

# Ship & Ocean Newsletter

Selected Papers

No. **11**  
September 2009

**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.11" contains English-language versions of papers from the Japanese Newsletter edition, published from No.171(2007.9.20) to No.190(2008.7.20).

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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# Harmonized Humanities-Sciences Education in Oceanic Studies for Graduate Students

— Aims of Yokohama National University's "Center for Oceanic Studies and Integrated Education" —

**Yoichi SUMI**

*Professor and Director-General, Center for Oceanic Studies and Integrated Education (COSIE), Yokohama National University  
(Ship & Ocean Newsletter No.171 September 20,2007)*

To ensure the sustainable and effective use of the oceans and protect the marine environment, the time has come for integrated ocean management. Yokohama National University has established the "Center for Oceanic Studies and Integrated Education" to nurture individuals capable of addressing ocean problems from a broad and integrated perspective, in addition to the traditional specialized approaches to ocean studies that include environmental problems, social and economic aspects, and industrial marine technologies. In the Center, professors from a wide range of ocean-related fields will offer an interdisciplinary program aimed at graduate students from all disciplines in the university, as well as adult learners.

## Oceans and university education

The recent economic growth of countries sharing maritime borders with Japan, while exerting a positive impact on Japan's economy, has also led to serious conflicts of interests in areas such as resource development, territorial issues and environmental problems in the seas around Japan. Achieving "integrated management of the oceans" to ensure the sustainable development of mankind in the 21st century has now become an extremely important task, both internationally and domestically. The Basic Act on Ocean Policy was enacted in April this year (2007), and efforts will soon be launched towards a new integrated management of the oceans. However, educating the personnel who will be responsible for this is a task of some urgency. As at other universities, education and research on ocean studies at Yokohama National University had become vertically segmented into various fields such as social sciences, engineering, environmental information and education. Levels of education and research in the various specializations of individual academic staffs may have been widely recognized, but this was not necessarily a system whereby

ocean-related problems could be grasped comprehensively by the university as a whole.

To address this situation, Yokohama National University established the "Center for Oceanic Studies and Integrated Education" (COSIE). Academic staff engaged in ocean-related research can now enter into free and flexible collaborations and provide an integrated humanities-sciences graduate-level educational program in ocean studies, essentially the first of its kind in Japan. As well as introducing the content of this program, I would now like to state our goals for education in ocean studies.

## How will the Center's educational program nurture specialists in ocean sciences?

The diagram below outlines the Center's organization. The educational program due to start in October of this year (2007) will be open to all graduate students of this university who are enrolled in master's courses (Ph.D. preliminary stage courses) primarily on ocean-related themes. Subjects available for study include two compulsory core subjects and more than twenty optional subjects. As shown

### Content of core subjects in the Integrated Ocean Management Program

Integrated Ocean Management Study I			Integrated Ocean Management Study II		
Lecture No.	Unit	Lecture Title	Lecture No.	Unit	Lecture Title
1	Introduction	The Oceans and Human Life	1	III Marine Pollution	Marine Pollution 1
2	I Knowing the Oceans	The History of the Oceans and the Earth	2	IV Managing the Oceans	Marine Pollution 2
3		The Physics of the Oceans	3		Ocean Management Systems (Matters Concerning Oceans and Coastal Regions, General Theory of International Law)
4		The Chemistry of the Oceans	4		Japan's Systems Concerning Oceans and Coastal Regions
5		The Biodiversity and Ecology of the Oceans	5		International Management of Maritime Activities
6		II Utilizing the Oceans	The Utilization of Fishery Resources		6
7	II Utilizing the Oceans	The Utilization of Seabed Resources	7	V Protecting the Oceans	Maritime Security
8		Latent Potential for Utilization of the Oceans	8		Management of the Marine Environment
9		Maritime Transport and the Shipping Industry	9		A Sustainable Fisheries Industry
10		The History of Shipbuilding Technology and Its Future	10		Mining Activities and Consideration of the Environment
11		Economic Growth and Port Development	11		Using Maritime Technologies to Reduce Environmental Impact
12		Maritime Leisure and Recreation	12		Marine Civil Engineering and Construction for Protection of Oceans
13		Teaching and Learning about the Oceans	13		Conservation and Regeneration of the Marine Environment
14	General Discussion		14	General Discussion	
15	Spare Day		15	Spare Day	

in the Table below, the core subject, "Integrated Ocean Management", comprises a number of basic key elements: "Knowing the Oceans", "Utilizing the Oceans", "Marine Pollution", "Managing the Oceans" and "Protecting the Oceans". These will be taught in an omnibus format by the university's teaching staff, together with part-time lecturers from outside the university. Most of the optional subjects are already taught in the various Graduate Schools, and cover the following fields:

**Humanities and Social Sciences:** International Law, Coastal Management, Maritime Transport Policy, Environmental Law, etc.

**Engineering:** Design Theory of Ships and Ocean Structures, Coastal and Ocean Wave Hydrodynamics, Earth Engineering, etc.

**Environmental Information Science:** Marine Biodiversity, Ecological Risk Management, etc.

**Education:** Marine Field Work, etc.

For graduate students enrolled in master's courses (Ph.D. preliminary stage), a condition for completing this program is that credits be obtained in the two compulsory subjects and three of the optional subjects mentioned above. They must also obtain a thesis-based master's degree related to ocean science in their special field of postgraduate study.

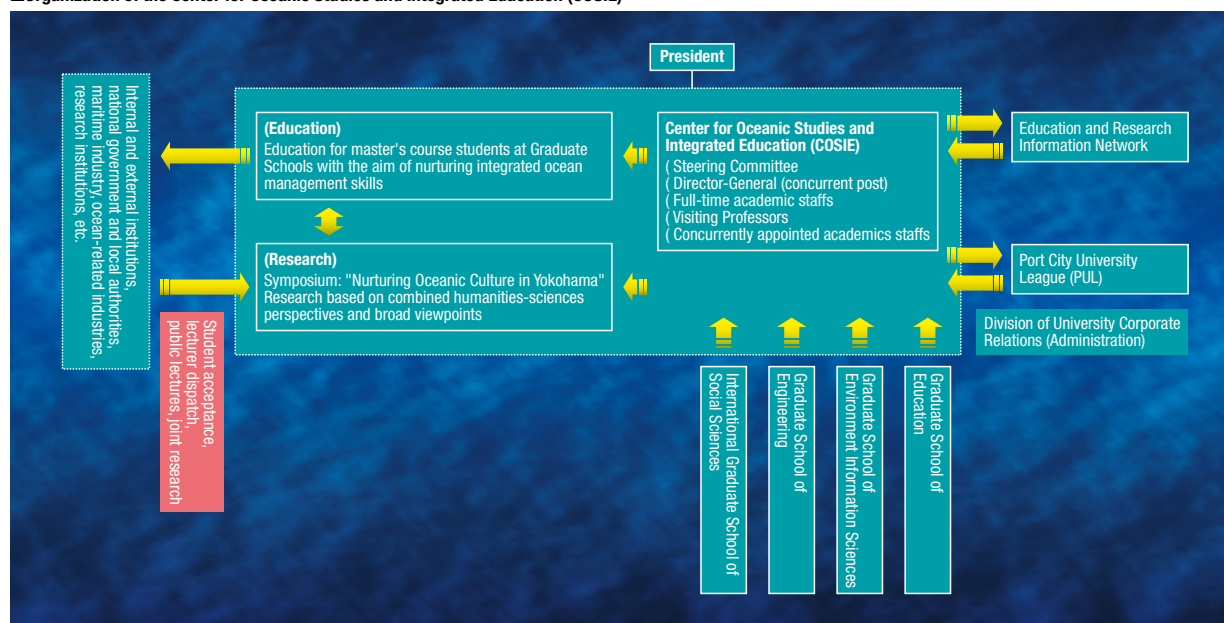
The aim of interdisciplinary education through this program is to nurture specialists who are capable of taking a larger view of problems related to oceans in general, while at the same time pursuing specializations in their various fields of postgraduate study. As interdisciplinary themes incorporated in this program, there are potentially 300

issues to be drawn from the matrix of 25 issues shown in the Table (excluding General Discussion). These issues will be necessarily diverse, ranging from interdisciplinary links between neighboring fields to the higher hurdles presented by links between social sciences and engineering. Examples of these include "Integrated management based on scientific understanding of oceanic environments", "How technology is impacted by international treaties on ballast water, marine oil pollution, vessel recycling, etc.", "Scientific evidence for global warming and how international treaties should approach it", "Scientific surveys on marine bioresource levels and directions for resource protection policies" and "Directions for port and harbor policies addressing the dramatic increase in marine freight transportation".

While more diverse topics may appear in future, I also see it as an important role of the Center to create opportunities for presentation, dialogue and exchange concerning these problems, and to promote mutual enlightenment among students from differing fields of specialization.

In contrast to conventional vertically-organized education, this program offers a horizontal, combined humanities-sciences curriculum. Generally, however, horizontal structures have a drawback compared to vertical ones, in that their budgetary basis and administrative organization are often weak. As such, they always entail a risk of increasing divergence if left unchecked. To address this, considering the importance of an overall coordinating function we have decided to appoint a Program Coordinator as well as create an academic affairs committee for recruiting

■ Organization of the Center for Oceanic Studies and Integrated Education (COSIE)



graduate students and managing performance based on a university-wide system. At the same time, we have the total support of the University's Administration Bureau, and for this academic year will enjoy financial support from the President's budgetary measures and subsidies under the "University Education Globalization Promotion Program" of the Ministry of Education, Culture, Sports, Science and Technology (MEXT). We have also accepted a commission from the Nippon Foundation under its "Nippon Foundation Courses" project, and have developed the curriculum on this basis. From the next academic year, in line with MEXT's system design for subsidiary subjects in graduate schools, we are preparing to adopt a degree granting system in subsidiary subjects (master's degrees) to students completing this program, as a program of interdisciplinary education going beyond individual graduate schools.

### **Nurturing oceanic culture in Yokohama**

The port of Yokohama was opened at the end of the Edo era. Over the next 150 years, it developed economically, culturally and internationally as a port city and a center of trade, marine navigation and shipbuilding. To reflect this proud local history, this Center will start its activities by providing opportunities for the practice of postgraduate education in ocean sciences. As an arena for research exchange, we have already held the symposium series, "Nurturing Oceanic Culture in Yokohama" three times since the last academic year. In the process, we have promoted mutual understanding and enlightenment among researchers, students and ordinary citizens from different fields of specialization. This year, we are again making preparations for a symposium to commemorate the establishment of the Center on "Culture Day" (November 3rd). We would like to make this a forum for advancing interdisciplinary research in the future.

To enable the Center to serve concurrently as a core for links with external institutions, we will intensify cooperative relationships with the Port and Airport Research Institute, the National Maritime Research Institute, and other government-related institutions and industrial organizations with which we have already entered into collaborative agreements. Meanwhile, we aim to contribute to the development of international education and research in ocean studies as Japan's foremost center for integrated education and research in ocean studies. In doing so, we will draw on the global network of the Port City University League (PUL: Southampton, Sao Paulo, Shanghai, Singapore, Chiang Mai, Ho Chi Minh, Vancouver, and Yokohama), of which this University is a founding member. ■



# Thoughts on "Sediment Management"

**Shoji FUNABASHI**

Director for Sediment Management, Land Conservation Office, Sabo Department, River Bureau, Ministry of Land, Infrastructure and Transport  
(Ship & Ocean Newsletter No.173 October 20,2007)

Sediment management is a term that is slowly coming to be better known. However, its true meaning is not widely understood. The term itself gained usage and raised expectations, but there remain many issues concerning not only administrative decisions, but also phenomena to be explained and necessary technologies to be developed. In this article on sediment management I offer my current thoughts concerning what perspective we should proceed from and how, as well as on possible future developments.

## What is sediment management?

What do people imagine when they first see the phrase "sediment management"? If they interpret the words alone without any background information, most people would probably associate it with ideas along the lines "comprehensive control of sediment" → "controlling sediment comprehensively, in other words, comprehensively controlling the movement or transportation of sediment" → "moving sediment efficiently". It is a phrase that is indeed difficult to understand without knowing the background. I myself would sum it up as meaning "efforts by relevant parties to normalize movements of sediment". Now, I think these efforts can be broadly divided into two stages. The first involves the relevant parties working together to improve the flow of sediment, as a way of solving progressive coastal erosion and other problems caused by abnormal movements of sediment. The second stage involves all parties who are in a position to influence movements of sediment being constantly aware of maintaining normal movements of sediment, and making efforts to maintain that normal state.

## From what angles are these efforts made?

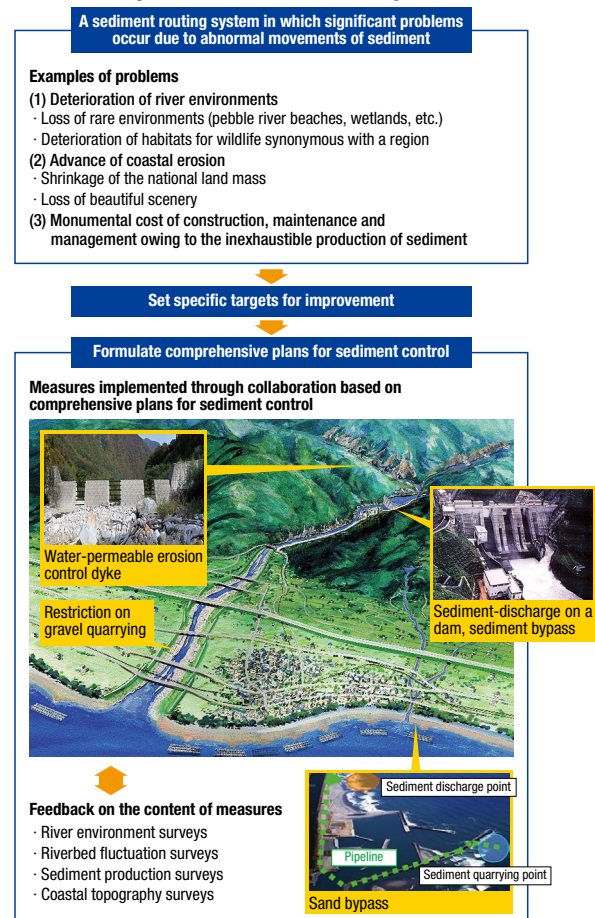
Aside from the meaning of the phrase, many people must have noticed its use increasing. I see this in a positive light, in that it illustrates the growing importance of and expectations for sediment management in the modern era. Over the last half-century, Japan has achieved enormous economic and other growth, with large-scale and vigorous development of national land, urban development, and so on. On the other hand, this growth has also producing downsides that could not originally have been foreseen. In light of this, attention is now being turned to the rationale of "sustainably managing national land", with a view to leaving our land to posterity in an improved state.

Specifically, this rationale entails the idea of skillfully utilizing and managing circulatory and other systems already inherent in nature, rather than forcibly and artificially controlling them with the aid of machine power. "Sediment management" is also based on this kind of

rationale.

Although movements of sediment are inconstant and irregular, they are always associated with the movement of water. In view of this, we understand movements of sediment within a system (scope) that can occur through the power of nature. The important thing is then how we attempt to solve problems within this framework. That is, the aim is to discover efficient and effective solutions and to tackle problems caused by movements of sediment, by understanding those movements in terms of the total area of movement from the production source to mountain

### ■ Schematic diagram of efforts for sediment management



streams, rivers and coasts. (In an FY1998 report, the Rivers Council proposed that the area from mountains to rivers and down to the coasts be termed a "sediment routing system").

As can be understood from this, sediment management is inevitably a cross-sector effort. In sediment routing systems however, the place where the problem becomes manifest often differs from the place where it is caused. Therefore, we first need to share information on what happens in sediment routing systems, what causes problems to occur, and so on. Particularly when areas of responsibility differ, not only the terms used but also the rationale and approach to solving problems also differ. This makes it important to explain our situations to each other in objective and quantified terms. Unless adequately rooted in this process, the road to fundamental and continuous solutions will remain only a vague notion.

### **We must start with an accurate understanding of the facts**

On the other hand, I also wonder if too much is expected of "sediment management". People tend to think that all problems will instantly be solved merely by implementing sediment management. Of course, it is a fact that there are many places all over Japan where former beaches are in critical danger of being lost due to erosion. But we should ask ourselves whether the causes of such problems are all artificially induced (e.g., by erecting structures that inhibit movements of sediment, or excavating gravel in massive volumes). In fact, some of these problems have been caused simply by the passage of time and across historical eras.

In the Chugoku region, for example, there used to be a technique known as "*kanna nagashi* (iron sand mining)". Slopes of weathered granite were artificially made to collapse, then the resultant sediments were washed off with flowing water and sorted by drawing on the difference in specific gravity. This method was employed to obtain the iron sand used as raw material for *tamahagane* steel, indispensable to the manufacture of Japanese swords. As a result, large volumes of unwanted sediment were discharged into rivers and seas. In the Taisho era (1912-1925), however, the method of iron manufacture changed and the volumes of sediment fell sharply. Similarly, there are also places where the production of sediment from major land collapses due to earthquakes or ejected matter from volcanic eruptions occurring in the Edo era has decreased over the long passage of time. There are also examples of devastated land ("bare mountains"), once a common sight, being increasingly covered with vegetation (research suggests that, of the last few centuries, vegetation cover is

most abundant in the present).

As these examples illustrate, movements of sediment that once maintained a major state of dynamic equilibrium are thought to have changed in a diminishing direction in many cases; we have no choice but to accept these long-term changes. This might be considered a retrogressive view, but if we are to tackle sediment management head on, it is vital that we correctly understand the situation in which we find ourselves. Moreover, a greater elucidation and quantification of phenomena related to sediment movement will need to be carried out before we can consider measures that will be more effective in a situation of minor dynamic equilibrium.

### **An eye to future developments**

For the future, as shown in the schematic diagram of efforts for sediment management, we will need to set improvement targets for problems and study specific means of meeting them. Until now, progress has been made in attempts to ascertain the movement of sediment as well as studies on countermeasures in individual sectors. In future, we will also need to apply these to solve problems as an overall system. Effective measures in individual sectors may not necessarily be efficient as methods for the system as a whole. Impacts after measures will need to be checked, and in some cases further measures will be needed to address these impacts. Furthermore, movements of sediment form basic environments for living organisms, and the very phenomenon of sediment movement has a diversity of functions besides the physical movement of sediment. As things stand, many aspects have yet to be elucidated in the relationship between sediment, on the one hand, and living organisms and plants, on the other. While tolerating (ascertaining) a certain degree of change, the most realistic method will to implement measures, then to carry out necessary monitoring surveys while feeding the results back into the system, and to finely tune the measures on this basis. Rather than relying on government decisions, support from the scientific community will also be required if we are to gain a firm grasp of occurring phenomena and tackle them continuously. Accumulating these individual efforts will help us to elucidate the universal principles and knowledge required for sediment control. Moreover, as knowledge and insights concerning movements of sediment increase, it is important that people who carry out large-scale man-made projects realize that those projects could destroy the balance of sediment movement. Rather than "sediment management" designed to solve problems, I hope the time will soon come when "sediment management" is naturally perceived as a means of preventing problems from occurring in the first place. ■



# Production of Biofuel from Seaweed

## — Establishing it as a uniquely Japanese technology

**Masahiro NOTOYA**

Professor, Department of Marine Biosciences, Faculty of Marine Science, Tokyo University of Marine Science and Technology  
(Ship & Ocean Newsletter No.175 November 20,2007)

Seaweed holds an important position in coastal ecosystems as a primary product, playing a role in the maintenance, restoration and conservation of seafood resources. It has been shown that by using the fertility and functions of artificially introduced "drifting seaweed" to produce seaweed biofuel, carbon dioxide in the atmosphere can be recycled, living resources accompanying "drifting seaweed" can be conserved, and eutrophic ocean areas can be cleansed. It is important to consider applied algology research when considering the effective use of coastal and ocean resources as well as the conservation of marine environments.

### Environmental conservation, harnessing the functions of seaweed

A number of crises on a global scale look set to threaten human livelihoods and economies in the near future; among others, there are problems with the environment, population, food, and energy. To avoid these crises, we need to dramatically increase production and make effective use of bioresources, as well as improving the economic structure while taking steps to conserve the natural environment. Ever increasing concentrations of carbon dioxide in the atmosphere, in particular, pose a fundamental problem related to all of these crises, and achieving a speedy conversion from fossil fuels to biofuels is seen as a task of the utmost urgency. Until recently, the emphasis was on halting widespread destruction of forests and planting forests in deserts and other unused areas to promote the absorption and accumulation of carbon dioxide. In recent years, however, the emphasis has shifted to more direct efforts aimed at reducing carbon dioxide emissions. Around 7 or 8 years ago, I proposed, in my own publications and elsewhere, a solution for the mass reproduction of ulva (sea lettuce) and other organisms that pollute and destroy coastal ecosystems (known as "green tide"). My contention was that it was important to make effective use of their fertility and functions as natural recycled resources, rather than simply burying them underground or burning them. At the time, seaweed was ignored on grounds that its carbon accumulation time was too short, but now it is at last understood that productivity rather than accumulation time is important when producing biomass fuels.

### The effectiveness of using the oceans

Sources of biomass fuels have, until now, been sought in land-based materials such as timber, plants, and agricultural products. However, land accounts for only about 30% of our planet. And a third of that is taken up by mountains and deserts that are unsuited for use as forests and farmland. The more usable lowlands have become areas for human habitation and environmental conservation, in the



■Fig. 1

A colony of *Sargassum macrocarpum* C. Agardh. It grows from the seabed at depths of 5 to 6m, extending to around 10m. (Toyota, Nakanoshima, Oki Islands, Shimane Prefecture)

form of cities and farmland for food production. Of terrestrial plant life, moreover, food crops and other competitive resources directly affect commodity prices depending on the volumes of supply and demand, and this can have a major socio-economic impact. It is a well-known fact that, as soon as the US government unveiled its policy of using maize as a biofuel material, prices leapt up and dairy farmers as well as various maize-related products and economies were impacted.

The Ministry of Agriculture, Forestry and Fisheries has proposed using fallow fields to produce fast-growing rice as a biofuel material. However, the world's population in 2020 is forecast to exceed eight billion, and this number will be hard to sustain even if all the world's farmland were diverted to food production. Closer to home, moreover, Japan has one of the world's lowest rates of self-sufficiency, and for these reasons, pursuing this proposal could cause huge problems. Meanwhile, the interim target for production up to 2030 is six million kiloliters (about 10% of the domestic requirement), but some have expressed the view that this is impossible with the use of agricultural products and waste alone. In that case, we inevitably have to consider non-terrestrial sources. In other words, we need to use the exclusive economic zone provided by Japan's

territorial waters, which account for more than ten times the national land area.

On this subject of using Japan's vast EEZ waters, producing diverse oceanic resources and making use of natural energies, I have for some years been proposing that a massive, self-standing offshore integrated production facility be constructed, mainly for the growth and propagation of seaweed.

### Using *Sargassum fulvellum*

Of all the photosynthesizing organisms that produce large amounts of oceanic biomass, *Sargassum fulvellum* is thought to require a lower energy cost than other algae in terms of mass harvesting and other processes as a biofuel material. The productivity of *Sargassum fulvellum* is said to rival that of tropical rainforests. The phycobiont has air pockets which make it float, enabling it to use the sun's photo-energy with relative efficiency. This also makes it easier to harvest. This species of seaweed grows in large colonies on coasts, forming "seaweed beds" that provide growth habitats for commercially useful fish and shellfish, as well as contributing to the maintenance and conservation of resources (see Fig. 1). Many of the drifting phycobionts accumulate as they grow, forming colonies of "drifting seaweed" that move with the ocean current. This "drifting seaweed" near coasts and in offshore seas provides spawning grounds for a diversity of useful fish and shellfish, including yellowtail, saury and goldeye rockfish, and serves as a rearing ground for fish larvae and juveniles. Because seaweeds absorb nutrient minerals from the sea as they grow, they have also been used for their function of restoring eutrophication in coastal areas in recent years.

The process of producing biofuel materials from "drifting seaweed" in the Sea of Japan could be conceived as

follows. First, small fragments of *Sargassum fulvellum* phycobiont are artificially released en masse near the coast of northern Kyushu. In this way, artificial "drifting seaweed" can be created. This accumulates and grows as it is carried northwards by the Tsushima Current, and fully grown phycobionts gather and drift into the Tsugaru Strait or the La Pérouse Strait. The varying locations along this flowpath and the times of arrival at the various points can be measured accurately using the high-precision simulation program developed by a group led by Professor Toshio Yamagata at the University of Tokyo. By merely releasing phycobiont fragments in this way, cultivation management and other processes can be omitted, making it easy to produce and harvest large quantities of biofuel materials. At the same time, this method also serves to conserve and restore resources of useful fish and shellfish accompanying artificial "drifting seaweed" and to cleanse the Sea of Japan. This is therefore technology that serves three purposes at once (see Fig. 2).

### Rationale on R&D and budget allocation

The idea of making seaweed a biofuel material is one we have studied over the last 4 or 5 years, mainly thanks to Yoshishige Katori at the Mitsubishi Research Institute. We have published the content of these studies in several reports and symposia to date. Since the Meiji era, Japan has pursued development based on the model of western science and technology. Perhaps because we have yet to break through this pattern, there appears to be a tendency whereby new and unique ideas or plans that are unknown overseas have difficulty in attracting research funding. In March of this year, the author made a presentation on "The development of seaweed biofuels and the conservation of marine environments and seafood resources" at the XIXth International Seaweed Symposium in Kobe. Immediately afterwards, I was inundated with inquiries not only from Japan but also from overseas, with a succession of invitations to lecture at academic gatherings, requests for consultation from overseas companies, and so on. The use of seaweed in biofuel is technology that should be established independently by Japan, bearing in mind Japan's geographical situation and the fact that it is a Japanese idea. But in spite of this, as things stand it is entirely possible that the technology will be established overseas in a few years' time, and Japan will then have to buy the rights in order to produce the bio-resources. For this to be established as Japanese technology, a research budget should be allocated immediately. We need to put an end to the process whereby we are always following movements elsewhere in the world, putting exorbitant amounts of money into research, but then allowing viable results to flow out of the country. ■



■Fig. 2 Use of Seaweed and development of seaweed biofuels for conservation of the global environment and marine resources  
Schematic diagram showing the production of seaweed biofuels by creating artificial "drifting seaweed" and "seaweed beds", as well as the protection of global and coastal environments and the conservation of marine resources.

# Advent of the Northern Sea Route Era?

**Hiromitsu KITAGAWA**

*Former Professor, Graduate School, Hokkaido University  
(Ship & Ocean Newsletter No.177 December 20,2007)*

A number of issues - including a sharp drop in arctic summer ice coverage due to global warming, the maritime shipping industry's worries over rising fuel costs due to unprecedented oil prices, heightened interest in the development of arctic resources due to a sharp increase in demand, and provisions in the United Nations Convention on the Law of the Sea (UNCLOS) concerning the continental shelf and EEZ - have generated new interest in Russia's Northern Sea Route (NSR) and Canada's Northwest Route, the use of which could drastically reduce voyage distance. Meanwhile, concrete moves to develop these routes are starting to be seen in Europe and North America. This article gives an overview of these trends.

## Background to the opening of the NSR

Interest in opening the Northern Sea Route (NSR, previously known as the Northeast Passage) goes back as far as the Age of Discovery. However, it was not until the advent of motor-powered ships that efforts to open the route started to have a basis in reality. After the Russian revolution, especially, the Soviet Union relentlessly pursued efforts to open the NSR as a state policy.

With the arrival of nuclear-powered icebreakers, most of the technical barriers to opening the NSR were removed, thanks to their powerful icebreaking capabilities and range. But under Cold War conditions, the NSR was maintained as a route exclusively for use by the Soviets, and other nations were barred from using it. The realities of the route were therefore shrouded in mystery. However, the end of the Cold War and the Declaration of Opening of the NSR by General Secretary Gorbachev (1987) provided a stimulus for renewed activity. The feeling at the time was that, even if currently unfeasible for year-round commercial shipping, the potential of the NSR as an international commercial shipping route was worth exploring in detail. Based on this judgement, the International Northern Sea Route Programme (INSROP, a comprehensive international cooperative research project on the NSR)<sup>1)</sup> was launched. At its core were three countries: Norway (the Fridtjof Nansen Institute), Russia (the Central Marine Research and Design Institute) and Japan (the Ship & Ocean Foundation - now known as the Ocean Policy Research Foundation - and the Nippon Foundation). Active from 1993 to 1999, INSROP's research showed the way forward towards opening up the NSR as an international commercial shipping route. Japan concurrently implemented its Japan Northern Sea Route Programme (JANSROP), a unique research project with emphasis on technical issues related to navigation of the NSR. JANSROP II, an international cooperative research project with its attention focused on the Russian and Asian Far East, was in operation for three years, from 2002. This laid the foundation for use of the NSR by industries in these regions.



## The IPCC assessment and heightened interest in the NSR

The Intergovernmental Panel on Climate Change (IPCC) made headlines with the publication of its Fourth Assessment Report (AR4) in February this year (2007), particularly the Working Group I Report on "The Physical Science Basis". Many examples and phenomena had already been highlighted as signs of man-made global warming in the Third Assessment Report (TAR, 2001). The important point, however, is that claims in the form of forecasts or possibilities in TAR were reported as more or less unequivocal facts in AR4. As one symbolic example, it was reported that the extent of Arctic Ocean sea ice in late summer was the smallest on record, causing quite a stir in the news media.

The interest of concerned parties in both the Northern Sea Route and the Northwest Route was intensified by TAR, but also by research papers on climate change starting several years before that. This was because in recent years it has become easier to obtain satellite images of the state of Arctic sea ice, and even before AR4 came out, the regression of sea ice could be seen quite clearly in satellite



images. It was already considered only a matter of time before this sea area would be transformed into an area of resource development and commercial shipping.

Increased demand and the progressive exhaustion of non-recyclable resources (especially energy resources) have been a driving force for expanding the scope of resource development into the deep sea beds and high latitude regions. If the barrier presented by this vast area of sea ice were removed, interest would inevitably be drawn to the Arctic Ocean, where many resources are thought to slumber in geological strata. Given the added connection with UNCLOS provisions on the continental shelf and EEZ, there has also been a sudden increase in claims related to the continental shelf and EEZ in the Arctic Ocean area by interested countries that intend to secure development rights.

The problem of securing seafood resources is also an important one. Fish species that are sensitive to changes in seawater temperature are already moving to new habitats, while a tendency is seen for fish species with a high commercial value to migrate northwards through the Bering Strait. As such, it is also thought to be only a matter of time before large fishing vessels will be seen in the Arctic Ocean.

### Prospects for the Northern Sea Route

While the Northern Sea Route should become a key factor in the transportation of resources through the Arctic Ocean and surrounding seas, its prospects are not at all certain in the short term, let alone the future. This is partly due to problems in interpreting Article 234 of the United Nations Convention on the Law of the Sea, as well as a number of other problems depending on whether Russian domestic legislation is enacted or amended in connection with Russia's declaration of WTO membership.

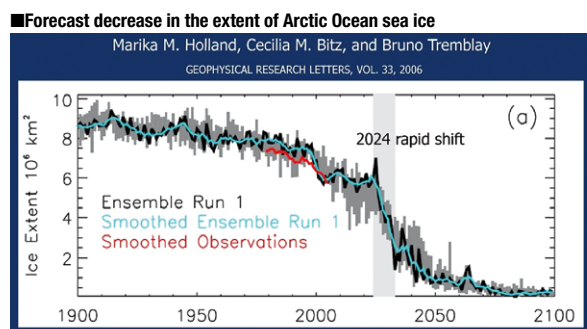
The rise in marine transportation fuel costs due to the unprecedented inflation of oil prices has revived a desire in the manufacturing and maritime shipping industries to

develop the shortest possible shipping routes. As such, there is now growing interest in assessments of the profitability and safety of the Northern Sea Route and the Northwest Route. Taking the example of a journey between Yokohama and Hamburg, the distance would be 14,542 nautical miles via the Cape of Good Hope, 12,420 nautical miles via Panama, 11,073 nautical miles via Suez, and 6,920 nautical miles via the Northern Sea Route. Here, the advantage of the Northern Sea Route is clear: it would reduce the distance traveled by a minimum of 40% compared to conventional routes. A similar reduction of traveling distance could also be achieved when shipping goods via the Northwest Route, passing through the Canadian Arctic Archipelago.

However, while the regression of Arctic sea ice in summer is dramatic, in winter it is not so obvious. For the next half-century, at least, perennial sea ice depletion in the Arctic Ocean is expected to gradually lengthen, albeit with some inconstancy. There will however be changes and fluctuation in the scope of sea ice depletion. Therefore, the system for maintenance of the NSR will need to be able to adapt to these seasonal fluctuations and the resulting variance in routes. Many issues are still to be resolved in connection with the NSR, in both tangible and intangible aspects; these include developing navigation support infrastructure for ordinary commercial shipping, regulating grades of vessels, setting tariffs for passage, systems of insurance, pollution removal, and establishing ports of refuge. Nevertheless, the details of concrete measures thought necessary in order to open an international commercial shipping route have already been set out in the JANSROP II proposals<sup>2)</sup>. An international framework to coordinate burden sharing among the countries interested in the route is necessary for managing and maintaining the vast NSR and for environmental conservation. It should also be seen by Russia as being in its national interest.

Once partial navigation of the NSR gets underway and the fully navigable season lengthens to more than six months, proportionate changes will appear in the nature of international shipping. On the European side, ports that offer advantageous conditions for both the Suez Canal route and the NSR, as well as having advantages in dispatching and collecting goods and well-developed port and loading facilities, could expect to be chosen as hub ports for international distribution.

Japan offers advantageous conditions for hub ports on the Asian side of the Northern Sea Route, and should not remain inactive during this transition towards a Northern Sea Route era.



1) See OPRF's Website [http://www.sof.or.jp/jp/outline/index6\\_1.php](http://www.sof.or.jp/jp/outline/index6_1.php)

2) "New Era in Far East Russia & Asia", See [http://www.sof.or.jp/en/report/pdf/200602\\_ISBN4\\_88404\\_169\\_0.pdf](http://www.sof.or.jp/en/report/pdf/200602_ISBN4_88404_169_0.pdf)

# Establishing Japan as a Maritime Nation and Comprehensive Governance of the Oceans

Naoya OKUWAKI

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(Ship & Ocean Newsletter No.179 January 20, 2008)

After first comparing Japan's self-awareness as a "maritime nation" (or "oceanic state") with the oceanic awareness of Britain and the USA, the author examines the meaning of two major concepts in the Basic Act on Ocean Policy, namely "establishment of a maritime nation" and "comprehensive governance of the oceans". For Japan to gain world recognition as a maritime nation and to "occupy an honored place" in the international community, as extolled by the Constitution, we need to systematically invest state funding from a long-term perspective - particularly in fields such as protecting marine environments, sustainable use of marine resources, and the advancement of knowledge in ocean sciences - thereby creating a framework for harnessing cutting-edge science and technology to provide the public goods of the ocean to the world.

## 1. A maritime nation

Japan is sometimes called "a maritime nation", but this is merely synonymous with the term "island nation", used for a nation physically surrounded by seas. The vision to present Japan to the world as a leader in maritime affairs is not well reflected in its policies. Based merely on a vague notion that Japan has no land borders and is protected by the sea, this country's ocean policy is passive and defensive.

Of course, the image of the oceans differs considerably from country to country and from era to era. In Britain, another "maritime nation", the ocean has historically been seen as a channel providing access to "the Seven Seas". Pirates in Britain have at times been labeled marine outlaws and "common enemies of mankind", but at other times as privateers who contributed to the national economy by plundering goods from enemy vessels while also keeping alive valuable navigational skills; and again, at other times, as supporting the security of the state by being incorporated into the navy. The state has both suppressed and used pirates. In the 19th century, meanwhile, on the pretext of enforcing prohibition of the slave trade, Britain made other countries recognize its right to stop and search foreign vessels in international waters stretching from the South Atlantic to the Indian Ocean - thereby effectualizing the Royal Navy's greatest mission, to "protect commercial shipping". In other words, Britain's sea power was established under the guise of a humanitarian cause.

The American image of the oceans is bipolar. The Atlantic Ocean is seen as a barrier that prevents America from being infected with the old, pernicious ways of old Europe. It is a sea of isolationism and alcoholic prohibition. The Pacific Ocean, on the other hand, is a sea that leads to Asia, a sea where doors were forced open through gunboat diplomacy; above all, a "sea of whales". This was a sea that brought wealth and prosperity to America. In this way, the oceans were platforms on which state policies were formulated and exercised in actual historical terms. The free,

open seas were also seas that were effectively managed by establishing sea power.

Kidnappings by North Korean agents, the Nakhodka oil spill, giant jellyfish, suspicious ships, and other occurrences in the seas around Japan today sometimes remind the Japanese public that the seas are what link Japan to the outside world. However, the response to these occurrences tends to be one of merely firming up our coastal defenses. The public, now well-accustomed to air travel, are not generally aware that most of the goods distributed around the world today are actually transported by ship. Unlike the brightly sparkling cosmos, the sea is dark, its tunes played in a minor key. Fewer young researchers are now devoting themselves to research on the Law of the Sea, which should surely be an arena for practicing thought on international law. More than four decades ago, Masataka Kosaka wrote "*Kaiyo Kokka Nihon no Koso* (Vision for Japan as a Maritime Nation)", in which he discussed a "guarantee of comprehensive security". But the future outlook for Japan as a maritime nation based on the seas is still unclear.

## 2. The significance of enacting the Basic Act on Ocean Policy

The Basic Act on Ocean Policy came into force on "Marine Day" last year (July 20th, 2007). The purpose of the Act is to promote comprehensive and consistent policy proposals on ocean problems that have been addressed individually until now - namely, seabed resources, fisheries, maritime transport, environment and ocean sciences - and "to realize the establishment of a new maritime nation in harmonization of the peaceful and positive development and use of the oceans with the conservation of marine environments".

**Establishment of a maritime nation:** The Basic Act on Ocean Policy presents the two major concepts of "establishment of a maritime nation" and "comprehensive governance of the oceans". But how are these two linked to each other? Establishing a maritime nation is not merely a



Japan Coast Guard Review of the Fleet in May last year. Aspects of on-board training were displayed to the public. (Photo: Sunao Maruyama)

question of firming up Japan's sea defenses and establishing the nation's security. It is an important duty of the state to protect the oceans around us as well as the life, limb, and property of the people. But a security framework designed only to secure Japan's national interests does not in itself provide any justification for announcing its establishment as a maritime nation to the world. Unless Japan considers what it can provide to the world while at the same time pursuing its own legitimate interests, the concept of establishing itself as a maritime nation will remain unfulfilled. On the subject of Southeast Asian "pirates", for example, Japan has achieved considerable success by providing aid for capacity building in coastal countries, promoting aid for the development of coastal economies, and cooperating in attempts to eradicate piracy. In the same way, we also need to show that policies adopted under the Basic Act on Ocean Policy are simultaneously useful to the rest of the world, and moreover that we can provide public goods to the world. We also need to persuade the Japanese public that this will be in Japan's interests in the long run. On the conservation of marine environments, protection of bioresources, and research on marine science and other issues, Japan needs to form a strong political will to invest in funding and accumulate knowledge over the long term. We need to construct a framework whereby the coastal inhabitants of other countries can feel that they are broadly benefiting from the leading-edge technology that is Japan's forte. The accumulation of efforts made within this framework, as they contribute to international society, will ultimately have the effect of enhancing Japan's security.

**Integrated management of the oceans:** The concept of comprehensive governance of the oceans also entails huge problems. America, Australia, Canada and other countries have already established legislation aimed at "integrated management of the oceans", and the powers of their governmental organs have been amended in this respect. This trend is fitting for the era of exclusive economic zones. When Grotius extolled the freedom of the open seas in the 17th century, his justification lay in the inexhaustibility of resources and the impossibility of managing the oceans. These premises have collapsed, and it is now a common

perception worldwide that both the management of ocean resources and the conservation of marine environments are impossible under the old concept of freedom of the open seas. Originally, the system of 200 nautical mile EEZs must have envisaged a sea of international cooperation, in which coastal nations would share roles in undertaking various measures to protect the planet's ocean systems. In this sense, the rationale of integrated management of the oceans results, as a matter of course, from the 200 nautical mile system.

In reality, however, integrated management of the oceans faces some difficult problems. Firstly, there are already a number of terrestrial interests involved in the use of the oceans. Secondly, as ocean management has conventionally been achieved individually in different sectors, ocean management technology, as well as information, know-how, and even systems of coordinating interests, have built up within a vertically divided organization. Thirdly, a country's interests as a coastal nation are sometimes at odds with its interests as an ocean-utilizing nation. If a country's interests as a coastal nation are excessively protected on the inside, it will encounter strict regulation as an ocean-utilizing nation on the outside. Unless legal compliance as an ocean-utilizing nation is rigorously observed, limits will appear in the country's regulation as a coastal nation. In this sense, the oceans are a space of mutual reciprocity, in which we need to form a consensus by gradually building up common interests.

Fourthly, oceans link us with the rest of the world. Problems of the oceans are always international problems. Measures for integrated management need to be promoted while avoiding clashes of interests with neighboring states at different stages of economic, social, and cultural development. Even with the exercise of rights as a coastal nation recognized under the Law of the Sea, we need to ascertain what exactly constitutes reasonable exercise of rights in individual cases, be mindful of those limits, and ensure that international relations are not destabilized.

### 3. Conclusion

To ensure that integrated management and good governance of the oceans do not end in empty gestures, Japan needs to propose what and how it plans to contribute to the international community as an established maritime nation. It is also important to develop human resources with expert knowledge of the oceans that includes this kind of broad perspective. The Basic Plan on Ocean Policy currently being formulated under the Basic Act on Ocean Policy is the first step towards making Japan a country that will "occupy an honored place" in the international community, as extolled by the Constitution. ■



# Marine Biological Stations: Outposts on the leading edge of marine biology with direct links to medicine and biotechnology

**Koji AKASAKA**

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(Ship & Ocean Newsletter No.180 February 5,2008)

For many people, "research on marine organisms" may conjure up images of fish breeding technology or the migratory habits of eel. There is hardly any awareness in Japan that marine organisms continue to produce results that are of real and direct use to medicine and biotechnology. In this paper, the author introduces the history of the Misaki Marine Biological Station, an outpost on the leading edge of marine biological research, as well as its current activities and the usefulness of marine organisms. In doing so, the aim is to spread understanding of the treasures of our seas, thereby encouraging more young researchers to enter this field.

## History of the Misaki Marine Biological Station

In the early years of the Meiji era (1868 - 1912), Tokyo Imperial University hired a number of foreign experts, including some naturalists. They were amazed when they went sightseeing in Enoshima and saw the souvenir shops there. For among the souvenirs they found many shellfish and marine organisms that they had never seen before. They took several of these souvenirs back to their countries and reported them as new species in academic journals. As a result, the world came to know that Sagami Bay provides habitats for a great diversity of marine life.

One of these visitors wrote in his travel journal that "One needs only to hunt around the souvenir shops (of Enoshima), and one will soon acquire a collection of marine organisms to rival any first-rate museum"<sup>1)</sup>. It was Edward Morse, inaugural Professor of Zoology at the University of Tokyo and famed discoverer of the Omori shell mound, who set up a research facility on marine organisms in Enoshima. However, once it was realized that the souvenirs at Enoshima had been collected by fishermen from Misaki on the southern promontory of the Miura Peninsula, a full-fledged marine biological station was established at Misaki. This was the Tokyo Imperial University Misaki

Marine Biological Station (more commonly known as Misaki Marine Biological Station), which survives today as one of the world's oldest marine biological stations.

Since its foundation, the Misaki Marine Biological Station has attracted a large number of researchers from both Japan and abroad, leading to the discovery of many new species as well as advances in our understanding of taxonomy and evolution. Meanwhile, developments in research equipment have contributed to a blossoming of experimental zoology, drawing on the characteristics of many different organisms. Now, marine biological stations have been established in the science faculties of 17 national universities across Japan, where they are used as centers for research and education on basic marine biology. The Misaki Marine Biological Station alone has produced many important discoveries and inventions that will remain etched in the history of the life sciences. They are too numerous to list in full, but include the "Shinya Scope" (a polarizing microscope invented by Shinya Inoue), the mechanism of fertilization using sea urchins (Jean Clark Dan), studies on the cytoskeleton (Hideo Mohri), and the mechanism of oocyte maturation using starfish ova (Haruo Kanatani). With the spread of model experiment animals like mice and flies, however, marine organisms have come

### ■ Important inventions and discoveries by the Marine Biological Station of the University of Tokyo, and the organisms used

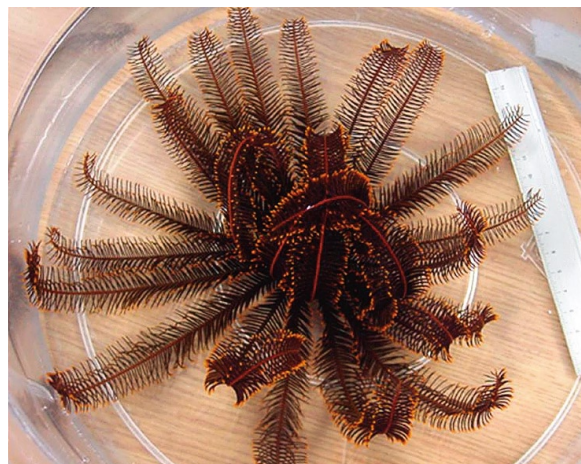
Year	Name	Research
1898	Isao Iijima	Description of hexactinellid sponges (deep-sea sponges with skeletons of silica glass): hexactinellid sponge
1947	Shinya Inoue	Invention of the "Shinya Scope" (polarizing microscope): sea urchin, others
1952	Jean Clark Dan	Discovery of sperm chemotaxis in animals: jellyfish
1952	Jean Clark Dan	Mechanism of fertilization (discovery of acrosome reaction): sea urchin and starfish
1968	Hideo Mohri	Discovery of cytoskeleton protein tubulin: sea urchin
1969	Haruo Kanatani	Mechanism of oocyte maturation (discovery of oocyte maturation factor 1-methylandinine): starfish
1977	Chikako Shingyoji	Development of analytical model for mechanism of flagellar movement in sperm: sea urchin
1978	Susumu Ikegami	Research on DNA reproduction and repair using aphidicolin: sea urchin and human cells
1980	Masaaki Morisawa	Mechanism of fish sperm activation (discovery that movement starts with osmotic pressure stimuli): grass puffer
1988	Issei Mabuchi	Mechanism of cell division (isolation of cleavage furrows): sea urchin, newt
2002	Manabu Yoshida	Mechanism of fertilization (identification of sperm attractants): sea squirt
2003	Shonan Amemiya	First description of growth of a stalked crinoid echinoderm: sea lily
2004	Koji Akasaka	*Invention of myelocyte gene therapy vector: sea urchin and human cells
2004	Masaaki Yamaguchi	Identification of organizer master gene: sea urchin
2007	Tomoko Shibata	Complete rearing of sea lily: <i>Oxycomanthus japonicus</i> (feather star)

to be used less and less today. This is because they have to be collected, and moreover their spawning seasons are limited, making marine organisms unsuitable for a modern system in which results are demanded in the shortest possible time. The number of researchers on marine organisms has decreased dramatically in Japan, and at the end of the 20th century the useful life of the marine biological station was said to have ended.

### How research on marine organisms contributes to medicine

Research using model animals has gradually clarified the common mechanisms of life phenomena. Now, research on life sciences has started investigating its next targets: "Where did human beings come from?" and "By what mechanisms are diverse organisms created?" Genome projects are currently in progress for a variety of life forms, and the revelation that "the sea urchin has slightly more genes than a human being and shares virtually the same gene set as humans" (Science Magazine, USA, November 2006) was met with widespread astonishment. All living organisms have evolved from creatures that originated in the sea. Nearly all phylogenetic divisions of the animal world, in taxonomical terms (chordates, arthropods, mollusks, etc.), are represented among the diverse wildlife living in the oceans. The existence of these diverse organisms is indispensable to elucidating the common object of human intellectual curiosity, i.e. "evolution". Meanwhile, the comparative study of genomes and evolutionary developmental biology ("evo-devo"), as targets of next-generation life sciences, are seen as fields that will continue to develop in future.

The staff and researchers of American and European marine biological stations are frequent winners of the Nobel Prize in Physiology or Medicine, but this is almost unheard of in Japan. The mechanism of cell cycles linked directly to cancer research has been clarified from research on sea urchins and hard clams, the mechanism of memory



A nature observation session for citizens, sponsored by the Nippon Foundation. Scene of a shoreside tutorial on taxonomy and ecology.

from research on the *Aplysiomorpha* mollusk (a type of sea slug), the mechanism of eyesight and body clocks from research on horseshoe crabs, the mechanism of neurotransmission from research on squid, and cellular immunity associated with transplanted tissue rejection from research on the body cavity cells of starfish. Meanwhile, green fluorescent proteins (GFP), an indispensable element of recent work in life sciences, have been isolated from jellyfish. GFP was discovered by Dr. Osamu Shimomura<sup>2)</sup> at the Woods Hole Marine Biological Laboratory in Massachusetts, USA.

Our research using sea urchins (see chart) has produced DNA sequences that are useful in gene therapy, as well as technology enabling us to cultivate blood vessel cells. With the latter, in particular, it used to be difficult to reproduce conditions *in vivo*. Diverse marine organisms use the same mechanisms for life activity as humans. Harnessing their simplicity and specialties will lead to important discoveries that will bring health and prosperity to mankind. In the West, efforts to develop the untold riches of the seabed are being promoted both as national policies and also in the private sector. To ensure that important discoveries, as well as the technologies and patents deriving from them, are not monopolized by US and European interests, we in Japan also need to form world class centers for basic marine biology. We need to develop strategically prioritized research, and train more young people in research on marine organisms.

One positive sign is that the *Ciona intestinalis* (ascidian or sea squirt) under joint research by the University of Kyoto and the University of Tsukuba's Shimoda Marine

The *Oxycomanthus japonicus* (feather star) adopted for the National BioResource Project. It looks like seaweed but has a brain and moves actively. It is used for research on evolution and restoration.

Research Center, and the *Oxycomanthus japonicus* of the University of Tokyo Misaki Marine Biological Station were selected as the first marine animals to be targeted by Japan's National BioResource Project (NBRP) in 2007. *Ciona intestinalis* is biologically close to vertebrates (including humans), and is important organism needed for understanding the evolution of vertebrates. *Oxycomanthus japonicus* belongs to the most primitive echinoderms related to vertebrates. It has a well-developed nervous system including a brain, making it an important organism for understanding the origins and evolution of that organ. It also has an extremely strong capacity for regeneration, and therefore promises much in elucidating regenerative mechanisms and applications to regenerative medicine. NBRP is a state-level project through which Japan plans to present its own original bio-resources to the world. It is a matter for celebration that the Japanese government has started to understand the importance of basic marine biology and is moving towards promoting it.

### Marine biological stations as sites of life education

Marine biological stations are also on the front line as centers for contact with diverse marine organisms. The tendency for life to be taken lightly, together with global warming, depletion of the ozone layer and other environmental problems, are thought to be among the main reasons why people are brought up and live in isolation from nature today. All of us, whether young or old, man or woman, and whether from a humanities or a science background, should be aware, by looking closely at the oceans that give birth to life and provide habitats for diverse organisms, that human beings are a member of the collective life on this planet; we need to raise our awareness of the need for environmental protection. Luckily, the Misaki Marine Biological Station has received support from the Nippon Foundation over the last three years, enabling us to hold nature observation sessions for ordinary citizens five times a year. The sessions are heavily oversubscribed, and the participants' evaluation of them is very high. However, teaching staff from the Marine Biological Station offer instruction on a voluntary basis, dividing their valuable time with their university education and research, and the burden on them is great. To meet the needs of ordinary citizens, we should appoint instructors specifically for life education, and assistance by the state and private sector in this are indispensable. ■

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- 1) Ludwig H.P. Doederlein(1855–1936) was a German naturalist who arrived in Japan in 1879 to serve on the faculty of the School of Medicine at the University of Tokyo, where until 1881 his taxonomic work concentrated on the collection of Japanese marine fauna. His vast collection of specimens from that period is now preserved in the Strasbourg (France) Zoological Museum. He later held the important positions of President of the National Zoological Museum in Munich and Chairman of the German Zoological Society.
  - 2) Osamu Shimomura, born August 27, 1928. Biologist (organic chemistry/marine biology). His discovery of the green fluorescent protein in the jellyfish *Aequorea Victoria* earned him a Nobel Prize in 2008 for his contribution to the development of bioscience research. He is Professor Emeritus of Boston University and also affiliated with Princeton University, Woods Hole Oceanographic Institute, and Boston University Medical School.

# Moves to Create New *Sato-umi* in Ago Bay

— Development and Future Prospects of the "Ago Bay Restoration Project" —

**Osamu MATSUDA**

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(Ship & Ocean Newsletter No.182 March 5,2008)

A unique attempt at nature restoration and coastal area management based on the "new *Sato-umi*" concept is currently underway in and around Ago Bay, Mie Prefecture. *Sato-umi* is a currently topical term referring to marine and coastal ecosystems with harmonized human interaction, also known as community-based inshores. While the focus of this initiative until the end of last year 2007 was the "Ago Bay Restoration Project" (a collaborative effort among industry, government, academia, and local communities), from this year 2008 onwards the focus of activities is shifting towards the citizens and authorities of Shima City, Mie Prefecture. As local activity is now gathering pace and much is expected of developments in the near future, these moves will be introduced here.

## 1. The Ago Bay Restoration Project

A unique attempt at nature restoration and coastal area management based on the concept of creating a new *Sato-umi* is currently underway in and around Ago Bay, Mie Prefecture. This initiative has been led by the "Project for Environmental Revitalization of Enclosed Coastal Seas" (commonly known as the "Ago Bay Restoration Project"<sup>1)</sup>), a collaborative effort among industry, government, academia, and local communities, known as a "regional intensive joint research project". That stage of the Project came to a close at the end of last year (2007), and the Project has now entered a new stage called Phase III. In response to this, the focus of activities from this year 2008 onwards is shifting towards the locality of Shima City, Mie Prefecture. Behind these activities lie a declining natural environment and depressed pearl culture industry in Ago Bay, despite the Bay's location in the center of Ise Shima National Park. The merger of five former towns as part of the "Great Heisei Merger" has also provided a major stimulus.

Two major themes within the "Ago Bay Restoration Project" were "to create a new *Sato-umi*" and "to forecast environmental behavior in Ago Bay". For the former, research and technical development were undertaken to improve the environment of shallows and introduce environmentally-harmonized pearl culture. Here, tidal flats and seaweed beds were treated as a unitary whole, based on the rationale of making effective use of dredged sediment and recycling resources. A major outcome was obtained in the quantification of material cycles ranging from terrestrial to sea areas.

As for the latter theme, an automatic environmental monitoring system and environmental forecasting model were developed in Ago Bay. The automatic monitoring system is already being used in various ways, including the management of pearl culture over the long term. Here, "*Sato-umi*" refers to cooperative and participatory management of coastal areas. The aim is to simultaneously achieve a high degree of biodiversity and productivity of marine



Seen from the air, the intricate and complex nature of the Ago Bay coastline is clear. The water is only about 40m deep in the deepest part, and sea water exchange between the inside and outside the bay is restricted.

organisms by introducing a certain level of manpower.

Nevertheless, the purpose of the five-year project was not the "restoration of Ago Bay" itself, but to research the techniques and develop the technology needed to achieve this. This Project was a public invitation project of the Japan Science and Technology Agency (JST). The Mie Industry and Enterprise Support Center promoted the 2003-2007 research project as a core institution, and the author served as coordinator of research and technology systems as a "new technology agent".

## 2. Moves by the local area, Shima City

Administratively, Shima City has positively promoted activities to apply the outcome of the "Ago Bay Restoration Project" to wider efforts for restoration in Ago Bay. Shima City has made various and significant cooperative connections with the Project, and the outcome of this became very clear in the "Shima City Comprehensive Plan (2006-2015)"<sup>2)</sup> drawn up by Shima City at the end of 2005, after its own "birth" through the merger of five towns.

Chapter One of this Basic Plan is entitled "The Will of the Environment - Living Together with Nature". It extols the importance of "Promoting the protection and restoration of nature", and, as a "direction for measures" in response to the Basic Plan, spells out that "To make effective use





Activities aimed at making Ago Bay a "new *Sato-umi*" in harmony with contemporary society have already begun.



Environment education by project researchers on a beach in Ago Bay.

of the outcome of initiatives in the 'Ago Bay Restoration Project', we will promote efforts aimed at establishing a local nature restoration committee in line with the Law for the Promotion of Nature Restoration, and will strive to protect the natural environment in collaboration with local organizations and related bodies". With a view to materializing these plans, the establishment of an Ago Bay Nature Restoration Committee (provisional name) centered on Shima City is now within reach. A nature restoration activity support project (Ministry of the Environment) focusing on Shima City was already in progress in fiscal 2007, while preparatory meetings and explanatory sessions have recently been held with great frequency.

"Ago Bay - For a New *Sato-umi*", a leaflet introducing the outcome of the recent Project in everyday terms, also plays a part in these preparatory activities. Shima's Mayor Chihiro Takeuchi himself took part in the 7th World Conference on Environmental Management of Enclosed Coastal Seas (EMECS7) held in France in 2006, and also gave a lecture on the Ago Bay restoration at a joint symposium of the Liaison Council of Coastal Environment Related Societies ("Enkanren"). These and other inputs reveal the Mayor's very positive attitude towards the restoration of Ago Bay. Based on this constructive momentum, studies on an overall scheme for Ago Bay nature restoration by a variety of relevant persons, groups and others are expected in the near future.

### 3. Creation of an activity base and future prospects

In Phase III of the regional intensive joint research project, Mie Prefecture was asked to establish a local activity base (known as a Center of Excellence or COE). To put it simply, this will provide a framework for making more effective use of the project's outcomes in the local community. The result was that an Enclosed Coastal Seas Environment Research Center (provisional name) is to be opened in April of this year (2008). This Center, to be established inside the existing Fisheries Research Department in the Hamajima District facing Ago Bay, will not only continue and develop the research but will also be a base for various local activities. A number of "follow-on projects" are already in progress. Many local citizens attended the local results report meeting held in October last year (2007), and a sense of keen local involvement could be felt.

A happy coincidence was that the Basic Act on Ocean Policy was also enacted last year. With this, the comprehensive management of coastal areas has now become a live issue, and the goal of "creating bountiful *Sato-umi*" was cited in the government's Strategy for Becoming a Leading Environmental Nation in the 21st Century. The area around Ago Bay contains many and various relevant sites, including the Shima Nature School and the Yokoyama Visitor Center, which has become a base for National Park volunteers. Efforts to create *Sato-umi* (marine and coastal ecosystems with harmonized human interaction) have been made through international exchanges, together with environmental education aimed at training the next generation. By linking the activities of the local COE and local residents to the activities of the Ago Bay Nature Restoration Committee<sup>3)</sup>, one would hope that the creation of new *Sato-umi* and comprehensive management of coastal areas, through intensive regional consolidation in the true sense, can develop over the long term in a form that fully reflects the wishes of the people. ■



A lively discussion was held at a local meeting to explain the research results.

1) Ago Bay Restoration Project ● <http://www.miesc.or.jp/mic/mienet/0801/pdf/tokushu.pdf>

2) Shima City Comprehensive Plan (2006-2015) ● <http://www.city.shima.mie.jp/gyosei/soshiki/kikakuseisaku/sogokeikaku/index.html>

3) the Ago Bay Nature Restoration Committee ● <http://agobay.org/>

# Development of Ocean Policy Leaders

**Masaji MATSUYAMA**

*Professor, Faculty of Marine Science, Tokyo University of Marine Science and Technology  
(Ship & Ocean Newsletter No.184 April 5,2008)*

The first class of Tokyo University of Marine Science and Technology, established in 2003, will graduate this spring (2008). At the same time, it has been decided to establish a Master's degree program in Ocean Management Policy Studies. Japan's ocean policy leaders require an interdisciplinary understanding of the ocean as well as an international perspective and practical experience. The goal of our new degree program is to develop leaders capable of drafting policy for comprehensive and systematic research, use, and management of the oceans.

## TUMSAT's first students approach graduation

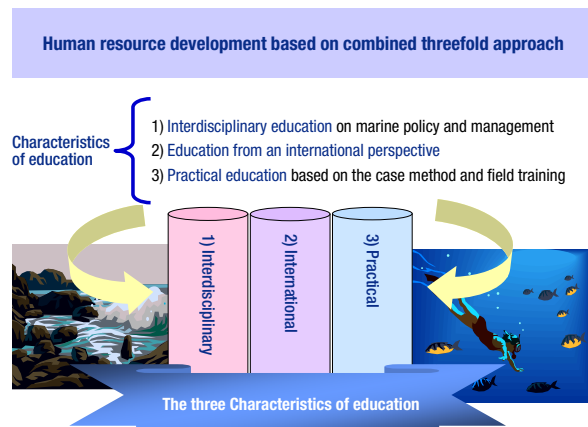
TUMSAT's Graduate School of Marine Science and Technology will launch a master's course in "Marine Policy and Management" this April. This article gives a brief introduction to this course. As readers will be aware, Tokyo University of Marine Science and Technology came into being in October 2003, when Tokyo University of Mercantile Marine merged with Tokyo University of Fisheries. With the aim of harnessing the strengths of both universities while further developing them, the University adopted a two-faculty system comprising the Faculty of Marine Science and the Faculty of Marine Technology, and welcomed its inaugural intake of students in April 2004. The Faculty of Marine Science consists of four departments: the Department of Ocean Sciences, the Department of Marine Biosciences, the Department of Marine Food Science (now the Department of Food Science and Technology) and the Department of Marine Policy and Culture. The Faculty of Marine Technology comprises three departments, namely the Department of Maritime Systems Engineering, the Department of Marine Electronics and Mechanical Engineering and the Department of Logistics and Information Engineering.

Based on the concept of "environment and food", the Faculty of Marine Science focuses its education on conserving marine environments and making effective use of bio-resources. The Department of Marine Policy and Culture is a young department. It was created out of the conviction that, in future, education and research will need to be conversant with various problems related to the oceans, not just in the field of natural sciences but in wider terms, including the two fields of social sciences and humanities. This was the first example of combined humanities-sciences education on ocean studies in Japan. Although both lecturers and students may have been somewhat disoriented at first, their efforts gradually started to take them in the desired direction. In March of this year, that first group of students will reach graduation. To the author, who had for some time only taught students in the natural sciences, the students in the Department of Marine Policy and

Culture offered new and refreshing perspectives.

In April of this year, the Basic Act on Ocean Policy was made into law, clarifying for the first time the basic directions for understanding, protecting, and utilizing the oceans. On the subject of universities and other educational institutions, Article 28, paragraph 2 of the Act provides that "The State shall take necessary measures to promote interdisciplinary education and research at universities and other institutions, in order to nurture human resources with the knowledge and capability required to meet political issues appropriately with regard to the oceans".

This university aims to provide a comprehensive education in ocean studies. When it came to establishing postgraduate courses in line with students' work in their undergraduate years, we decided to establish a master's course in "Marine Policy and Management", incorporating the principles of the Basic Act on Ocean Policy. The purpose of the course in Marine Policy and Management is to "Understand the oceans as assets common to all mankind, and to teach and research the importance of appropriate utilization and protection, as well as methods and systems of comprehensive management of the oceans in an interdisciplinary and pioneering way". The ultimate aim here is to train specialists who will be able to propose policies for the comprehensive and systematic investigation, use and management of the oceans, and to send them out into society.





### The Marine Policy and Management course: a fusion of natural and social sciences

A major feature of this course is that it offers comprehensive and interdisciplinary study of marine policy and management involving a fusion of the natural and social sciences. In the marine policy field, lectures are given on proposing policies and creating rules for inclusive and sustainable use of the oceans. In the field of marine utilization and management, students learn management techniques aimed at the rational use and conservation of marine resources.

As shown in the diagram, the three characteristics of the curriculum are that it is "interdisciplinary", "international", and "practical". It goes without saying that marine management education depends on interdisciplinary efforts, but the international perspective is also indispensable to Japan, surrounded as it is by the ocean. In addition, there is a need for practical experience in order to address a variety of situations appropriately. This is the rationale on which these three main characteristics were decided upon.

To tackle issues concerning the sea from a broad perspective, the curriculum has been set up as follows. Specific lecture subjects are as shown in the diagram. General subjects have been set as common subjects for the master's course, and these are taught broadly in the first year to impart a wide range of general knowledge. After this, the students attend lectures the specialized subjects in the various fields. As stated above, one of the special features of this course is its practical orientation. It is characterized by making effective use of the University's facilities for practical learning at sea using the Umitaka Maru and other

training ships, as well as practical training in field surveys using the Hydrosphere Field Science Center. Practical training through experience at sea is education that imparts the precious experience of learning in the field, together with practical training in the social fields. Our belief is that no one can discuss the oceans without first-hand knowledge of them.

The teaching method is another characteristic of this course. It is based on the case method, whereby students gain simulated experience of problems through case studies. This practical method has also been introduced into our undergraduate education, where it has produced a number of results. To introduce one example: "Taking a case in which small-scale fishermen suffered considerable damage due to random development of mangrove swamps, the Project Cycle Management (PCM) method was used to analyze the relative interests and problem structure, and specific measures were proposed and planned with a view to solving the problem by empowering the fishermen".

The master's course in Marine Policy and Management follows the same format as other master's courses, in that the standard course length is two years, 30 credits are required for graduation, and the student is awarded a master's degree (in ocean science) on completion. The maximum intake is 18 students, of whom up to 4 may be adult students. Selection for admission consists of a general selection process based on a language examination and an oral examination, while the special selection process for adult students is based on document screening and a language ability test (oral examination). To assist the acceptance of adult students, we will introduce a system of

#### ■"Curriculum of the master's course in ""Marine Policy and Management"" at TUMSAT's Graduate School of Marine Science and Technology"

Interdisciplinary Education on Marine Policy and management			
	Common Subjects (select 2 credits in each and a minimum of 4 credits)		Practical Subjects (select 1 credit in each and a minimum of 2 credits)
Common Subjects	General View on Marine Policy		Internship for Marine Management Policy
	General View on Marine Utilization and Management		Practical ESD Training
	International Marine Management Policy		Shipboard Training for Coastal Oceanography Special Seminar in Oceanographic Observation
Special subjects in Marine Policy *	Marine Policy (select 2 credits in each and a minimum of 6 credits)		
	Institution of Marine Resource Utilization	International Cooperation	Coastal Regional Development
	International Institution of Ocean management	Coastal Society and Culture	Methodology for Wise Use of Coastal Areas
	Maritime International Relations	Marine Environmental Policy	Policy for International Fisheries
	Asian Marine Policy	Ocean Literacy	Marine Economic Policy Maritime Affairs Policy
Special subjects in Marine Utilization and Management *	Maritime Utilization and Management (select 2 credits in each and a minimum of 6 credits)		
	Fish Population Dynamics	Fisheries Stock Assessment	Study on seabed Resources
	Marine Ecosystem Management	Marine Environmental Systems	Coastal Zone Conservation
	Fisheries Stock Management	Marine Environmental Assessments	Coastal Protection and Management

Besides the above, Special Seminars (4 credits) and Special Research (8 credits) in each field (total 12 credits) are selected and studied

\*For special Subjects, Students acquire a minimum of 6 credits for special field

day-and-night tuition. We expect many students to enroll. Teaching staff will be increased from the present 13 to 16 members, and fields that cannot be adequately covered by the affiliated staff will be taken care of by doubling posts or taking on additional part-time lecturers. Full-time staff will not only be staff from the Department of Marine Policy and Culture, but some staff affiliated with the Department of Ocean Sciences and the Department of Marine Biosciences will also be involved in the Graduate School's course in Marine Policy and Management.

### **Training human resources to be responsible for Japan's marine policy**

Our aim is (1) to train highly specialized professionals who have interdisciplinary knowledge on ocean resources, environments, and policies, and who can propose policies from long-term and multiple perspectives, and (2) to nurture human resources who can play central roles in national and local public bodies, think tanks, survey companies, administration, and industry. Also, since the students will have graduated from a specialized field of education and research, i.e., the oceans, we also expect to produce human resources who will be active in overseas cooperation agencies and public interest corporations, NGOs, NPOs, and so on.

This postgraduate course was established in the strong belief that nurturing human resources who have a broad and deep knowledge of the ocean and can participate in proposing and planning marine policy is vital for Japan, which, though a maritime nation, cannot be said to offer sufficient education about the ocean. The teaching staff is therefore determined to promote this education and research with maximum enthusiasm. We would welcome guidance and support from all those who have supported our efforts in the past. ■

# Basic Plan on Ocean Policy and Management of the Sea

## Yasuo OHBA

Secretary General, The Secretariat of the Headquarters for Ocean Policy, Cabinet Secretariat  
(Ship & Ocean Newsletter No.186 May 5,2008)

**A variety of measures are raised in the Basic Plan on Ocean Policy, but as regards the new perspective that a policy for management of the sea represents, I feel that strong interest and expectations have been generated among ocean stakeholders. This article provides an outline of the measures for managing the sea in the Basic Plan on Ocean Policy.**

### 1. Gist of the Basic Plan

Pursuant to the Basic Act on Ocean Policy, which came into force on July 20th last year (2007), the first "Basic Plan on Ocean Policy" was approved in the Cabinet Meeting and publicized on March 18th, 2008. Recognizing the urgent need to arrange the various conditions necessary for Japan to take the first step to realize a new Oceanic State, the period of the Basic Plan was set for next 5 years with the following goals:

- Goal 1: Challenge to take the initiative in coping with panhuman issues in the sea
- Goal 2: Foundation for sustainable use of abundant marine resources and marine space
- Goal 3: Contribution in the marine-related fields for realizing safe and secure lives of the citizenry

On this basis, the Plan indicates the basic policy for implementing measures based on the six basic principles stipulated in the Basic Act .

The six principles stipulated in the Basic Act :

- (i) Harmonization of the development and use of the sea with the preservation of the marine environment
- (ii) Securing the safety and security of the sea
- (iii) Enhancement of scientific knowledge of the sea
- (iv) Sound development of marine industries
- (v) Comprehensive governance of the sea
- (vi) International partnership with regard to the sea

At the same time, it stipulates ocean measures necessary to be promoted in a comprehensive and planned manner, out of 12 basic measures stipulated in the Basic Act, such as measures to be implemented intensively or measures to be implemented under close cooperation among related agencies.

1. Promotion of the Development and Use of Marine Resources
2. Preservation of Marine Environment, etc.
3. Promotion of Development of EEZ and Continental Shelves
4. Securing Maritime Transport
5. Securing the Safety and Security of the Sea
6. Promotion of Marine Surveys
7. Promotion of Research and Development of Marine

Science and Technology

8. Promotion of Marine Industries and Strengthening the International Competitiveness
  9. Comprehensive Management of the Coastal Zones
  10. Preservation of the Islands
  11. Securing International Coordination and Promotion of International Cooperation
  12. Enhancement of Citizen's Understanding of the Sea and Fostering of Human Resources
- (See diagram of the following page.)

### 2. Ocean Management in the Basic Plan

One of the major significance in enforcement of the Basic Act was that ocean management was clarified as a national policy. Policies regarding oceans had been based on the perspective of how to use the "space" of the sea so far. Under the international order based on the United Nations Convention on the Law of the Sea (UNCLOS), however, coastal States have not only jurisdiction over vast exclusive economic zone (EEZ) and continental shelves, but are also responsible for appropriately managing resources and environments in those zones. Moreover, in order to properly deal with changes in the circumstances of the sea in recent years, such as congestion in marine exploitation activities, it is indispensable to establish a new system to plan and determine policy from the viewpoint of managing the sea with due considerations to the possibility and capacity thereof. This is also necessary for Japan in order to respond to these international moves about management and exploitation of the sea, clearly showing its stance from the viewpoint of managing the sea.

The Headquarters for Ocean Policy, which established within the Cabinet pursuant to the Basic Act to promote ocean policy intensively and comprehensively, is a core of this administrative system and will promote various measures based on the Basic Plan.

Hereinafter, I'd like to introduce a summary of the sections of management of the sea in the Basic Plan (Chapter 1-(v) and relevant parts in Chapter 2). A comprehensive viewpoint of various characteristics of the sea is absolutely necessary for its management. Based on such awareness, the Plan requires that the international society should actively endeavor to form an international order of the

sea, in order to realize peaceful, equitable and sustainable development and use.

In Japan's jurisdictional marine zones, she should make efforts, so as to (a) keep the zones in appropriate conditions, (b) clarify the possibility of future development and use and promote the realization thereof, and (c) maintain orderliness in using.

Based on such awareness, in connection with (a), we will attempt to establish marine protected area for ensuring the biodiversity and realizing the sustainable use of fishery

resources, and to control sediment in an integrated manner with land areas in coastal zones, etc.. For (b), We will establish a "Plan for the Development of Marine Energy and Mineral Resources (provisional title)" to promote exploration and development of methane hydrate, polymetallic sulphides, etc., and establish an integrated system for management and provision of marine-related information, with a view to contributing to the development of marine industries, etc. Finally, with respect to (c), we will strive to construct proper relationships concerning utilization of

■Basic Plan on Ocean Policy

Period of the Plan  
5 years (with Predictions for 5years hence (FY2012))

Policy Goals

- Goal 1: Challenge to take the initiative in coping with panhuman issues in the sea
- Goal 2: Foundation for sustainable use of abundant marine resources and marine space
- Goal 3: Contribution in the marine-related fields for realizing safe and secure lives of the citizenry

Chapter 1 Basic Policy of Measures with Regard to the Sea

(i) Harmonization of the development and use of the sea with the preservation of the marine environment "Need to restore fishery resources, establish the programs for developing technologies for energy and mineral resources, etc.."	(iii) Enhancement of scientific knowledge of the sea "Need to establish systems for marine-related surveys and researches, foster and ensure human resources, strategically promote research and development, etc"	(v) Comprehensive governance of the sea "Need to form international maritime order, proper management of EEZ etc, with the viewpoint of comprehensive study in the characteristics of the sea."
(ii) Securing the safety and security of the sea "Need to establish systems and strengthen frameworks for securing safety and security of the sea, secure the safety of maritime transport, strengthen the countermeasures against natural disasters, etc."	(iv) Sound development of marine industries "Need to strengthen the international competitiveness and the management base of maritime industries, promote the creation of new marine industries etc."	(vi) International partnership with regard to the sea "Need to utilize and support international juridical bodies, actively promote international coordination and cooperation, play a leading role in forming and developing maritime order, etc."

Chapter 2 Measures that the Government Should Take Comprehensively and Systematically with Regard to the Sea

<b>1. Promotion of the Development and Use of Marine Resources</b> Enhancing management measures on fishery resources, and strengthening restrictions etc. Promoting the resource exploration etc. for commercialization of energy and mineral resources.	<b>5. Securing the Safety and Security of the Sea</b> Promoting institutional arrangement for securing safety, strengthening of systems, securing the maritime transport safety, strengthening countermeasures against natural disasters, etc.	<b>9. Comprehensive Management of the Coastal Zones</b> Promoting measures carried out in an integrated manner with land areas, such as comprehensive sediment control, construction of proper relationships concerning utilization, clarification of the details of management, etc."
<b>2. Preservation of marine environment, etc.</b> Clarifying how to establish marine protected areas. Improving the water environment, countermeasures against wastes drifting or washed ashore, Contributing to the preservation of the global environment, etc.	<b>6. Promotion of Marine Surveys</b> Implementing marine surveys necessary for the management of the sea. Establishing systems for the management, provision and accumulation of marine-related information comprehensively.	<b>10. Preservation of the Islands</b> Establishing the basic policy preservation and management of islands. Revitalizing islands through industrial development by respecting innovative ideas, etc.
<b>3. Promotion of Development of EEZ and Continental Shelves</b> Taking measures for the examination of the limits of Japan's continental shelves. Deliberating institutional measures for scientific researches, etc. Plans for the development of marine energy and mineral resources.	<b>7. Promotion of Research and Development of Marine Science and Technology</b> Promoting research and development. Developing the research base, such as ships and other equipment, human resources, etc. Strengthening coordination among related agencies.	<b>11. Securing International Coordination and Promotion of International Cooperation</b> Dealing with the order of the surrounding marine zones and the formation of international agreements, etc. Promoting participation in international efforts and international cooperation in various fields
<b>4. Securing Maritime Transport</b> Arranging conditions for the international competitiveness of Japanese international shipping industry, Arranging the environment for fostering and securing crew members, etc. Developing maritime transport bases.	<b>8. Promotion of Marine Industries and Strengthening the International Competitiveness</b> Reinforcing the management culture. Strengthening competitiveness by maintaining technical capability, etc. Developing and introducing new technologies such as marine biomass.	<b>12. Enhancement of Citizens' Understanding of the Sea and Fostering of Human Resources</b> Promoting events such as awards ceremonies on Ocean Day. Enhancing school and social education. Fostering of human resources.

Chapter 3 Other Matters Necessary to Comprehensively and Systematically Promote Measures with Regard to the Sea

Effective implementation of measures. Responsibilities of related parties and mutual coordination and cooperation. Active publication of information.

The sound development of the economy and society of our State to improve the stability of the lives of citizenry  
Contribution to the coexistence of the oceans and mankind

coastal zones, that is, establish and strengthen systems of monitoring, instructing and regulating activities in marine zones, and create the sea surface utilization coordination rules, etc.

Furthermore, based on the fact that UNCLOS allows nations to establish the outer limit of continental shelves beyond 200 nautical miles, the government should take all possible measures for the examination of the limits of Japan's continental shelves. We will also be diligent in deliberating over institutional countermeasures to take appropriate actions in order to manage scientific researches by foreign vessels; in collecting and compiling basic information such as low-water line and bathymetric features necessary for the management of the sea; and in conducting necessary deliberations concerning desirable management based on special features of respective coastal zones.

Finally, islands scattered widely within vast jurisdictional marine zones of Japan play a significant role as one of the grounds to establish that zones, as well as in securing maritime transport safety, developing and using marine resources, and preserving the marine environment. Therefore, it is necessary to clarify the position of islands in promoting the government's ocean policy and establish the "Basic Policy concerning Preservation and Management of Islands for Management of the Sea (provisional title)," which stipulates appropriate management systems, measures, etc.

### 3. Conclusion

The discussion in this paper concerns only a small part of the Basic Plan on Ocean Policy. When the Basic Plan was under construction, we took care in the choice of expressions to ensure that it could be read and understood smoothly by as many people as possible; a glossary of terms was also prepared to explain the terminology used in it. I would earnestly hope that you would read the whole text of the Plan. I think the numerous measures listed in the Basic Plan can produce great results only by cooperation of as many related parties as possible, to say nothing of the government's efforts. For enjoying benefits from the sea into the future, we should strive to construct mutual coordinative and cooperative relationships of all parties, including national government, local governments, and related businesses operators, etc. ■

# Comprehensive Governance of 200 Nautical Mile Waters

— Using EEZ basepoint islands, ocean platforms and amphibian —

**Hiroyuki NAKAHARA**

Managing Director, Research Institute for Ocean Economics; Member of Board of Directors, Ocean Policy Research Foundation  
(Ship & Ocean Newsletter No.190 July 5,2008)

**Comprehensive governance of the oceans is one of the main principles stated in both the Basic Act on Ocean Policy and the Basic Plan on Ocean Policy. In order to achieve this principle in Japan's 200 nautical mile zone including the Territorial Sea and the Exclusive Economic Zone (EEZ), it is important to focus on the role of EEZ basepoint islands, and the use of ocean platforms and amphibian.**

## What exactly is meant by "governance"?

One of the principles in the Basic Act on Ocean Policy that came into force on July 20th, 2007 is "comprehensive governance of the oceans" stated in the Article 6. Also, this principle is described extensively in the Section 5 titled "Comprehensive governance of the sea" in Chapter 1 in the Basic Plan on Ocean Policy, authorized by the Cabinet on March 18th, 2008. There, governance is explained as comprising three elements, namely (i) keeping ocean areas in an appropriate condition, (ii) promoting the use of ocean resource and space, and (iii) maintaining order.

In Japanese, the governance is expressed by using the term, "*Kanri*", in general, but the word "*Kanri*" has a strong nuance of regulation or control. What, more specifically, does governance or "*Kanri*" mean? Various terms in English could be used to assist in an understanding of this principle. *Law enforcement* could also be included in the scope of "*Kanri*", when used in the sense of governance within a legal framework. Another suitable translation would be *administration*, while the term *stewardship* is used in some countries, and of course *governance* is used among them. The most commonly used equivalent is *management*. Examples include resource management, environmental management, coastal zone management, and ocean management, and this would appear to be the most appropriate term. However, when considering the meaning of "*Kanri*", the selected term needs to embrace all of the aspects mentioned above. As a master of cormorant fisher might manage a number of controlling ropes of many cormorants simultaneously, "*Kanri*" should be understood as integrating policies on all relevant aspects, including resources and environments, and its policy and strategy efforts should be aimed at above-mentioned three basic elements, "keeping ocean areas in an appropriate condition, promoting their use and maintaining order", or more simply "knowing, protecting and using" oceans.

Incidentally, in the Basic Act on Ocean Policy, the title of Article 6 is given in English as "Comprehensive Governance of the Oceans". Some scholars have expressed the view that "Integrated Management" would be more appropriate, a view to which the author also supports and subscribes.

## Importance and use of EEZ basepoint islands

The total area of Japan's 200 nautical mile zone, including territorial waters and the Exclusive Economic Zone (EEZ), is about 4.47 million km<sup>2</sup>, the 6th largest in the world. This vast area is supported by the many islands that form the territory of Japan as an archipelagic state. In the case of the scattered Minami Torishima and Okinotorishima islands, for example, it would be possible to secure an EEZ of at least 400,000 km<sup>2</sup> around each of them. Although difficult to discern by looking at a map, both of these are actually larger than the Japanese landmass, territory itself, of around 380,000 km<sup>2</sup>. Also, though not conspicuously visible on the midline between Japan and facing or neighboring countries, there are also remote islands that form EEZ basepoints in the East China Sea and the Sea of Japan. These create bulges in the midline between EEZs. Meanwhile, the scattered nature of Japanese islands that form basepoints causes the line indicating the 200 nautical mile range on the Pacific Ocean side to appear as a succession of arc-like bulges. There is a tendency for these distant and remote islands to be called "frontier islands", but here the author will refer to them as "EEZ basepoint islands".

As examples of these EEZ basepoint islands, in the Pacific Ocean we have the Bayonnaise Rocks, Smith Island, and Sofu-Iwa belonging to the Izu Islands, the Ogasawara Islands of Nishinoshima and Iwojima (all of the above belonging to the Tokyo Metropolitan Region), and Okidaitōshima (belonging to Okinawa Prefecture). In the East China Sea, besides the well-known Senkaku Islands, there are also Iwotorishima (Okinawa Prefecture), the Danjo Islands (Nagasaki Prefecture) and others. In the Sea of Japan, there are of course Takeshima (Shimane Prefecture), as well as Kyuroku Island (Aomori Prefecture) and others. These EEZ basepoint islands, most of which are uninhabited, are thought to number around 25 in total.

It hardly needs pointing out that the cornerstone of our management of Japan's vast 200 nautical mile zone lies in making active use of these EEZ basepoint islands.

## Using ocean platforms and amphibian (flying boats)

As for the use policies for inhabited remote islands,



measures designed to improve resident welfare and living convenience lead directly to management of the oceans. More than anything, this is because Japanese citizens live there, have their livelihoods and industrial activities there, and because their affairs are administered there. In the case of uninhabited remote islands, the development of facilities and various activities on the landward side or in the surrounding waters forms the basis of ocean management. However, open-sea works, including the construction of ports, harbors, runways or other facilities, is enormously costly, involving long-distance transportation of materials and equipment by ship from the mainland. Moreover, if the island is rocky, facilities cannot be constructed on the landward side. In these cases, serious study should be given to the idea of installing and using ocean platforms in the territorial waters or EEZ around such islands. In particular, floating structures can be built on the mainland and then need only be towed out to the site and anchored there. If a problem arises, they can be moved. Structural models, the arrangement of mounted facilities, etc., can be designed with a degree of variation (manned or unmanned, large or small, etc.) depending on the anticipated sites in which they are installed and the purpose of use.

In any case, one would expect steps to be taken to improve the content of the "Plan for the Development of Ocean Energy and Mineral Resources (provisional title)" due to be formulated during fiscal 2008<sup>1)</sup> and the "Basic Policy concerning Preservation and Management of Remote Islands for Ocean Management (provisional title)", as stipulated in the Basic Plan on Ocean Policy, with a view to using this kind of ocean platform.

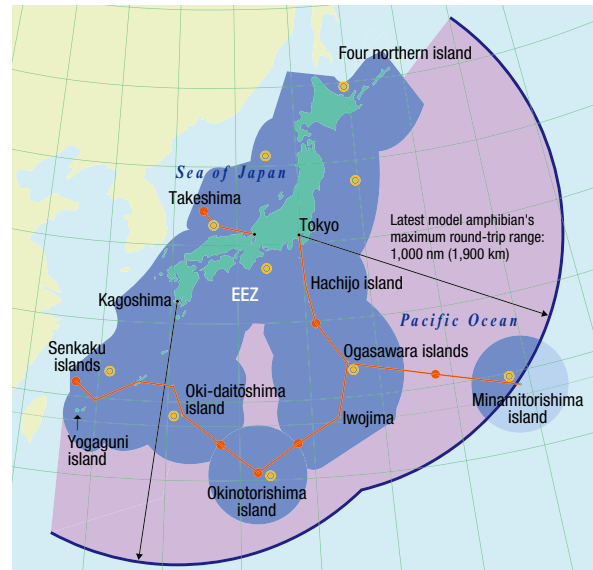
Finally, something else from which significant functions can be expected in relation to ocean management is the amphibian, the flying boat. The latest model of amphibian, manufactured in Japan is an outstanding product boasting a performance not found anywhere else in the world, namely the ability to take off and land, actually touch down onto the surface water, using only around 300m of sea surface, even with a wave height of 3 meters in open seas. Even if remote islands or ocean platforms are not taken into account, amphibian can cover any sea area within the EEZ

■ Latest model of an amphibian (flying boat) on take-off



Cruising range: at least 4,500km, maximum take-off and landing weight (land): 47.7 tons, maximum take-off and landing weight (water): 43.0 tons, maximum take-off distance: 280m, maximum landing distance: 310m, maximum wave height: approx. 3m. (Photo courtesy: ShinMaywa Industries, Ltd.)

■ The relationship between Japan's 200 nautical mile zone, ocean platforms and amphibian(flying boats)



● Hypothetical locations of ocean platforms equipped with functions for ocean management, resource development and surveying, ocean observation, etc., according to the "Grand Design for the Ocean in the 21st Century" (2000), proposed by Keidanren.

● Hypothetical locations of ocean platforms, particularly equipped with helipad for non-refueling flight routes for high-performance helicopters to link these platforms with remote islands to implement ocean management in wide EEZ of Japan, according to a joint proposal by the Research Institute for Ocean Economics and the Floating Structures Association of Japan (2007)\*

\* Floating Structures Association of Japan, a voluntarily organized organization by ocean-related industries, ceased its eighteen years activity and merged with Research Institute for Ocean Economics in April, 2008.

in a return journey of one day. Since they can land in the sea at their destination, moreover, they can not only carry out maritime rescue operations but also transport personnel reinforcements and food supplies, support ocean surveys and conduct independent marine observation, among other potential work. While aircraft and helicopters only permit management operations from the air, amphibian can visibly demonstrate Japan's presence on the seas, since they can land on water and can keep staying there for certain period of time.

■ Artist's impression of a floating ocean platform for heliport base



For comprehensive governance of the oceans, i.e., management of Japan's 200 nautical mile zone, besides routine ocean management operations by the government, local authorities, universities, research institutions and others using ships, buoys, etc., it would also seem important to make use of EEZ basepoint islands, ocean platforms, and amphibian. Moreover, these measures should be developed to show Japan's intentions regarding ocean management in multiple-approach, highly visible forms.

1) Plan for the Development of Ocean Energy and Mineral Resources (provisional title) was formally decided by the Headquarters for Ocean Policy on March 24th, 2009.