, Graduate School of Science, The University of Tokyo/Program Director, Climate Variations Research Program, Frontier Research Center for Global Change, JAMSTEC

(Ship & Ocean Newsletter No.93 June 20, 2004)

The reality of global warming is the modulation of climate modes that excite climate variations. In order to improve accuracy in prediction of the phenomenon, the advancement of not only atmospheric general circulation models, but also of oceanic general circulation models, is necessary. To advance oceanic general circulation models, a practical application of oceanic forecasts, like that of atmospheric forecasts, is essential. Making prediction of oceanic variations on a daily basis will create a new future for the industrial, governmental, and academic sectors.

Global warming and climate variations

A climate regime shift that occurred around 1976 is well known among climate researchers. The increase rate of the average surface temperature doubled compared with that of before 1976, and it exceeded 0.1 degree per 10 years in a recent decade. This is largely due to the recent perennial El Niño-like condition across the entire tropical Pacific Ocean (called decadal El Niño) as well as to the fact that El Niño phenomena themselves occurred more frequently. Therefore major El Niño phenomena were more easily generated recently. This is understandable because the El Niño phenomenon is a mechanism to release accumulated heat in the tropical ocean into the atmosphere and subtropical oceans. The increased sea level around islands in the central tropical Pacific Ocean was caused actually by the decadal El Niño phenomenon rather than directly by the global warming. The Indian Ocean Dipole Mode phenomenon (an El Niño-like phenomenon that occurs in the tropical Indian Ocean and causes heat waves in East Asia) also has recently begun to be easily generated due to the increased sea surface temperature of the Indian Ocean. In this way, global warming can be identified as concrete oceanic and atmospheric climate variations. Attention should be drawn to the fact that great concern began to be expressed from around 1976 over global warming in relation to greenhouse effects, accompanying the increase in concentration of greenhouse gas due to deforestation and enormous consumption of fossil fuels.

Prediction of climate variations

Against this background, the importance of oceanographic and meteorological interdisciplinary research for predicting oceanic and atmospheric climate variations has long been recognized. This trend accelerated on the wake of the major El Niño that began in 1982/1983. As a result, the Tropical Ocean and Global Atmosphere (TOGA) program was implemented for 10 years from 1985 to 1994 under the World Climate Research Program (WCRP) sponsored by World Meteorological Organization (WMO), Intergovernmental Oceanographic Commission (IOC) of UNESCO and International Council for Science (ICSU).

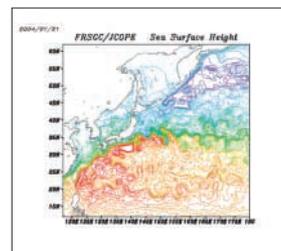
To predict oceanic and atmospheric climate variations, it

is necessary to operate with an atmospheric general circulation model coupled with an oceanic general circulation model. Observational data from wide areas are introduced to this coupled model as initial values, so that they can be assimilated readily. Both atmospheric and oceanic models have biases, and as they are complicated and nonlinear they display more chaotic behaviors if they exceed prediction limits. Therefore, with real-time observational data being assimilated into the model appropriately, a numerical integration must be done continuously to obtain the results of predictions without a break. Observational data from wide areas include sea winds, altimetry data of sea surfaces, water temperature, precipitation, and the distribution of cloudiness through satellite observation; atmospheric data through sonde observation¹⁾ in the air, such as wind velocity, atmospheric pressure, temperature, and humidity; and water temperature data through vessels.

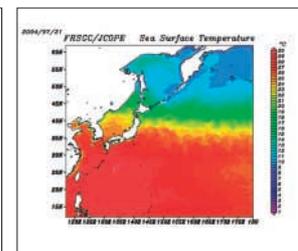
Data on sea water temperature, ocean currents, and wind velocity obtained through 70 mooring buoys

■ Prediction with the use of the JCOPE system

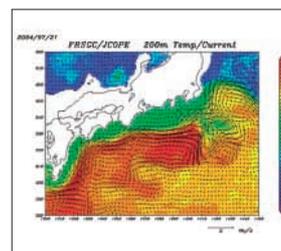
The images show the conditions of July 21, 2004, which were predicted on May 21, 2004. Attention should be drawn to the fact that the Kuroshio does not take a large meandering path called Type C, but an offshore path called Type B.



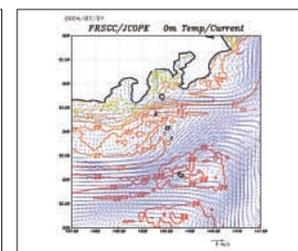
Distribution of sea surface height



Distribution of sea surface temperature



Velocity of the Kuroshio, and distribution of water temperature at the depth of 200 meters



Enlarged view of surface currents and water surface temperature from the Tokai area to an area off Boso

(TRITON/TAO) deployed in the equatorial area of the Pacific Ocean have also been used recently through the Tropical Ocean and Global Atmosphere (TOGA) program. In the future, it is hoped an improved observation system can be put in place not only for predictions of El Niño phenomena in the Pacific Ocean but also for predictions of Indian Ocean Dipole Mode phenomena in the Indian Ocean and similar phenomena in the Atlantic Ocean.

Necessity of oceanic forecasts

Atmospheric general circulation models used for the predictions of climate changes are basically the same as those used for daily weather forecasts, but in order to aim at increasing their accuracy, improvements are being constantly made by the Japan Meteorological Agency and related research institutes. With regard to oceanic general circulation models, it is also necessary to predict ocean currents, water temperature, salinity concentration and the like on a daily basis, especially as they might have an impact on human activities, and to continue the search for ways of improvement.

In order to promote this, the Frontier Research Center for Global Change started the Japan Coastal Ocean Predictability Experiment (JCOPE) in 1997 when the center was established. Based on its results, predictive data for two month periods on currents and water temperature variations from the sea surface to the sea bottom in the western Pacific Ocean, including seas close to Japan, have been made available since December 2001 through its website (<http://www.jamstec.go.jp/frsgc/jcope/index.html>).

"Oceanic forecasts" began to be developed much later, compared with the long history of atmospheric forecasts, but it can be said that the practical application of oceanic forecasts has finally come on to the horizon. Current spatial resolution is approximately 10 kilometers, but imminent flows in bays can also be predicted by improving a nesting method²⁾ and other methods. In addition, it is possible to develop a system predicting chemical variables and biological variables, with the current system predicting physical variables as a platform.

If oceanic forecasts like this are made on a daily basis, it is thought that ocean management will become easier. Considering that the unrestrained coastal management of a certain country that disposes of radioactive and other waste is costly to neighboring countries, countries far away, and even future generations, and that the overdevelopment of marine resources is likely to endanger even the existence of

human beings themselves in the end, and considering the importance of countermeasures against illegal dumping in the ocean and of ensuring the safety of marine traffic, it is also possible that oceanic forecasts will help create a system for each country to truly manage the world's oceans in cooperation with each other. Oceanic forecasts will also further prompt the advancement of the ocean part of the combined atmospheric and oceanic general circulation model used for the prediction of climate variations, and eventually contribute to the clarification and prediction of the climate variations of not only tropical regions, but also of subtropical and subarctic regions. This is also thought to have useful effects on the prediction of the decadal climate variations, which appears in the world oceans as a signal of global warming, and on the design of social infrastructure based on the predictions.

Future direction

Measures to promote the prediction of El Niño phenomena, and other oceanic climate variations, and the prediction of oceanic variations, namely oceanic forecasts, were also included in the initial design of the Global Ocean Observing System (GOOS), which was initiated by UNESCO's Intergovernmental Oceanographic Commission (IOC) and based on Chapter 17 of the Action Plan, Agenda 21, adopted by the UN Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. The development of a precise oceanic forecast system that is verified by daily in situ data is essential for the prediction of climate variations, i.e., the reality of so-called global warming phenomenon. It is also capable of activating all the industrial, governmental, and academic sectors through the improvement of a global observation system, the verification of results of predictions with the use of general circulation models, and the improvement of general circulation models. These sectors can also be involved in the utilization of results of predictions for ocean management, the establishment of a mechanism for conveying the results of predictions through mobile terminals, in a search for beneficiaries' additional needs, and the possibility of the introduction of systems for professions specializing in the management of marine resources and environments, and oceanic (weather) forecasters. It is hoped that Japan will take the initiative in the establishment of such a system, and promote the formation of an international network for its system technology, and the international standardization of the system technology. ■

1) Sonde observation: Sonde observations are made by releasing balloons with meteorological instruments attached, and observing the vertical distributions of temperature, atmospheric pressure, humidity, etc. Sonde observations are made in various parts of the world at fixed times under the World Weather Watch (WWW) system of the World Meteorological Organization.

2) Nesting: Nesting is a method of running simulations by calculating with the use of fine grids for phenomena or regions of interest, and coarse grids for areas around them, and by exchanging information.

● In order to promote the advancement of system technology and the establishment of an international network for oceanic forecasts, the Study Group for Prediction and Information on Oceanic Conditions has been working actively.

Kozagawa Project

—Toward the creation of a research discipline for linkage studies of forests, the countryside, and the sea, and applying research results to society—

Yoshihisa Shirayama

*Seto Marine Biological Laboratory, Field Science Education and Research Center, Kyoto University
(Ship & Ocean Newsletter No.94 July 5, 2004)*

The Koza River is a clear stream flowing through the Kumano region of Wakayama Prefecture, but the impact of the Shichikawa Dam - which exists for the purposes of flood control and power generation - on both the river and the river mouth during both ordinary times and times of heavy rain is not insignificant. The Field Science Education and Research Center of Kyoto University is attempting to clarify the impact of this manmade structure on the natural environment, especially the linkage among forests, the countryside, and the sea, based on detailed data.

1. Necessity for a research discipline for linkage studies of forests, the countryside, and the sea

There has been growing public concern over the close linkage between marine ecosystems and terrestrial ecosystems. Because coastal environments are affected by all the integrated changes of terrestrial environments, concern is growing especially from the ocean side, as typified by the fact that fishing people are active in tree planting. However, it cannot be said that the linkage between forests and the sea through rivers has been fully clarified scientifically. For instance, it can be easily imagined that large schools of salmon swimming upriver in fall plays an extremely important role in the nutrient cycle of forest ecosystems in sub-arctic regions. However, to the best of the author's knowledge, in the case of Japan, where almost all the salmon that swim up rivers are caught for spawning at downstream areas under a salmon hatching project, there have been no materials publicized with regard to quantitative discussions as to how the project affects forests. It is possible that *ayu* (Japanese trout) and eels play a similar role as salmon in mid-latitude regions.

Under these circumstances, Kyoto University established the Field Science Education and Research Center in 2003, as one of three pillars to promote research on problems of the global environment. The Center is going to directly address the creation of a "discipline for linkage studies of forests, the countryside, and the sea" in order to clarify the close relationships between forest and coastal marine

ecosystems, through rivers, as mentioned above, considering also the artificial impacts deriving from the countryside (or urban areas).

2. Linkage of the dam with forests, the countryside, and the sea

Though flood control dams have long played a socially useful role in their prevention of flood damage, it is pointed out that the decrease of river water and subsequent change in water quality negatively affect ecosystems along rivers. In addition, water discharged during times of heavy rain causes a drastic increase in water volume and subsequent drastic changes in water quality. It is thought that the artificial changes of the environments of rivers during ordinary times and in times of emergency seriously affect marine environments at the mouths of rivers. However, there is no example of a study that evaluates the good and bad points of dams from a comprehensive viewpoint in consideration of regional ecosystems, such as a linkage study of forests, the countryside, and the sea.

3. The Koza River System as a research model

The Koza River runs through the southeastern part of the Kii Peninsula, the Kumano area, and consists of its main river and a tributary river, the Kogawa. Though abundant natural areas remain in this region, that is to be registered as a World Heritage Site, the Shichikawa Dam has been constructed on the main river, primarily for controlling floods and generating power. The catchment basin of the Koza River is often hit by localized heavy rain from typhoons and the like, making the flood control function of the dam an important one. However, there have been several cases where ecosystems in the downstream area, especially at the river mouth on the sea side, were seriously damaged because of water that was discharged to protect the dam facilities, something which has prompted local residents to see the dam as a problem. Because of this, there is now a social need to discuss the advantages and disadvantages of the dam. From the standpoint of a linkage study of forests, the countryside, and the sea, it is almost impossible to treat scientifically most other rivers, due to their huge drainage areas and related diverse phenomena. However, as the



Koza River system is manageable in size, and has the Kogawa as a contrasting river, problem establishment is considerably easier.

Furthermore, as a base for research on forests, the headstream area of the Koza River has a solid infrastructure of facilities for research. These include the experimental forests of Hokkaido University, the Kii Oshima Research Institute, and the Seto Rinkai Research Institute of the Kyoto University Field Science Education and Research Center. The headstream area of the Koza River is an extremely rare case, complete with ideal conditions for research on the relation between forests and marine ecosystems through the countryside area. For these reasons, the Field Science Education and Research Center selected the Koza River System as a model field in order to do comprehensive research on the area from the forest to the river mouth. It will also make proposals on the optimum positioning of the flood control dam and future comprehensive management of all elements of the drainage basin, including the forest area, the countryside, and the river mouth.

4. Differing water qualities and the results of preliminary investigations

The Center began its efforts by comparing the water quality of the main Koza stream and the Kogawa tributary in order to clarify the impact of the dam. Even visual observations indicate that running water in the main stream of the Koza River is severely turbid with a large amount of suspended matter. On the other hand, the Kogawa River is very clear, and the difference between them is evident at their meeting place, suggesting some impact from the dam (Photo 1). When actual water samples were collected and filtered, water from the Kogawa tributary had almost no particles caught by filters, whereas water from the main stream had large amounts of substances caught by filters (Photo 2). It can be said that the clarification of the substances is an important future research issue. In addition, we have found that the chemical properties of the river waters are different: water from the Kogawa tributary, with a pH of approximately 6.8, is slightly acidic, while water from the Koza main river, with a pH of 7.1, is slightly alkaline. According to interviews with residents, various kinds of turbidity can be discerned. Greenish turbidity that is suggestive of green tea, found in the Kogawa tributary and the upstream area of the main stream after heavy rains has long been called "*chanigori* (tea-like turbidity)" by local people. There are also other kinds of turbidity, such as "*shibunigori*," which seems to be leachates from the forest floor, or a pool of stem flows, and appears temporarily dur-



Photo 1: View of the confluence of the Koza main river and its Kogawa tributary, seen from the Kogawa side. The difference between the colors of the river waters is obvious.



Photo 2: Comparison of filters used in the Koza river: from the main river (on the right) and the Kogawa River (on the left)

ing a light rain, and "*sasanigori*" in pale brownish green, which appears when the weather gets better. In addition, it is becoming clear that there are several kinds of artificial turbidity, including brownish turbidity caused by the collapse of slopes¹⁾, and turbidity caused by clayish water that flows from the catch basins of paddy fields during the period of *shirokaki*²⁾ from March to May.

5. The future of the project

Local autonomous bodies and residents along the Koza River are highly interested in river management and the environmental impact of the Shichikawa Dam, and many residents from Kozagawa Town attended a briefing session held recently with regard to the content of our research. Encouraged by this, the Field Science Education and Research Center of Kyoto University would like not only to make the Kozagawa project a first step in the creation of a research discipline for linkage studies of forests, the countryside, and the sea, but also promote it as a model research project for the sharing of research results with the community by elucidating the linkages between dams and the marine environment. ■

1) Slopes include cut land and earth fills.

2) *Shirokaki* (also called *takaki*) means channeling water into paddy fields, and crushing and harrowing soil in preparation for rice planting.

Interview: Reflections on Marine Day

Yohei Sasakawa

President, The Nippon Foundation

*Interviewer: **Hiroshi Terashima**,
Executive Director, Institute for Ocean Policy, Ship & Ocean Foundation

(Ship & Ocean Newsletter No.95 July 20, 2004)

What is the Marine Day national holiday for? If the day is meant for us to express our gratitude for the benefits of the ocean and wish for the prosperity of Japan, which is surrounded by the ocean, we should take a new look at the future of Japan as an oceanic country. The national government should reconsider its recent negligent attitude toward the ocean, make its ocean policy a priority, and establish a system to promote it.

What is Marine Day for?

- Japan is an oceanic country surrounded by the ocean. First, in order to take up the problems of the ocean now, what do you think most important?

We often hear that Japan is an oceanic country entirely surrounded by the ocean, but I think that is only because Japan is surrounded by the ocean geopolitically. Japanese people are not sufficiently aware that Japan has become a developed country and that its history and culture have been greatly influenced by the ocean. Though Marine Day, which is a national holiday, especially provides us with a good opportunity to think about the ocean, it is quite regrettable that people use the day only as one more summer holiday.

- For the enactment of Marine Day, 10.38 million people signed, and 70% of nationwide autonomous bodies, including 47 prefectures, submitted their opinions in writing that a national holiday should be provided for Marine Day. Among many national holidays, Marine Day was the first national holiday that resulted from a national movement.

Because Marine Day is meant to be a day when we express our gratitude for the benefits of the ocean and wish

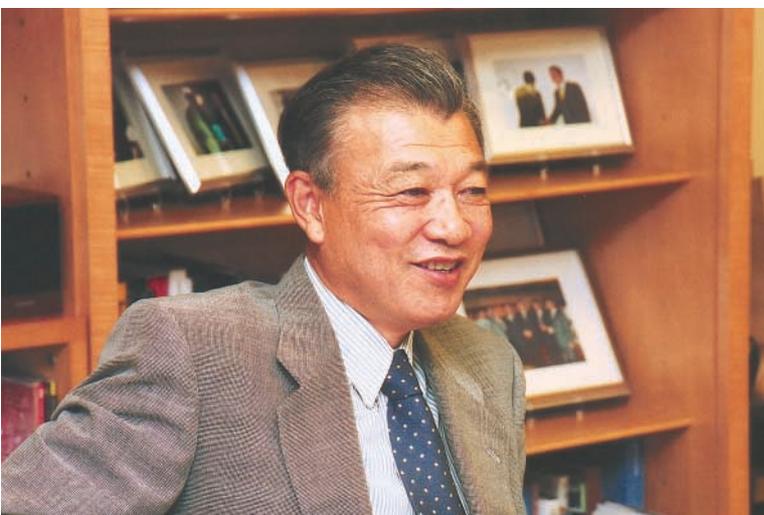
for the prosperity of Japan, the whole nation should celebrate Marine Day sincerely. In the U.S., although not a national holiday, the President issues a statement of maritime affairs on Marine Day. It would be appropriate for the Japanese Prime Minister also to send a message to the nation in the light of Marine Day. I feel strongly that those of us who engage in maritime affairs should make efforts to increase understanding of the significance of Marine Day among all people. It would be shameful to be satisfied simply with the fact that the holiday was established.

Japan lacks an ocean governance perspective

- Due to the coming into effect of the United Nations Convention on the Law of the Sea in 1994, territorial waters expanded to 12 nautical miles, and a 200-nautical-mile Exclusive Economic Zone was also created. As a result, "national territory has expanded significantly in the sea. However, people lack awareness that these waters should be managed. The Japanese people in general may be bound by the old conception of the three-mile territorial limit.

We lack a perspective that views the country from the ocean side. In Japan, people used to think that the shore was the limit of the sea, and that beyond was the abode of the gods.

However, we now have the Law of the Sea convention, which controls the development, utilization and conservation of enormous marine spaces, for the first time in history. We must maintain a global perspective, which includes the ocean. First, we are being called upon to consider the future of the world's oceans within the conceptual framework of ocean governance. Next, Japan must shift its focus from large to small areas, thinking first of how Japan's Exclusive Economic Zones should be handled, and then its coastal zones; otherwise problems in the respective zones will not be sorted out properly. If, when we are confronted with problems, they are handled based only on precedents and with extemporaneous comments, contradictions will inevitably arise. We need a system that settles matters from a wider viewpoint. Therefore, we need a government office dedicated to ocean policy.



- Various countries in the world, like the U.S., Australia, China, and Korea strive to control their seas by establishing ocean policies, the law of the sea, and coastal area management acts.

Unfortunately, Japan is weak in that aspect. The demarcation of boundaries in Exclusive Economic Zones in the East China Sea, the investigations of continental platforms, and the control of isolated islands, such as the Senkaku Islands and Okinoshima Island, are prerequisite for the control of the ocean in a new era. Though Japan's Exclusive Economic Zones are the sixth largest in the world, they are now almost being neglected because of its do-nothing policy.

Japan also needs to formulate its ocean policy and take drastic measures promptly by establishing basic ocean laws, appointing a minister in charge of maritime matters and holding ministerial conferences related to maritime matters so that the ocean policy can be implemented. In order to do so, I think that organizations such as "headquarters for ocean policies" should be established in the Cabinet first, in order to start discussing Japan's ocean policy and its system to promote the policy.

- Chinese oceanographic vessels are investigating the ocean near Okinotori Island. They are doing so because they are concerned even about the ocean far away from its Exclusive Economic Zone. What do you think about the problems of isolated islands?

I think that they had a history of a unilateral policy. I think that the government has seen isolated islands only as areas in poverty that need aid. The government lacks vision in terms of how we should utilize the histories of isolated islands, their wisdom for living, and their environments, including sea areas with abundant resources. Isolated islands are no longer deserted islands; rather, they are Japan's domains themselves. From now on, they should be considered part of the important national land along with the surrounding Exclusive Economic Zones.

China recently established "regulations concerning the administration of the protection and utilization of uninhabited islands" and has been tackling the control of isolated islands. We should refer to the regulations.

A government office in charge of ocean policies should be established promptly

- The Agenda 21 for Change adopted in the Earth Summit held in Rio de Janeiro in 1992, and the Plan of Implementation adopted in the World Summit held in Johannesburg ten years later in 2002 took up the integrated management of the ocean and coastal zones,

and the protection of resources and the environment. The world is moving actively now; however, Japan unfortunately cannot catch up with that movement.

It is obvious that the sea is irreplaceable for all living things on earth. How should we human beings control the sea from a global viewpoint? The sea is not inexhaustible. The increase of the world population obviously contaminates the sea, and excessive fishing will change marine ecosystems if indiscriminate fishing continues. We must be aware that climatic relations also have an important impact on the existence of human beings.

I recently visited Bhutan in the Himalayas. Bhutan takes a very serious view of environmental protection, and they take good care of forests and greenery. Bhutanese understand well that the Himalaya mountains are the heart of the earth, and they understand what will happen to the earth if the Himalayan ecosystems are destroyed. When I met with the Prime Minister of Bhutan and said to him that it was wonderful that Bhutanese were aware of those things, he told me an intriguing story. He said, "Our neighboring country, Nepal, has been developed too rapidly, so earth and sand from the Himalaya mountains have been flowing through rivers to the Bay of Bengal in Bangladesh. The earth and sand have accumulated inside the bay and are taking the shape of an island. I don't think that the island will belong to Bangladesh, but to Nepal, because it will be made of earth and sand from Nepal." The problems of the sea should be resolved with mountains and rivers taken into account.

Environmental protection is essential for "sustainable development." However, in Japan, the "environment" and "development" are still being discussed separately, and integrated management has not been realized.

It is also regrettable that matters related to the ocean are not touched on during discussions about sustainable development. The way of managing the ocean is one of Japan's important political issues. Though the ocean is a field of expertise for Japan, which is a major economic country with technical expertise, and Japan should play a major role internationally, Japan actually lags behind other countries in the world. I am apprehensive that time just runs on without a ministry or an agency that has charge of ocean policies.

The Bay of Tokyo is now cleaner compared with the conditions of the bay 30 years ago. The fact that industrial and domestic wastewater are being treated well should be more highly evaluated. Our bitter experience in confronting environmental problems in Minamata and Yokkaichi served as a lesson. It is necessary for us to make use of the world's most advanced environmental technology in China and other developing countries. Then we will

be able to have a bigger voice and take the leadership in the world.

- There are instances when those in charge of maritime affairs in Japan do not attend important international conferences on marine issues.

It is widely known that marine issues should be discussed comprehensively, so international conferences that handle marine issues comprehensively and cross-sectionally are often held. It seems that there are many instances when those in charge of maritime affairs in governmental offices in various countries attend such conferences, but nobody from Japanese ministries or agencies attends those conferences except researchers and those from the private sector from Japan. We are now apprehensive that Japan may be left behind without knowing while information on the ocean is exchanged daily, and official and unofficial meetings are held. At present, there is no department or agency that generalizes and handles the problems of the ocean comprehensively. Therefore, there is nobody who can respond to all the details discussed in such meetings, even if some one attends those meetings. Unless there are some appropriate counterparts in Japan, other countries cannot provide us with information. This causes a vicious circle and Japan will further lose touch with the world's movement. That is why I want the Institute for Ocean Policy to hang on for a while.

Ten years passed since the effectuation of the United Nations Convention on the Law of the Sea, so we are now at a turning point in ocean management. Because 10 years passed after the effectuation of the convention, each country is now qualified to propose a revision of the convention. In addition, it is most likely that the United States, which takes the leadership in the world's maritime affairs, will soon join the United Nations Convention on the Law of the Sea. In the U.S., the Commission on Ocean Policy will submit its final report shortly to the Congress and the President. It is possible for a movement in the U.S. to accelerate an international movement for ocean management sharply.

Japan should consider its ocean policy as an important national issue, establish a system to promote the policy and proceed with the policy; otherwise Japan will really be left out of the world's movements.

Necessary personnel training

- To tackle the problems of ocean management, we need personnel with expertise and experience.

One of the Nippon Foundation's recent efforts is personnel training. Unfortunately Asian countries, including Japan, have a shortage of personnel related to the sea in comparison with European countries and the U.S. We



Mr. Sasagawa, at the center in the front row, and recipients of Sasagawa Fellowships at the World Maritime University (November 2002)

think that "the sea provides routes connecting people living on earth" and have been proceeding with personnel training in various fields related to the sea.

The Nippon Foundation and the Ship and Ocean Foundation cooperate to provide a fellowship system at the World Maritime University (WMU) in Malmö, Sweden. Two hundred seventy-three students from 40 countries already graduated from the university. After graduation, they organized graduates' associations, have been keeping in touch with each other, returned to their respective native countries and have been active in their specialized fields. In order to aim at the improvement of education for seamen who take charge of international marine transportation, we also strongly support the activities of the International Association of Maritime Universities (IAMU), which is an assembly of maritime universities throughout the world. In addition, last year we also started a scholarship program for maritime law in the International Maritime Law Institute (IMLI) in Malta. This year, we will start personnel training projects, including the training of specialists in the preparation of seabed feature charts, the provision of special classes in the Partnership for Observation of the Global Oceans (POGO), and educational and internship programs for the United Nations Convention on the Law of the Sea. We would be happy if we could be helpful for the proper function of ocean management through trainees in these projects who will discuss and cooperate with each other in the future.

Improvement of education related to the sea, and disclosure of information on ocean management

- It seems that Japanese people recently have gradually increasing concern for and understanding about the sea.

There must be many people who used to think that our sea was safe, but realized that the sea has big problems in

terms of Japan's security after the incidents of suspicious ships. There might be some people who started being concerned that the quantity of fishes in Japanese waters is decreasing, and that excessive fishing must be creating problems. I watched a TV program yesterday about fishermen in Akita Prefecture who consulted with each other and decided to stop fishing sandfishes for three years, because they started having difficulty catching sandfishes. The fishermen succeeded in restoring fishing resources.

In order to further enhance people's interest in and understanding about the sea, it is necessary to improve education related to the sea, disclose information related to the ocean to people, or provide such information for people.

- It seems that there are few opportunities for teaching about the sea even at school. There are a growing number of teachers who belong to generations that have little knowledge about the sea. I hope that students have more opportunities to learn about the sea through experience along the seashore during integrated learning classes.

We must provide opportunities to explain, and programs to teach children simply and easily that we live on the living earth, and implement those programs actively.

It seems that there are some parents who do not like their children to enjoy the sea, but it is necessary to enjoy the sea and commune with nature. It seems to me that they are under the false impression that people can live only in man-made structures.

For the disclosure and provision of information related to the ocean, it will also be important for the government to do a follow-up on international movements thoroughly, and inform people fully and easily about the information that has been obtained.

Now it is important for private research institutes like ours to compensate for what governmental offices are weak in, and short of, support them and gain expertise so that we can provide governmental offices with our expertise when they start moving. Some one must start moving as a leadoff man, and I expect the Institute for Ocean Policy to act as a leadoff man. ■

A Proposal on Reformation of Japan's Marine Policies

Hiroyuki Nakahara

Managing Director, Research Institute for Ocean Economics
(Ship & Ocean Newsletter No.96 August 5, 2004)

Prioritized budgets should be allocated and a comprehensive strategy should be employed for surveys on the Continental Shelves beyond Exclusive Economic Zone. Our government should work on active geophysical exploration and needed exploratory drillings in the Japanese side area along the equidistant line in the East China Sea, and take necessary actions to settle down the boundary dispute based upon Japan's position.

To promote Japan's ocean policies comprehensively and inclusively, it is necessary for us to have clear recognition on the administrative framework from a bird's-eye viewpoint. Then, the Ministry of Land, Infrastructure and Transport (MLIT) should play a pivotal role in the promotion of ocean policies, and the Minister of LIT should be designated as the Minister Extraordinary of Marine Affairs, taking initiative on integration and upgrade of government-wide ocean and coastal policy development and implementation. The Ministerial Marine Policy Conference and Marine Policy Advisory Council should be also established promptly, replacing current status. Also, Ocean Policy Office should be set up in the Cabinet Office in order to manipulate these governance procedures.

This year, four years after we stepped into the 21st century, we celebrate the 10th anniversary after the United Nations Convention on the Law of the Sea entered into force. As far as the problems of Japan's ocean policies, important issues have popped up one after another over these four years. They include problems of suspicious ships and spy ships, problems of needed surveys on Continental Shelves beyond Exclusive Economic Zone, problems of Okinotori-shima Island, problems of the dominion of the Senkaku Islands and Takeshima Island, and problems of boundary dispute and oil and gas development in the East China Sea. Since such various and sensitive problems on marine affairs have emerged all of a sudden, we are in an unprecedented situation in the history of Japan's ocean policies. On the other hand, various opinions and proposals

regarding ocean policies were also publicized over the past five years, as indicated in the summaries. (See Table 3) This is also unprecedented in the history of Japan's ocean policies.

Ample budgets should be allocated for Continental Shelf surveys, and a multi-year exploration project should be implemented in Japanese side sea area along the equidistant line in the East China Sea

Among the above-said problems, I would like to touch upon the problems of Continental Shelf surveys beyond EEZ and oil and gas development in the East China Sea.

Regarding former problem, a new inter-ministerial/agency liaison conference was inaugurated, and the Conti-

Table 1 : Major inter-ministerial/agency liaison conferences related to marine affairs

Source: Research Institute for Ocean Economics, July 15, 2004

Name	Members (◎:Chairperson; ○: Vice Chairperson)
Inter-Ministerial/Agency Liaison Conference concerning Marine Development (approved by the Chief Cabinet Secretary on June 17, 1980) (partially revised on March 9, 1984, July 1, 1984, July 1, 1986, June 26, 1997, January 4, 2001)	◎Deputy Chief Cabinet Secretary (clerical work), ○Assistant Chief Cabinet Secretary Ministry of Public Management, Home Affairs, Posts and Telecommunications / Ministry of Foreign Affairs / Ministry of Education, Culture, Sports, Science and Technology / Fisheries Agency / Agency for Natural Resource and Energy / Ministry of Land, Infrastructure and Transport / Ministry of the Environment
Working Group for the Use of Okinotori-shima Island, Inter-Ministerial/Agency Liaison Conference concerning Marine Development (Inter-Ministerial/Agency Liaison Conference concerning Marine Development on September 13, 1993) (partially revised on July 17, 2001)	Counsellor, Cabinet Secretariat (under the Assistant Chief Cabinet Secretary) Ministry of Public Management, Home Affairs, Posts and Telecommunications / Ministry of Foreign Affairs / Ministry of Education, Culture, Sports, Science and Technology / Fisheries Agency / Agency for Natural Resource and Energy / Ministry of Land, Infrastructure and Transport (Policy Bureau / River Bureau) / Ministry of the Environment (Observer: Ministry of Health, Labour and Welfare)
Inter-Ministerial/Agency Liaison Conference concerning Preparation for and Response to Oil Pollution Incidents (The first conference was held on June 13, 1995, and the following conferences have been held according to circumstances in order to conduct studies on measures for the oil disaster of Nakhodka accidents, and petroleum development in Sakhalin.)	Counsellor, Cabinet Secretariat, Director for Disaster Response Operations under the Director-General of Cabinet Office National Police Agency / Defense Agency (Director-General's Secretariat, Facility Division, Environmental Action Office, and Bureau of Defense Operations / Defense Operations Division) / Ministry of Public Management, Home Affairs, Posts and Telecommunications / Fire and Disaster Management Agency / Ministry of Justice / Ministry of Foreign Affairs / Ministry of Education, Culture, Sports, Science and Technology (Minister's Secretariat, Department of Facilities Planning and Administration, Facilities Planning Division / Research and Development Bureau, Ocean and Earth Division) / Ministry of Health, Labour and Welfare / Fisheries Agency / Agency for Natural Resource and Energy / Ministry of Economy, Trade and Industry (Nuclear and Industrial Safety Agency, Mine Safety Division) / Ministry of Land, Infrastructure and Transport (Policy Bureau / River Bureau / Ports and Harbors Bureau, Environment and Engineering Division) / Japan Coast Guard / Ministry of the Environment
Inter-Ministerial/Agency Liaison Conference concerning Continental Shelves (agreed by related ministries and agencies on June 7, 2002, and partially revised on August 26, 2003)	◎Assistant Chief Cabinet Secretary (foreign affairs), Assistant Chief Cabinet Secretary (domestic affairs) Defense Agency / Ministry of Foreign Affairs / Ministry of Education, Culture, Sports, Science and Technology / Fisheries Agency / Agency for Natural Resource and Energy / Ministry of Land, Infrastructure and Transport / Japan Coast Guard / Ministry of the Environment <Members of Board of Governors> Counsellor, Cabinet Secretariat (under the Assistant Chief Cabinet Secretary) Defense Agency / Ministry of Foreign Affairs / Ministry of Education, Culture, Sports, Science and Technology / Fisheries Agency / Agency for Natural Resource and Energy / Ministry of Land, Infrastructure and Transport / Ministry of the Environment / Japan Coast Guard (Hydrographic and Oceanographic Department, Administration and Planning Division / Continental Shelf Surveys Office)

Note: Ministries and agencies shaded in blue are common members of the four inter-ministerial/agency liaison conferences.

mental Shelf Surveys Office was organized in the Cabinet Secretariat on December 8, 2003. (See Table 1) Such a completely new office setting within the heart portion of the administration is quite epoch-making in the Japanese political history, particularly on ocean policies. In the industrial world, on February 3, 2004, Japan Continental Shelf Survey K.K. was also newly established as a private firm, and started surveying activities upon contract from the government. Furthermore, in the political world, the Federation of Members of the Diet for the Promotion of Continental Shelf Surveys (Chairperson: Ms. Chikage Ohgi, former Minister of Land, Infrastructure and Transport) was also organized as a pressure group. (See Table 2) Plus, Ministry of Foreign Affairs ordered a contract-base study to the Society of Exploration Geophysicists of Japan (SEGJ), and SEGJ began discussion in their Committee on the Study of the Demarcation of Continental Shelves, not only in the technical perspective but also in political ones, so that it examines the trends of other coastal nations, and Japan's political alternatives in a certain degree. Because it seems very crucial to submit application to the United Nation's Commission on the Limits of the Continental Shelf (UNLCS) by May 2009, prioritized budgets for survey activities on the expansion of continental shelves beyond EEZ must be allocated to execute sufficiently and to be done on time. It is needless to say a comprehensive ocean policy strategy is necessary, in order to overcome technical and political obstacles during surveys activities, and to make negotiations effective with UNLCS. Of course, how to manage the expected new jurisdictional continental shelves is essential in such strategy.

With respect to the latter problem, there have been a chain of movements: Ms. Kawaguchi, Minister of Foreign Affairs, requested China to provide data around the production platform near the anticipated equidistant line, the Chinese side probed for a proposal for joint development, Mr. Nakagawa, Minister of Economy, Trade and Industry,

mentioned that Japan is ready to start its own surveys and drilling activities, the Chinese side expressed its strong interest, a geophysical survey ship chartered by the Japanese Government left the Port of Naha to execute seismic survey just close to the equidistant line in the East China Sea in July, and Mr. Nakagawa expressed discomfort over activities being done by Chinese marine research ships. In such tense situation, about several months ago, the Working Group on Maritime Interests (Chairperson: Mr. Keizo Takemi, Diet member of Upper House) in the Liberal Democratic Party's Board of Investigations on Foreign Policies publicized a constructive proposal with regard to a series of the movements described above. It includes geophysical exploration in a sea area along the equidistant line on the Japanese side and exploratory drilling in important points should be started on a full scale as a strongly supported project. Japanese government implemented similar long-term project of exploration in a sea area very close to the Okinawa Islands in the past, but yet in the mid sea area of the East China Sea. At the same time, it says necessary measures should be taken to settle down the boundary dispute, based on Japan's position.

Have a bird's-eye view on ocean policy framework first, and each administrative organization should provide more information

Although each ocean policy problem is unique and inherent, it is related to each other in a complicated manner. For example, the dominion of the Senkaku Islands and Takeshima Island, the problem of boundary demarcation, and measures against suspicious ships and spy ships should be examined and treated as the problems of comprehensive marine management, for which individual policies should be implemented under overall ocean strategy as a whole. For the reference, the author prepared the above organizational chart (Figure 1) in order to understand administrative framework related to Japan's marine affairs from a bird's-eye viewpoint.

Eight ministries and six agencies are related to Japan's marine affairs, in addition to the Cabinet Secretariat. There are eight related advisory councils (over 10, including sub-councils). There are also four inter-ministerial/agency liaison conferences, which include individual sub-conferences with members of different levels, as indicated in the table 1. Taking these formations into account, there are a total of eleven ministries and eight agencies related to national marine affairs, and there are about twenty major independent administrative corporations.

Now, how much do we know about the actual activities of the respective organizations, in particular, administrative-related trends? For example, in the Inter-Ministerial/Agency Liaison Conference related to Marine Affairs

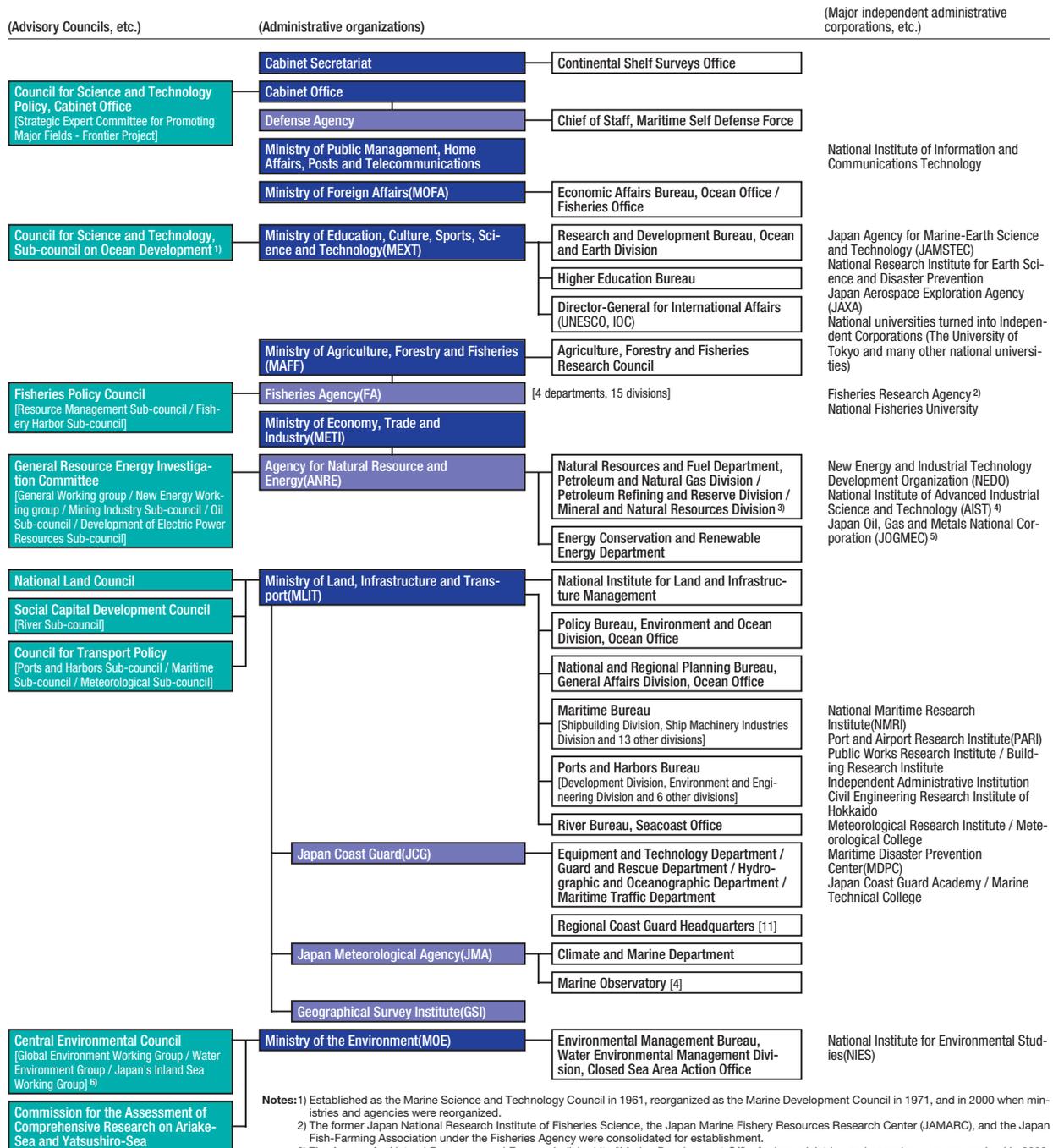
■Table 2: Major Federations of Diet Members on Marine Affairs

Legislators Organization for Ocean
Legislators Organization for Promoting Continental Shelf Surveys
Legislators Organization for Accelerating Practical Application of Techno-Super-Liner
Legislators Organization for Promoting Countermeasures for Higashi-Nankai Earthquake and Nankai Earthquake
Legislators Organization for Replacement of Northern Territories and Accelerating Exchange with Four Islands
Legislators Organization for Accelerating Development of Ports and Harbors (with a working group for promoting exchange with urban area and fishing village)
Legislators Organization for Ports and Harbors
Maritime Legislators Organization
Legislators Organization for Preserving Beaches with White Sands and Green Pines
Legislators Organization for Whaling
Legislators Discussion Forum for Promoting Coastal Fisheries Ground Development
Legislators Organization for Promoting Inland Water Fisheries
Legislators Discussion Forum for Fish Culturing
(Liberal Democratic Party, Special Committee on Ocean Measures)

Source: Research Institute for Ocean Economics, July 15, 2004

Figure 1: Organizational chart of administration related to Japan's ocean policies

Source: Research Institute for Ocean Economics, July 15, 2004



Notes: 1) Established as the Marine Science and Technology Council in 1961, reorganized as the Marine Development Council in 1971, and in 2000 when ministries and agencies were reorganized.
 2) The former Japan National Research Institute of Fisheries Science, the Japan Marine Fishery Resources Research Center (JAMARC), and the Japan Fish-Farming Association under the Fisheries Agency were consolidated for establishment.
 3) The Agency for Natural Resources and Energy abolished its "Marine Development Office" when ministries and agencies were reorganized in 2000, and the Mineral Resources Section took over the office.
 4) The National Institute of Advanced Industrial Science and Technology abolished its Marine Resources and Environments Department in 2004.
 5) The former Japan National Oil Corporation, and the Metal Mining Agency of Japan were consolidated for establishment.
 6) The Technical Committee on Marine Environments was established in the Global Environment Working Group of the Central Environmental Council.

held on August 20, 2002, it was agreed to increase regular meetings from once a year in July to twice a year in January and July, to place the re-classification of marine-related laws on the agenda, and to provide sub-conferences to handle themes crossing over plural ministries and agencies. It seems that the existence of the Working Group of the Use of Okinotori-shima Island, which was established under the Inter-Ministerial/Agency Liaison Conference, is not being

known at all, but the working group has been continuously holding meetings once or twice a year. The Inter-Ministerial/Agency Liaison Conference concerning Preparation for and Response to Oil Pollution Incidents has been held continuously whenever pollution incidents such as Nakhodka accidents occurred, and held its sessions seven times from September 1999 to January 2004 in order to examine countermeasures against oil spills that may happen in relation to

oil and gas development in Sakhalin.

The actual structures and discussions in such framework are very difficult to know from outside. This tells us that we need to make more effort to know and to learn them, and also brings out the point that government offices are not necessarily providing enough information. When we discuss marine policies, we must take consideration with such knowledge and information in order to stand upon more comprehensive perspectives. Therefore we hope that more information would be publicized and provided, though nec-

essary limitation and consideration may also be given.

The Minister of Land, Infrastructure and Transport should act as the Minister Extraordinary of Marine Affairs, and Ministerial Conferences on Ocean Policies should be organized as soon as possible

Though proposals, made by Nippon Keidanren in 2000 and by Nippon Foundation in 2002, requiring government structure reorganization, were introduced and discussed

Table 3 : Outline of the recent proposals concerning national ocean policies

Source: Research Institute for Ocean Economics, July 15, 2004

<p>Nippon Keidanren</p> <p>"Grand Design for the Ocean in the 21st Century" - Establishment of a network for marine development in Japan's 200-mile zone - June 2000</p> <p>*The proposal was adopted after a study was conducted at the General Sectional Meeting of the Committee on the Promotion of Marine Development, and it was reviewed at the Committee on the Promotion of Marine Development, and in a meeting with the Chairman and the Vice Chairman. The proposal attached with a cover letter with the name of Mr. Takashi Imai, the Chairman of Nippon Keidanren (then), was distributed and explained to major government offices.</p>	<ul style="list-style-type: none"> • Named after the "Grand Design for National Land Development in the 21st Century" (5th National Comprehensive Development Plan), because ocean policy should be considered as national policy in line with national land policy. • The necessity of a unified national project was proposed by the industrial society because the handling of marine affairs was broken down into three fields - energy, shipbuilding and food - in the "Strategy of Industrial and Technological Nation in 15 Fields" (March 2000). • Sea areas around Japan should be classified into seven types according to their characteristics, and bases should be constructed in each sea area gradually in order to create a network. • Proposed a pilot project on a marine base as a national project.
<p>Nippon Foundation</p> <p>"Ocean and Japan: Proposal concerning the 21st century's national ocean policies" May 2002</p> <p>**Report on questionnaires concerning national ocean policies" submitted at the same time</p>	<ol style="list-style-type: none"> 1. Formulation of comprehensive ocean policies <ol style="list-style-type: none"> 1.1. Idea of marine management, to be clarified 1.2. "Basic Fisheries Law" to be established 2. Improvement of administrative organizations for the formulation and implementation of ocean policies <ol style="list-style-type: none"> 2.1. Administrative organizations/position to be established: Ministerial Conference related to Marine Affairs, Minister in charge of Marine Affairs, Inter-Ministerial/Agency Liaison Conference concerning Marine Affairs, and Headquarters for Ocean Policies (in the Cabinet Office) 2.2. Establishment of a marine council 3. Improvement of the law of comprehensive coastal zone management 4. Systematic management of fishery resources, and coordination of fisheries, and other uses of the ocean 5. Accomplishment of the mutual management of exclusive economic zones and continental shelves 6. Improvement of education on the ocean for young people, and interdisciplinary education and research
<p>Marine Development Sub-council, Council for Science and Technology</p> <p>Report (of an inquiry made in April 2001) "Basic concept and promotional policies of marine development from a long-term viewpoint" August 1, 2002</p> <p>*Title of a brochure for distribution: Japan's ocean policy in the early 21st century</p>	<p>[Principles of ocean policy]</p> <ul style="list-style-type: none"> • Shift to a policy that is well-balanced in terms of "the protection of the ocean," "the use of the ocean," and "the knowledge of the ocean" • Planning and drafting ocean policy strategically from a global viewpoint • Drafting ocean policy from a comprehensive viewpoint, and implementation of measures in cooperation with related ministries and agencies <p><<Marine conservation>> Implementation of the evaluation of the values of marine environments, and four other items <<Use of the ocean>> Five items, including the use of renewable energy, and mineral and energy resources <<Matters concerning infrastructure improvement>> Study on a system of planning and drafting a plan in order to implement ocean policies from a comprehensive viewpoint, and four other items</p>
<p>Research Institute for Ocean Economics</p> <p>"Proposal concerning the establishment of a network for marine development in Japan's 200-mile zone" - Aim at the sustainable use of exclusive economic zones and continental shelves - May 2003</p> <p>*Project with the Nippon Foundation's grant (2001 and 2002)</p>	<ol style="list-style-type: none"> 1. Exclusive economic zones and continental shelves should be managed by the national government as the most important issue similar to national land management. (promotion and use of isolate islands, and promotion of investigations on continental shelves) 2. It is necessary to create a network for the improvement of basic laws concerning marine management. <ul style="list-style-type: none"> - Basic law that defines the national strategy of the development, use and conservation of exclusive economic zones and continental shelves in five years - Establishment of headquarters for ocean policies in the Cabinet Office for the establishment of a network for marine management 3. It is necessary to formulate a Basic Marine Management Plan (tentative name). 4. The classification of information on the ocean should be initiated immediately for the formation of a basis for marine management. 5. It is necessary to develop a comprehensive policy for the sustainable use of resources. 6. It is necessary to obtain the public's understanding, and train personnel.
<p>Liberal Democratic Party's Board of Investigations on Political Affairs (Working Group on Maritime Interests)</p> <p>"Nine proposals for the protection of maritime interests" June 15, 2004</p>	<p>Proposal 1: A "Ministerial Conference related to Maritime Interests" (tentative name) should be established for the formulation and implementation of strategic policy.</p> <p>Proposal 2: Investigations on natural resources should be conducted in a sea area along the intermediate line on the Japanese side under the leadership of the national government, mining licenses should be granted, and drilling should be implemented.</p> <p>Proposal 3: The problem of boundary demarcation in the East China Sea should be resolved promptly.</p> <p>Proposal 4: Investigations for the preparation of an application for the expansion of continental shelves in 2009 should be accelerated.</p> <p>Proposal 5: The risk management system of the Prime Minister's official residence, including measures to be taken during a "grey zone" between peacetime and emergency, should be improved.</p> <p>Proposal 6: The Japan Coast Guard's security and surveillance systems concerning guarding in an area around the Senkaku Islands should be reinforced.</p> <p>Proposal 7: A resolute stance on the Chinese marine research ship should be taken.</p> <p>Proposal 8: Japan's administrative power over Okinotori-shima Island and the Senkaku Islands should be strengthened.</p> <p>Proposal 9: A system that responds to various situations should be ensured by reinforcing the capabilities of the Self-Defense Forces, and utilizing the framework of the Japan-U.S. Security Treaty.</p>

Note: In addition, there are also other proposals that include the "2000 Appeal," which asked for the establishment of a comprehensive coastal zone management, by the Japanese Association for Coastal Zone Studies, "Use of fisheries school ships for education about and research on marine science" (May 14, 2001) by the Liaison Committee on Research on Marine Science of the Science Council of Japan, and "Continental shelf surveys concerning the United Nations Convention on the Law of the Sea" (December 18, 2003) by the United Forum for Science, Technology & Arts.

during the process of deliberation in the Marine Development Sub-council of the Council for Science and Technology, its official report publicized on August 1, 2002, only mentioned the necessity of "a study on a system of planning and drafting a plan in order to implement ocean policies from a comprehensive viewpoint." On the other hand, a proposal submitted from political circles by the Working Group on Maritime Interests in June 2004 was derived from such previous proposals, which was to be estimated further advanced and developed.

The author therefore came up with the following tentative proposal as follows, taking account of precedent proposals: First, Minister Extraordinary of Marine Affairs should be set up, and the Minister of Land, Infrastructure and Transport should be appointed to that position. The details of discussions held in each council related to marine affairs, and the cross-sectional issues of all administrative organizations should be reported to the Minister of Extraordinary, and government-wide comprehensive and integrated policies should be promoted under the leadership of the Minister Extraordinary of Marine Affairs. In other words, my proposal is that the current situation, under which the Ministry of Education, Culture, Sports, Science and Technology takes charge of both of responsibilities on marine science and technology, and on the entire national ocean policies coordination, should be resolved, and that the Minister of Land, Infrastructure and Transport should play a pivotal role in coordination and promotion of national ocean policies as a whole. Of course, it is necessary to divide work into fisheries, resource and energy, science and technology, diplomacy, and environmental issues as previously being done though, pivotal manipulating functions should be reinforced in order to ensure and upgrade the integration of ocean policies and its implementation.

The reasons why I centered around the Ministry of Land, Infrastructure and Transport(MLIT) are; firstly that MLIT is in charge of coastal zone management, and its coverage is now more than 70% of the total of Japan's 35,000km long coastline; secondly that far-isolated islands in the Pacific Ocean which are important for the management of exclusive economic zone, including Okinotori-shima Island, are managed mostly by the MLIT; and thirdly I believe that the ocean should be managed as equivalent to our national land territory where being managed by MLIT. Preparatory activities should be initiated by the leadership of newly appointed Minister Extraordinary of Marine Affairs, and the Ministerial Ocean Policy Conference be called and set up, and the Ocean Policy Office in the Cabinet Office should be established. The mission of the Office is to take charge of the distribution and classification, and the required transmission of all information on policies on

the ocean and coastal zones including the world's trends, and fulfill the important functions to promote ocean policy governance procedure among the governmental framework.

In addition, the current Marine Development Sub-council under the Council for Science and Technology should be reorganized as a Marine Science and Technology Sub-council which focuses on simply on science and technology as an advisory board to MEXT only (it means it gets back to the original organization, predecessor of Marine Development Council), and replaced by a Marine Policy Council that will make deliberations on overall national ocean policies, as well as ideal ways of comprehensive, inter-ministerial, and cross-section policies, should be newly established as a high level advisory board to the Prime Minister.

The improvement of laws and reorganization of administrative structures should be considered as mere expedient, and should not be done merely for their own sake. We should not forget that our purposes are getting better understanding of the ocean and coastal zones, further promotion of sustainable development, vitalization of ocean related industries, and make contribution to the national economy and communities making use of the great potentials of the oceans. ■

(This article represents only the author's personal opinion, and it does not necessarily represent the opinion of the institution the author belongs to.)

History and Future of the International Association of Maritime Universities (IAMU)

Hisashi Yamamoto

Secretary, International Association of Maritime Universities
(Ship & Ocean Newsletter No.97 August 20, 2004)

The International Association of Maritime Universities is an organization that includes among its members most of the world's four-year maritime universities of excellence. The membership has rapidly increased since seven maritime universities representing each region of the world established the Association in 1999. Currently there are 43 member universities representing nearly every part of the world. The goal of IAMU is to make tangible contributions to the international maritime community through the education and training of top notch maritime personnel and by conducting academic research activities in maritime safety.

1. History of the International Association of Maritime Universities (IAMU)

The International Association of Maritime Universities (IAMU hereafter) was established with seven maritime universities, including six universities representing each region of the world-Asia, North/South America, Oceania, Africa, Western Europe, the Mediterranean/Central and Eastern Europe-and the World Maritime University (WMU) located in Malmö, Sweden, with the support of The Nippon Foundation in November 1999. At that time, there was not a single global organization of 4-year institutions offering maritime education and training for officers' certificate of competence, and academic degrees for a maritime personnel.

These universities shared the following common awareness: the importance of an appropriate response, as institutions for higher education, to the rapid development of globalization in the international maritime community; the importance of safety in management of marine traffic and the conservation of marine environments; and the importance of the maintenance and development of maritime technology, and skill levels for conducting investigations and research, as well as the handing on, on a global scale, of these knowledge, experience and skill levels.

The seven maritime universities (Representative Universities) that were involved in the establishment of IAMU set the following four items as their goals for activities:

(1) Development of a comprehensive maritime educational system desirable for the next generation, (2) establishment of international maritime safety management, (3) development of integral curricula at the faculty level, and (4) development of an international unified system for granting seafarers' competency certificates.

The International Executive Committee, which consists of 16 members, includes the seven Representative Universities, eight maritime universities nominated from each region, and The Nippon Foundation, initiated various activities and has endeavored to recruit new members. IAMU has grown to become a large organization of 43 universi-

ties, accounting for more than 90% of all 4-year maritime universities in the world, and The Nippon Foundation as a Special Member (refer to page 8, for a list of IAMU member institutions).

2. IAMU's activities

IAMU has been working on the realization of its goals through its worldwide network of member universities. The followings are its four main activities:

Annual General Assembly: Attendance by all member universities; the Annual General Assembly is held to discuss the management of IAMU and research papers are presented by member faculties.

Working Groups: Various investigation and research activities related to the realization of IAMU's goals are being conducted on a routine basis. This year, it was decided to start establishing "an annual unified theme" that encompasses aspects from each of IAMU's goals-"maritime education and training for the next generation," "maritime safety management," "unified curricula," and "unified certificates for seafarers"-in order for member universities to engage jointly in investigation and research activities. This year's theme is "liquefied natural gas (LNG)". This decision was based on the fact that the world trade of LNG is rapidly expanding, that global LNG fleet are correspondingly increasing at an unprecedented scale, and that the new LNG carriers are equipped with most advanced and sophisticated high-technological systems in all respects.

Members' proposal system: Excellent proposals for investigation and research activities submitted by the faculties of all member universities are selected and supported in line with IAMU's goals. This year, nine proposals for investigation and research were carefully selected from 50 proposals. The final report will be presented to next year's Annual General Assembly.

Editorial Board: The Editorial Board compiles and publishes two periodicals: "IAMU Journal," which is a collection of academic papers, and "IAMU News," which aims at the mutual exchanges of the members and the provision of

public information. The periodicals are distributed widely among member universities as well as concerned parties in the world maritime community, such as the International Maritime Organization (IMO).

These activities provide a spark for academic exchanges, the formulation and actual trial of common curricula, and the exchange of faculties and students between two or more member universities. These activities are spreading rapidly across national borders, and a wide variety of innovative activities in the areas of maritime education and training, and research activities are in rapid progress through IAMU's large worldwide network.

3. What we have learned through our activities

I would here like to introduce some extremely interesting information that has gained attention through our efforts to establish the International Association of Maritime Universities, an unprecedented organization in the world's maritime field.

1. Types of advanced maritime education: There are "four types" of education among the world's maritime universities, as follows:

[Type 1] British (or British Commonwealth) type: Emphasis is placed on the minimum requirements of the international standards (the Standards of Training, Certification, and Watchkeeping for Seafarers [STCW]) regarding qualification requirements for seafarers. Instructors hold advanced seafarers' competency certificates, and have broad experience aboard ship.

[Type 2] East European type: Students obtain seafarers' competency certificates and an academic degree (bachelor's degree) after an education period of five to five and a half years. For instructors, those with advanced seafarers' competency certificates and broad experience aboard ship, and academic researchers are assigned appropriately.

[Type 3] Japanese and Asian type: Students obtain qualifications for seafarers' competency certificates and an academic degree (bachelor's degree) after an education period of four to four and a half years. For instructors, those with advanced seafarers' competency certificates as well as academic researchers are assigned appropriately. Emphasis is placed on academic research.

[Type 4] U.S. type: Students study in a military-style boarding school for four years, and can obtain an academic degree and a qualification for seafarers' competency certi-

■ List of the member universities of the International Association of Maritime Universities (IAMU)



Red letters: indicate the seven maritime universities (Representative Universities) which were involved in the establishment of IAMU, and the Nippon Foundation (Special Member)
Black letters: Other member universities

cates. Most of the instructors hold advanced seafarers' competency certificates and have broad experience aboard ship.

Although the details can be left to another occasion, it is the author's opinion that Types 2 and 3 are in the best balance in focusing to the education of maritime personnel and academic research, while the U.S. Type is most suitable only for the education of maritime personnel.

2. Maritime university-an essentially national existence: All the IAMU member universities are national or public (state) universities, and there are no private universities. The maritime universities are bound by their respective national systems, so it is difficult to respond promptly to the realities of the international maritime community, which has rapidly and constantly become globalized. This makes the existence of IAMU important. This is because IAMU can add an additional dimension to the "two-dimensional world" where the member universities find themselves on day to day basis, and can provide a fresh space where national restrictions can be transcended.

3. Increasing gap between maritime universities and the actual shipping industry: Due to the progress of globalization, the shipping industry has been accepting fewer graduates from maritime universities. As a result, it seems that the gap between maritime universities and the shipping industry has increased.

4. Locations of member universities: Without exception, the member universities are located in those countries that have a systematic base for maintaining higher maritime education institutions through national finances. In other words, maritime universities were established in those countries which had their own shipping industry to meet their nation's physical ocean transportation needs for import and/or export. This fact should prove valuable when thinking about the "passing on of maritime technology."

5. The U.S. and China are maintaining traditional maritime education: The U.S. and China are major countries where costly maritime education and training are maintained by attracting enough young people and through proper discipline. In both countries, one can say that their fleets are largely manned by "traditional, disciplined seafarers" from their own countries (by comparison, the Japanese merchant marine depends on foreign seafarers to cover more than 90% of its need for seafarers.)

6. Common tests among the member universities: There has been serious discussion as to whether IAMU can provide unified tests in order for member universities to evaluate their students' performance; however, this has proven to be a very challenging task for IAMU, as well as for the entire world maritime community.

4. IAMU's future prospects

As we have seen so far, IAMU is a truly timely project that provides a space for international activities for the member maritime universities, which are bound systematically by the frameworks of their respective countries, and cannot respond to globalization in the best suitable manner. The globalization of the world maritime community continues to progress, but the number of able maritime officers in the respective countries where the member universities are located has now started to decrease rapidly. IAMU is now facing a truly global challenge that require the maximum utilization of the IAMU network, which is now firmly established to cover all corners of the world, and the realization of a system for supplying the best personnel to the world maritime community. ■

Marine Affairs Education in the UK

Howard S. J. Roe

Director, Southampton Oceanography Centre, UK

(Ship & Ocean Newsletter No.101 October 20, 2004)

Marine affairs education in the U.K. conforms to the perception that as a maritime country, marine science and technology education and training are extremely important for the U.K. and its importance will be further increased. I will introduce places of education and efforts to publicize the importance of oceans generally.

Over 70% of the earth's surface is covered by the oceans, to an average depth of some 4,000m.; the oceans hold about 98% of our total water; they are essential to life; together with the atmosphere they control our weather and climate, they are the largest (and most poorly known) three-dimensional ecosystem on the planet, and they are a huge resource! These facts alone indicate the importance of the oceans, but if we add issues such as coastal zone management, environmental management, shipping, transport, energy, defence, fisheries, biodiversity and leisure we rapidly develop a rationale for the importance of marine affairs which touches every single one of us. Rational management requires understanding and knowledge, and the foundations for acquiring existing knowledge and developing new knowledge lies in our education systems.

In the UK the last review of marine education was carried out by the Government based Inter-Agency Committee on Marine Science and Technology in 1998. The IACMST report concluded that "education and training in marine science and technology are vitally important to the UK as a maritime nation, and seem likely to become increasingly so". Both sentiments are still true. The importance, and vitally, the public awareness of the importance of the oceans has grown through both formal channels e.g. the International Climate Change Panel, and informally through the newspapers and television programmes such as the "Blue Planet". The educational opportunities in higher education have increased - in 1998 a survey of the website of the Universities and Colleges Admissions Service (UCAS) revealed some 32 institutions offering about 190 courses in marine related topics. A similar survey now shows 39 institutions with some 198 courses - both are underestimates because many courses will include marine issues without these being specified in their title, and some Universities and colleges are not in the UCAS system. But clearly there is a lot of opportunity, and a very diverse range of courses available at undergraduate level. This diversity is further illustrated by taking a single institution - the School of Ocean and Earth Science at SOC offers 19 undergraduate courses which break down into 95 units covering different skills and different disciplines - all these for an annual intake of about 170 students. The IACMST sur-

vey also noted the need for multi-disciplinary approaches - this is evident in all the courses noted above, and in common with UK higher education everywhere, student experience is broadened to include training in personal and transferable skills, e.g. computing and communications, as well as specialist training.

Higher education in the UK has an international dimension. Within Europe we have the European Commission programmes which cover research, infrastructure and education at both the under and post graduate levels. Marine students can benefit from exchange programmes such as SOCRATES and Marie Curie. Exchanges are also developed locally - at SOC for example we have postgraduate exchanges with institutions in the USA, and the Worldwide University Network is a consortium of institutions in the USA, the UK and China which develops joint undergraduate lectures and research programmes - again marine issues are well represented.

Opportunities for postgraduate education in marine affairs are as diverse as for undergraduates. Higher degrees can be taught or research based, or both; funding is typically via grants from Government funded Research Councils, from Industry, from both, or by scholarships or bursaries from institutions, learned societies or, of course, privately. Undergraduates have similarly varied funding sources available to offset the tuition fees.

The quality of the resultant teaching and qualification is maintained primarily by national procedures within the degree awarding institution. Recently a new approach to marine science education and training in the UK has been taken by the Institute of Marine Engineering, Science and Technology (IMarEST). IMarEST is an international professional body and learned society recently formed (in 2001) by the incorporation of marine scientists and technologists into the Institute of Marine Engineers which was established in 1889. As a result the professional accreditation of degree courses and training which existed for marine engineering is being expanded to cover marine science and technology - both nationally and internationally. Accreditation provides a recognised quality standard and

upholds the professional status of those completing the appropriate courses.

Awareness of the sea starts much earlier than in higher education. There is very little formal marine teaching in schools - but there are many initiatives which take children out of their classrooms into institutes, universities or the work place and promote courses and projects to widen the children's education. Marine activities are involved in many of these. An example is the government sponsored Science Engineering Technology and Mathematical network (SET) that enables visits and projects to be made by schoolchildren at various host organisations. One such organisation is the University of Southampton and SOC, where we host numbers of visits, supervise "marine" projects and give talks to children during "Science Week" - typically in the spring. Another example is the British Association's Creativity in Science and Technology programme (CREST) sponsored by Universities, research councils and industry which is a project based scheme in which teams (or individuals) from schools develop ideas which are presented and judged at host institutions. Again marine science and engineering features in these projects and some of these are hosted at SOC. A different type of school programme is the "Classroom of the Sea" - which is sponsored by the European Commission and by the Natural Environment Research Council and is based at SOC. Here teachers are taken on research cruises, take part in the research, and send daily reports back to their schools via an interactive web site.

But education is not confined to schools, universities or formal learning. Key to the public recognition of the importance and interest of marine affairs is exposure to interesting, relevant and well produced talks, articles and programmes within the institutions and in the media. Again at SOC we run public lectures in the evenings on a whole range of topics - whales, coral reefs, climate change, and so on; we hold "hands on" days when children (and their parents) come and bundle specimens, rocks and fossils; we hold open days and open weeks - and we have a specific funded group of staff whose role is to inform the media and keep marine issues (and SOC!) in the public eye.

This is very much a personal view, based largely upon examples from my centre. But the issues are general within the UK - there are a lot of opportunities for students of all ages; there is recognition of the importance of public awareness and acceptance of the issues in marine affairs; and there is recognition of the benefits of national and

international links with the developing concept of professional accreditation of marine scientists to go alongside the well established procedures for engineers. ■

A Geological Perspective on Global Warming

S. George Philander

Professor, Princeton University, USA

(Ship & Ocean Newsletter No.106 January 5, 2005)

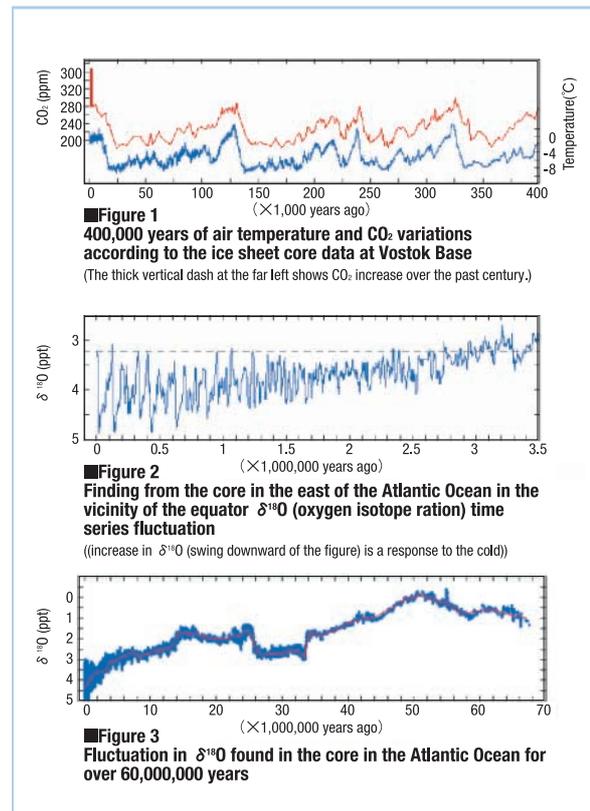
Unraveling past climate changes that can be found in geological data, such as ice ages that repeatedly occurred over the past two million years, will help predict future global warming very reliably.

The impressive achievements of our species over the past several millennia - the invention of agriculture, the building of cities, the advances of civilizations, and the development of industries and technologies - are bringing us rich rewards, but are also having inadvertent and disquieting consequences -- a rapid rise in the atmospheric concentration of carbon dioxide. This is clear evidence that we are now geologic agents capable of interfering with the processes that make this a habitable planet. We have therefore become the custodians of the Earth, the only planet known to be habitable. To make responsible decisions on behalf of future generations, it is helpful to have some familiarity with the Earth's past, especially the remarkable climate changes evident in fig.1.

Some 60 million years ago, at the time of the demise of the dinosaurs, temperatures in high latitudes were so high, in the neighborhood of 15C, that the poles were free of ice. Since that time the Earth has experienced the gradual global cooling shown in the bottom panel of fig.1. The main cause was plate tectonics with which is associated the drifting of continents, the building of mountains, and processes such as weathering that reduced the atmospheric concentration of carbon dioxide. Superimposed on the gradual cooling, whose source of energy is internal to the Earth, are the Milankovitch cycles, climate fluctuations in response to periodic variations in sunlight because of periodic variations in the tilt of the Earth's axis (at a period of 41,000 years), the precession of the axis (at a period of 23,000 years) and the eccentricity of the orbit (at a period of 100,000 years). It is striking in the geological record that, even though the Milankovitch forcing over tens of millions of years was essentially constant, the climatic response to that forcing changed dramatically with time. The response was modest until around 3 million years ago but then started to amplify enormously as can be seen in the middle panel. The top panel is a more detailed picture of the Ice Age cycle over the past 400,000 years. Note the remarkably high correlations between fluctuations in atmospheric CO₂ levels and Antarctic temperatures. The anthropogenic rise in CO₂ levels over the past century is the vertical bar at the left-hand extreme.

Today is a special moment in the Earth's history for two

reasons: (1) the climate is so sensitive to small perturbations that modest variations in sunlight cause recurrent Ice Ages; (2) the present is an infrequent warm, interglacial period of naturally high carbon dioxide levels in the atmosphere. The rapid increase in those levels, because of our industrial activities, is therefore at an inopportune time. The consequences, according to the empirical correlations in the top panel of fig.1, could include a return to the warm world of approximately 3 million years ago (3Ma). Recently Ravelo et al (2004) presented evidence that, at that time, equatorial Pacific sea surface temperatures were as warm in the east as in the west. Today, such a warming of the east occurs only briefly during intense El Niño episodes such as that of 1997-98. Up to 3 Ma El Niño was apparently a perennial phenomenon. Under what conditions will El Niño become a permanent phenomenon?



Geologically, the cooling of the Earth has been taking place for 60,000,000 years (Figure 3). Over the course of 3,000,000 years, the Milankovitch cycle had intensified (Figure 2). In the past 100 years, there has been an increase in atmospheric CO₂ (man-made source) concentration (Figure 1).

Studies that address this question include calculations with a variety of computer models of the atmosphere, the ocean and earth's climate. Interesting results are emerging, but how do we test the validity of these results?

Geoscientists have made enormous progress with the prediction of the daily weather, and interannual El Niño events, mainly because of the availability of data to check models and theories. The phenomena of interest do not repeat themselves - the precise weather pattern at this moment has never appeared before, and will not appear again. Data that describe a succession of many, many weather patterns are therefore needed to improve models. Fortunately the weather changes frequently. In the case of El Niño the changes are more gradual but fortunately the frequency of El Niño occurrences is sufficiently high for us, over the past thirty years, to have observed several El Niño episodes. This contributed to considerable progress. When we turn to climate changes over decades and longer, the available instrumental records are too short to provide adequate checks for models, and will continue to be so for a long time to come. Hence climate modelers have no choice but to turn to the geological record of past climates. Fortunately those records provide a wealth of information, and invaluable checks for climate models, as is evident in the figure. Explaining and predicting the climate changes in that record, the recurrent Ice Ages for example, will bolster confidence in the results from climate models enormously.

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What Japan should Do as the Country that Produced the Internationally Used Word, "Tsunami"

Nobuo Shuto

*Professor, Faculty of Policy Studies, Iwate Prefectural University
(Ship & Ocean Newsletter No.107 January 20, 2005)*

A Giant tsunami seldom occurs, and the full extent of the Sumatra Tsunami cannot be conceived from TV images. Also, as the next giant tsunami may occur only after many generational changes, it is extremely difficult to convey knowledge about it. We can only provide continuous training for disaster prevention and make preparations for tsunamis at every opportunity. Japan, which has suffered more tsunamis than any other country, has numerous technologies that can be transferred to others. Now is the time to utilize them.

1. Why so many casualties?

The tsunami that occurred in Sumatra in December 2004 shook the entire world. The videotaped scenes of the horrific tsunami were seen on TV, and there are many people who have just now recognized the horror of tsunamis. However, judging from the TV images, the intensity of the tsunami was minor except for Indonesia. Nevertheless, why was so much damage done?

I regret speaking unkindly about the dead, but the fact is that the high casualties were the result of a lack of countermeasures against tsunami and a lack of knowledge about tsunamis in general.

2. What is a giant tsunami?

At the time of this writing, we do not know the details of the tsunami that hit the coast of Aceh Province in Indonesia, but it can safely be said that it must have been a giant tsunami.

Of the past tsunamis that were witnessed in detail, there are some giant tsunamis. In the case of Japan, the Meiji Sanriku Tsunami hit the country in 1896. When the steep front surface of the tsunami came near, houses were blown off by the wind that was generated by the approaching

tsunami before it reached the coast. There were places that were hit by a tsunami of almost 40 meters in height. It caused 22,000 deaths. In Iwate Prefecture, 18,000 people were killed, and the remains of 8,000 people were not recovered.

A tsunami of a similar magnitude occurred 50 years later in 1946 in the Aleutians. Figure 1 shows a picture of the Aleutian Tsunami that was painted right after the occurrence of the tsunami by a painter who checked with survivors many times in order to depict the tsunami. The picture was given to the author by Dr. Bernard of NOAA, about 25 years ago, and he noted that the painter's name was no longer known at that time. The front of the tsunami of 30 meters in height stood steep like a cliff, and felled a newly constructed lighthouse with a single blow.

Both giant tsunamis were caused by "a tsunami earthquake," that is, a minor earthquake that causes a major tsunami. Because the earthquake that caused the Meiji Sanriku Tsunami had a seismic intensity of only two, no one thought to evacuate and many lives were lost.

3. Basics of tsunami countermeasures

How should we cope with tsunamis, which are natural phenomena? In 1960 when the Chile Tsunami reached New Zealand, where no earthquake was felt, an ebb tide preceded the tsunami there. It is said that residents of European ancestry who thought the ebb tide an extraordinary sight walked down to the beach, and that the aboriginal inhabitants who thought the ebb tide an abnormal natural phenomenon walked away from the beach. As the latter's attitude of awe for nature will likely disappear in future, we must now make conscious efforts to learn how tsunamis in fact operate.

A tsunami, especially a giant tsunami, occurs at intervals of 100 to 200 years. During the intervals, generations pass, so people's memories wane and the sense of urgency is lost. In order to counter this,

■Figure 1: Giant tsunami that hit Unimak Island of the Aleutian Islands in 1946



there is no way other than continuous education for disaster prevention. Various kinds of countermeasures for disaster prevention are the next step.

4. Necessity of preparation for tsunami countermeasures

It is easy to say that the Sumatra Tsunami caused the damage it did because an international tsunami warning system was not in place in the Indian Ocean area, though one was in the Pacific Ocean area. We should ask ourselves, then, if a tsunami forecast system was available in the Atlantic Ocean when a tsunami of 12 meters in height hit Lisbon in 1775 and a tsunami of 10 meters in height hit the Azores Islands in 1855? Even the tsunami warning system based in Hawaii, said to be the only one of its kind in the world, was only established after the Chile Tsunami that occurred in 1960.

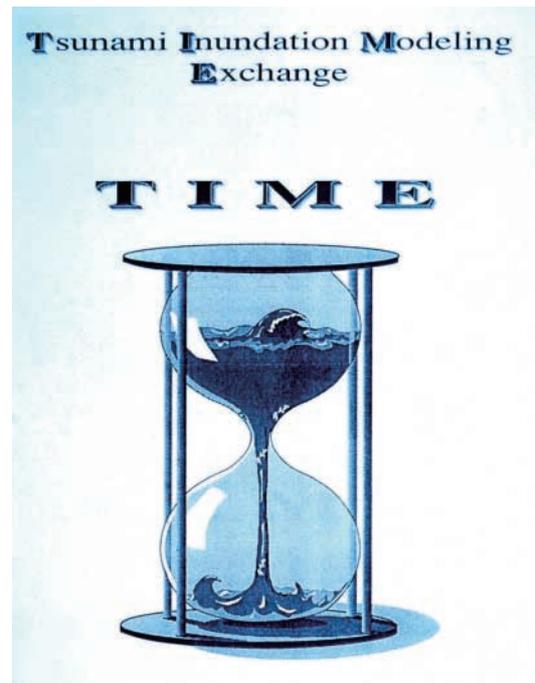
It is too late if a cry for countermeasures rises only after the occurrence of a disaster. We should prepare for tsunamis at every opportunity. As an example, if the high-precision buoys for marine observation that Japan began installing near the equator in 1998 had tsunami gauges attached to them, like those provided by the U.S., the buoys would be extremely useful in improving accuracy in the forecasting of remote tsunamis.

What is sought is preparation for a tsunami that may occur at any time. Bemoaning the lack of countermeasures after the occurrence of a disaster will not ensure preparedness for the next tsunami.

5. What Japan can do

Japan, which has been hit more often by tsunamis than any other country in the world, is the world's most advanced in terms of preparedness for tsunamis. There are many ways of utilizing that knowledge. One example of utilizing that knowledge is the Tsunami Inundation Modeling Exchange (TIME) Project, which is implemented mostly by the Disaster Control Research Center, Tohoku University. A numerical calculation method used as UNESCO's standard method was adopted, and the method is utilized to prepare hazard maps by countries in danger of being hit by tsunamis.

For comprehensive countermeasures against tsunamis in Japan, three kinds of approaches are combined: one for structures, one for the construction of tsunami-resistant towns, as well as software-oriented countermeasures that include forecasting and warning. Japan has accumulated experience in each of these countermeasures. Because it is now feasible to transfer technology and these countermeasures can be made to fit at applicable points in applicable countries, there is no reason not to make the best use of them. ■



Symbol mark for the Tsunami Inundation Modeling Exchange Project implemented internationally by Tohoku University

New Concept of Maritime Security: Securing the Oceans

Kazumine Akimoto

Senior Researcher, Institute for Ocean Policy, SOF

(Ship & Ocean Newsletter No.109 February 20, 2005)

"Securing the Oceans" is a new concept of security for taking comprehensive action in maintaining peace and protecting the environment in the oceans. Researchers who participated in the international conference, "Geo-Agenda for the Future: Securing the Oceans," sponsored by the Institute for Ocean Policy, SOF over three years, adopted "The Tokyo Declaration on Securing the Oceans" in the final international conference in December 2004. The declaration proposes the promotion of ocean governance as required by the UN Convention on the Law of the Sea and Agenda 21 through implementation of new maritime security.

New maritime security

A new concept of maritime security has come about. "Securing the Oceans" is a new concept of security, which seeks the comprehensive management of various maritime affairs, especially those concerned with military affairs, peaceful uses, resources, and the environment. Distinct from the conventional, narrowly-defined view of securing the safety of the state and its people through defense, diplomacy, and security, "Securing the Oceans" is a concept of comprehensive security in a broad sense, based on the recognition that resource management and environmental protection are fundamental requirements for the survival and development of mankind. The concept provides a comprehensive and integrated approach to all the issues of the ocean, improves greatly on the conventional, sectoral, and restricted approach, and contributes to ocean governance through security.

Current ocean management

Mankind has evolved and prospered with the use and bounty of the oceans. We have been heavily dependent on the oceans, which account for 70% of the earth's surface, and ocean resources for sea lanes, fishery resources, seabed resources, industry, and our livelihood. There will also be no peace and development in the future without the sustainable use of the ocean. In addition, it is the oceans that support the mechanisms of the earth, so life on earth cannot exist without the preservation of the marine environment.

But all countries and entities are now increasingly approaching the oceans in search of resources and energy. Under such circumstances, conflicts among nations with regard to the development and utilization of the oceans have come to the surface and are escalating military tensions. In addition, since the end of the Cold War, religious and ethnic conflicts, or armed conflicts and terrorist attacks stemming from poverty, have occurred frequently in coastal countries and regions along major sea routes in the world. These, combined with the activities of pirates and armed robbery, pose increasingly serious problems and are destabilizing conditions for use of the oceans. On the other

hand, with the acceleration of economic activities, land-based marine pollution is spreading due to the patterns of mass production, mass consumption, mass disposal, and unregulated development of coastal areas. In addition, the increase of the population and the improvement of diet have led to the overexploitation of marine resources, furthering the deterioration of the natural marine environment, the destruction of ecosystems, and the depletion of resources.

After the UN Convention on the Law of the Sea was ratified in 1994, coastal states' territorial waters were extended to 12 nautical miles. In addition, coastal states were given sovereignty over Exclusive Economic Zones and continental shelves and entrusted with their management. As a result, vast sea areas that had previously been used freely under the paradigm of the open seas, and that make up about 40% of ocean space, were placed under the control of coastal states. In accordance with the UN Convention on the Law of the Sea, and the Earth Summit Agenda 21, which was adopted two years before the ratification of the convention, a new system aiming at the comprehensive management and sustainable development of the oceans was established.

Ironically, however, with most of the ocean being divided into sea areas under the jurisdiction of coastal states, borders drawn along these sea areas often hinder law enforcement authorities in combating sea crime, making their pursuit of offenders difficult, as they are able to slip across these same borders. Problems have also arisen due to the artificial nature of coastal states' borders, as they make it difficult to manage the highly integrated marine environment and freely moving biological resources.

Each country needs to face these realities directly and realize that the oceans, their vastness alone making them international in character, need to be comprehensively managed by coastal states in consideration of the ocean as a whole. They must also realize that collaboration and cooperation among countries in each region are needed and reinforce a cooperative relationship for the comprehensive management of the oceans. The "New concept of maritime

security: Securing the Oceans" is intended to respond to this kind of need.

Efforts for securing the Oceans

The Institute for Ocean Policy, SOF engages in research on comprehensive marine management based on its basic philosophy, "coexistence between mankind and the ocean," with the support of the Nippon Foundation. As part of its research, under a 3-year plan from 2002 with the theme of "Geo-Agenda for the Future: Securing the Oceans," the foundation conducted research for policy recommendations in order to advocate a new concept for comprehensive maritime security, "Securing the Oceans," and to implement the concept in society.

2004 December, the Institute for Ocean Policy, SOF held a final international conference and invited experts on the Law of the Sea and ocean policy to Tokyo from nine countries, mostly in the East Asian region, and from international organizations, and adopted the "Tokyo Declaration on Securing the Oceans" as the consensus of the participants. With regard to the formation and implementation of a political idea for the realization of the new concept of

maritime security "Securing the Oceans," the Tokyo Declaration proposed to take 10 concrete measures that include the establishment of an international think tank for the oceans, the regular holding of an international conference on "Securing the Oceans," the establishment of systems for the conflict prevention and environmental protection, the information sharing, and cost sharing. For the outline of the proposals, please see the list below (for the full text of the proposals, access the website of the Institute for Ocean Policy, SOF via http://www.sof.or.jp/topics/2004_e/pdf/041220_e1.pdf).

Considering it important to implement the proposals included in the Tokyo Declaration, the Institute for Ocean Policy, SOF makes it its business to call for the implementation of proposals to relevant parties at every opportunity. The foundation also would like to organize "Securing the Oceans Advocacy Group" as its backbone, and to promote activities to actually implement the policy recommendations of the Tokyo Declaration. We would appreciate your understanding of, and your cooperation in the promotion of the consolidated management of the oceans, which are the foundations of human survival. ■

Tokyo Declaration on Securing the Oceans

I Building political will

- 1-1 Proposals to individual states and international organizations
- 1-2 Creation of an international ocean think tank
- 1-3 Establishing outreach programs
- 1-4 Establishment of a coordinating mechanism and cross-sectoral body for ocean affairs
- 1-5 Holding "Securing the Oceans" international conferences on a regular basis

II Towards implementation of Securing the Oceans

- 2-1 Conflict prevention and environment protection systems
- 2-2 Surveillance, monitoring, and enforcement systems
- 2-3 Information sharing
- 2-4 Burden sharing
- 2-5 International cooperation for capacity building