

Ship & Ocean Newsletter

Selected Papers

No. **10**
September 2008

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.10" contains English-language versions of papers from the Japanese Newsletter edition, published from No.151(2006.11.20) to No.170(2007.9.5).

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

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East African Mountain Biodiversity and the Indian Ocean Driver

Rob Marchant

*York Institute for Tropical Ecosystem Dynamic, University of York, UK
(Ship & Ocean Newsletter No.151 November 20, 2006)*

One of the guiding principles of understanding the processes and impacts of climate change is concerned with looking back in time to see how climates and ecosystems have changed, or put another way, the past is the key to the present, which in turn is the key to the future. By understanding the past we can wholly understand the present, we can then project this understanding towards future 'what if ?' scenarios.

The Eastern Arc Mountains are well known for their great floral and faunal diversity, and why it may be able to retain such biological wealth under past climate change is finally going to be tested by a new research.

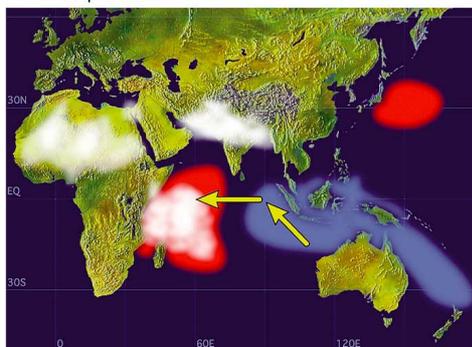
Background to ecosystem change

Over recent years there has been growing awareness concerned with climate change and how this impacts on our planet, its ecosystems and human populations. In addition to impacting on the world we live in, climate change will increasingly determine the nature and focus of scientific research and political decisions. For example, considerable effort has focused on understanding aspects of climate change, such as the impacts of increasing global temperatures, ice sheet melting and rising levels of atmospheric carbon dioxide, and the impacts these may have on our planet. Policy and international agreements are increasing being based on scientists understanding, however, as well as providing guidance for policy makers, scientific research often raises more questions that it answers. Processes and associated impacts concerned with environmental change are highly complex; resulting from a series of interactions between changes in solar activity, ocean currents, atmospheric weather systems. A good example comes from the Indian Ocean: for decades climate researchers have regarded the Indian Ocean as a boring basin, lacking the dynamic climates that El Nino and La Nina produce in the Pacific Ocean. In 1999 a team of scientists led by Professor Yamagata, Dr Saji and associates of the Climate Variations Program of Frontier Research System for Global Change have identified the climatic kin of El Nino in the Indian Ocean - the Indian Ocean Dipole (IOD) (Figure 1). Until

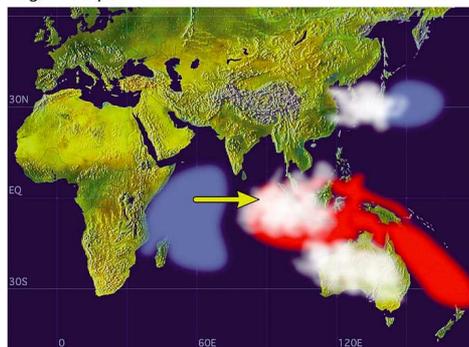
recently it was either assumed that the Indian Ocean did not have such a cycle involving interannual ocean-atmosphere coupling, any variation being forced primarily by ENSO and teleconnections with large oceanic circulations systems. However this is not the case; the IOD is a unique ocean-atmosphere mode characterised by anomalous warm sea-surface temperature (SST) over the western Indian Ocean and anomalous cold SST in the eastern Indian Ocean (Figure 1). Since a considerable amount of rainfall falling on landmasses adjacent to the Indian Ocean originates from the ocean it would be reasonable to assume that such SST anomalies would have a marked influence over the climate of East Africa. Indeed, an IOD 'event' it has been shown to be primarily responsible for large floods experienced in Kenya during 1997.

Having identified and characterised the IOD the next step is to investigate how this may change over time. The tendency of tropical climates to change relatively suddenly, even over the past millennia, has been one of the most surprising outcomes of the study of earth history. The tropics, rather than being stable or complacently following environmental changes recorded at temperate latitudes, may provide an early warning system to climate change, particularly within the present interglacial period when climatic ties to high latitudes have weakened considerably with the demise of the polar ice sheets. This complexity of climate systems, and efforts to understand these, that have fuelled

Positive Dipole Mode



Negative Dipole Mode



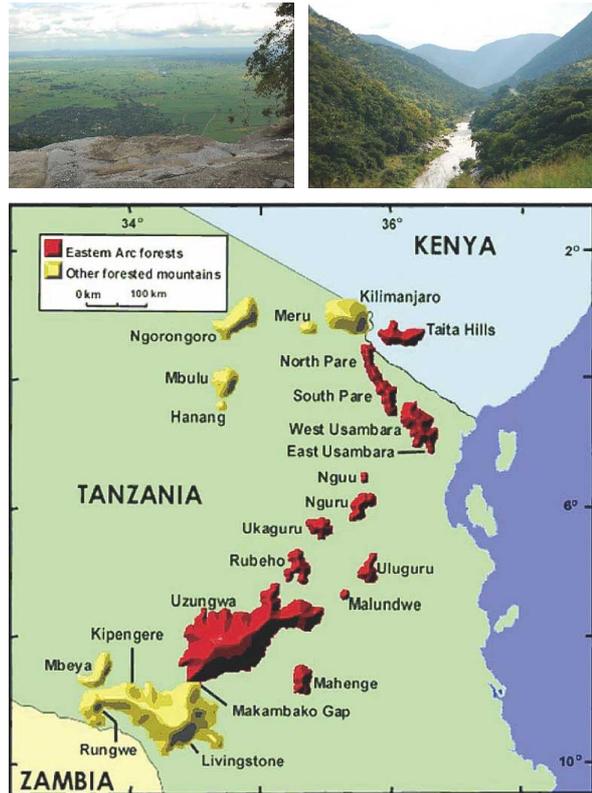
■ **Figure 1**

The Indian Ocean Dipole (IOD) in action characterised by SST anomalies (red shading denoting warming; blue cooling) during a positive IOD event (left), white patches indicate increased convective activity with arrows indicate wind direction. The negative IOD (right) which is, in effect, the reversal of the positive IOD - complete with increased convective activity over Australia, Indonesia and Japan. Images courtesy of A.Suryachandra Rao of the Institute for Global Change Research, Yokohama City, Japan.

recent debates both within scientific and political arenas on impacts of climate change and how to adapt and what methods to implement for such adaptation. There has been much debate on the impact that global warming may have on our planet - it is increasingly clear that this is not a debate with purely academic interest; the impacts of environmental change influencing the lives of the global population, an influence that can only increase based on current future scenarios. As exemplified by the relatively new understanding about the IOD; how, where and when these impacts will be felt are very difficult questions to answer - not beyond our capacity but not to be underestimated. The enormity of the task partly stems from the complexity of the earth's environmental system and wholly because we are not able to travel forward in time. However, one of the guiding principles of understanding the processes and impacts of climate change is concerned with looking back in time to see how climates and ecosystems have changed, or put another way, the past is the key to the present, which in turn is the key to the future. By understanding the past we can wholly understand the present, we can then project this understanding towards future 'what if ?' scenarios - such as how would the IOD react if global temperatures increase by 2°C. Therefore, it is imperative to understand the full range of natural variability, what are the climatic mechanism driving this, and how this may project to the future for consideration by economists, agronomists, conservation biologists and policy makers to develop effective long-term management strategies.

The Eastern Arc Mountains are well known for their great floral and faunal diversity, range of beautiful landscapes and are increasingly recognised as an important national treasure for the associated services they provide to the Tanzanian and Kenyan nations through provision of water and agricultural produce, electricity generation and tourism revenue (Figure 2). The term the Eastern Arc Mountains, coined by Dr. Jon Lovett some twenty years ago, was borne out of both the recognition of the great biological diversity and high number of endemic plants and animals - organisms that are not found anywhere else in the world. The Eastern Arc also has connotations of a storehouse of biological wealth, and the reflects the arc shape of the mountain chain - a receptacle for Indian Ocean moisture stretching from the Taita Hills in Kenya to the Udzungwa in southwest Tanzania (Figure 2). This concept of why certain ecosystems are so species diverse, have more than their fair share of endemic species, and may be able to retain such biological wealth under past climate change is finally going to be tested by a new research group at the University of York UK. Funded under the EU Marie-Curie Excellence programme, the York Institute for Tropi-

Figure 2



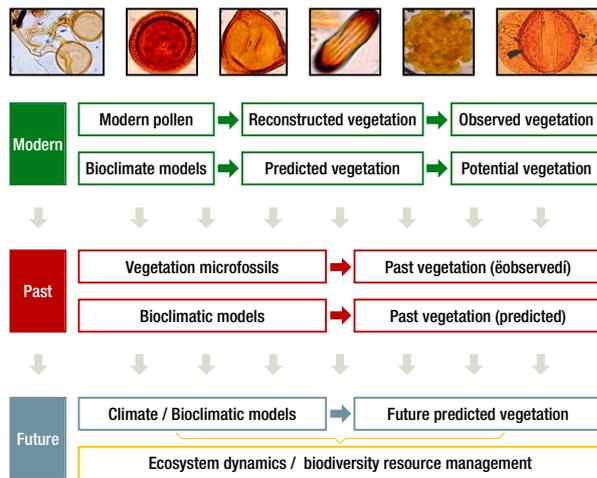
The Eastern Arc Mountain views: an ideal natural laboratory for studying biodiversity and impacts of environmental change.

cal Ecosystem Dynamics (KITE) is exploring the relationship between ecosystem dynamics, climate change, and human impacts to understand the patterns and processes on which the evolution of mountain biodiversity is based. Why the area is so biodiverse ?, in particular do high levels of biodiversity depend on buffering the mountain areas from global climatic change, due to the close proximity of climate systems originating from the Indian Ocean. Collaboration with the Japan Marine Science and Technology Center (JAMSTEC) will explain the relationship between the IOD and East African ecosystems, both in terms of characterising moisture supply and investigating feedbacks to IOD character resulting from land surfaces changes.

Research tools

A particularly good understanding of how our planet reflects, and has responded to, environmental changes can be obtained from plants. Plants are particularly good indicators of the environment as, unlike us in the animal world who can choose to migrate as climate change, plants can only grow, mate and develop populations where the ambient environment will allow. Each individual plant species is enclosed within an environmental envelope within which

■Figure 3



A view of the research steps that allow us to travel through time reconstructing past plant communities and the using this to investigate what the future may hold. Some of the fossils pollen grains and fungal spores that allow us to identify past ecosystem composition are shown along the top of the schematic.

temperate, moisture, seasonality and soil type (amongst other factors) are able to support plant growth, allow flowering, reproduction, seed production and next generation growth. Apart from exceptional circumstances, plants will not be able to grow outside of their given environmental envelope. For example, we would never find large buttressed tropical trees growing within Japan, similarly we would not find yew (*Taxus*) trees growing within a tropical rain forest! By overlapping the individual environmental envelopes of all the plants, large vegetation communities of Eastern Arc ecosystems can be recorded. As the environment changes, then the associated composition and distribution of the biomes will reflect this change. As well as being tightly constrained by their environmental envelopes, plants are well suited to unravelling environmental changes as they leave behind plant fossils. By accessing archives, normally lake or bog sediments, that contain plant fossil such as leaf fragments, pollen (Figure 3), fruits and seeds that are preserved as sediments accumulate it is possible to reconstruct plant communities of the past. When these 'snap-shot' reconstructions are placed within a time frame that can be provided by the application of a radiocarbon dating, we can determine how the vegetation at a single site has changed over time. Despite the pivotal position, in terms of ecology and climate, having a range of excellent potential sites and good logistical infrastructure the Eastern Arc Mountains has only a single pollen-based record of vegetation change - this is quite remarkable and is being addressed. KITE researchers are accessing swamp sediments along the Eastern Arc Mountains (Figure 2) to reconstruct plant communities of the past; by having a number of

such records a four-dimensional view of Eastern Arc Mountain ecosystem dynamics will be reconstructed

As described in the introduction, climate systems and ecosystem response are complex; as such there is a pressing need to develop methodologies that integrate past, present and future perspectives on ecosystem dynamics (Figure 3), particularly one that can move from the site to regional scale, and move between past, present and future to inform socio-economic predictions, and hence, be useful in policy formulation. To assess what the future may bring it is necessary to construct and apply models that are appropriate to the research questions; often addressing multiple problems at the interface between archaeology, plant ecology, and geophysical aspects of climate change. A bioclimatic model developed at the University of York and applied on UK ecosystems to investigate impacts of climate change on plant biodiversity will be used under varying climatic scenarios to investigate Eastern Arc Mountains. The model starts with a 'chromosome' divided into a suite of environmental parameters (e.g. temperature, CO₂, precipitation, altitude, seasonality), this is allowed to 'breed' using a genetic algorithm to determine the spatial extent of the niche occupied by a given species' climate envelope. Output will be compared and checked against observed distributions from field-based ecological surveys along the Eastern Arc Mountains. This will allow an understanding to be developed about the role of the terrestrial biosphere in climate change research; how it interacts with the atmosphere and oceans, in the regulation of global biogeochemical cycles and climate under past, present and future conditions. Key to the development of climate and vegetation models is the ability to link ocean and terrestrial processes to test how the ecosystems respond to different climatic regimes, such as changed character of the IOD; and in turn, how a changed character of ecosystems and land surface may influence the formation and subsequent behaviour of the IOD.

Thus collaboration within KITE and JAMSTEC is fully integrating skills of archaeologists, ecologists, climatologists, oceanographers and modellers to understand ecosystem response to climate change, the presence, and character, of stable states, signals of transitions and likely future scenarios to be examined. Ongoing and developing research will generate new data to develop our understanding of ecosystem dynamics. Results will be used within model testing, developing biogeographical theory, long-term planning and conservation biology - research areas that are particularly important within a period of uncertain future climate change and increasing human impacts, not just along the Eastern Arc Mountains but in other areas of the world too. ■

Development for a New World Maritime Community

Yohei Sasakawa

Honorary Chair, International Association of Maritime Universities (IAMU) / Chairman, The Nippon Foundation
(Ship & Ocean Newsletter No.154 January 5, 2007)

Along with the globalization of the world economy, there has been a rapid internationalization and multi-nationalization of maritime activities. It is against this background that we must now undertake needed reforms of maritime society in order to realize coexistence between the ocean and mankind and to deal with emerging ocean problems. The development of superior human resources is the first step on the way to this new maritime society.

(Speech by IAMU Honorary Chair, Yohei Sasakawa delivered at the 7th General Assembly of the International Association of Maritime Universities, Dalian Maritime University, Dalian, People's Republic of China October 16, 2006)

Human life has been closely connected with the sea since the beginning of history, but it was in the second half of the 20th century that worldwide maritime transportation developed most dramatically. It is now an essential means of global logistics, supporting our lives and the development of our countries.

About 90% of world trade is by sea, which means that maritime transportation is a major factor of globalization which drives the world economy.

On the other hand the expansion of maritime transportation has also brought various problems with it. We have developed our port facilities and established new sea routes.

But at the same time, there has been a rise in marine accidents, including oil spills and the pollution of the sea and coastal areas. These, in turn, have brought adverse effects on human health and marine ecosystems. The ever-increasing amount of pollution has moved well beyond the self-cleaning capacity of the sea. The sea was once believed to have virtually unlimited capacity for use by human beings. However, it has turned out to be very fragile. Moreover, its development and exploitation now threaten the very basis of our lives.

In order to cope with such crises, we need to do more

than just use the sea. We need to move toward protecting it. We need to adapt ourselves to its changes. Since the maritime community's activities are such a large part of the human use of the sea, it is crucial for us to review our own behavior, and make appropriate changes in the way we treat the sea.

Under the leadership of the International Maritime Organization the maritime community has been working together in many ways, such as the development of international regulations. This system has produced significant improvements in maritime safety and the protection of the marine environment.

However, we are now facing the emergence of new challenges that defy the conventional way of handling problems on a case-by-case basis. Such problems include environmental damage, and the inadequate management of ships throughout their life cycle. Both of these have been brought to light by the question of how we dismantle and scrap our ships. We also need to find ways to deal with the disruption of transportation caused by marine accidents, as well as piracy and terrorism in internationally vital sea lanes such as the Strait of Malacca. More needs to be done to deal with these problems. Yet another area that requires further effort is one of your university's main themes: a seafarer-centered safety management framework for the international shipping industry.

However, efforts based on conventional methods and procedures are insufficient to deal with such issues.

In June of last year, the IMO invited me to speak to delegations from around the world.

I took that opportunity to propose a new concept: "the sustainable development of maritime activities." This concept is a framework for the coexistence of mankind and the sea. Globalization has been accompanied by rapid internationalization and multi-nationalization of maritime activities and problems. I came up with this concept on the



Chairman Sasakawa giving the keynote speech at Dalian Maritime University.

basis of my view that, in order to achieve coexistence with the sea, in order to solve emerging issues related to the sea, we need to reform the traditional system of the maritime community, in which each government basically acts as an individual.

For this new framework, we need to achieve a form of international cooperation whereby nongovernmental maritime organizations and the IMO and governments support each other as they reform maritime policy together.

In order to maintain harmony between the marine environment and our maritime activities, and to tackle issues against which conventional systems and methods are inadequate, we need to grasp the overall picture of the maritime community and its activities. We need to work so that all stakeholders approach the issue of coexistence of mankind and the sea from their own viewpoints, but in a responsible manner. To effectively address the relationship between the sea and mankind, we need to discuss maritime responsibility in a comprehensive and cross-disciplinary manner. A key step in developing a new maritime community will be the nurturing of human resources capable of dealing with the many difficult challenges that we face.

As we develop the required human resources, one crucial group will be our seafarers. However, in this area, there are many problems, and this is of central concern for all of us here.

It is said that without the contribution of seafarers, half of the world would freeze and the other half would starve. This underscores the important role of these people who work on the frontlines of maritime transportation.

However, the increase in the number of high-tech ships, such as advanced LNG carriers, has highlighted the global need to improve the technical skills not only of seafarers but also of the personnel engaged in the safe management of vessel navigation.

Each country trains seafarers using its own maritime education and training system and sends them out to work together with seafarers from other countries. Each country's level of maritime education and training system is different, and so it is necessary to develop an international standard for safe operational skills. There is an urgent need to ensure not only a high level of education, but also a uni-



Thirty universities from twenty countries attended the General Assembly.

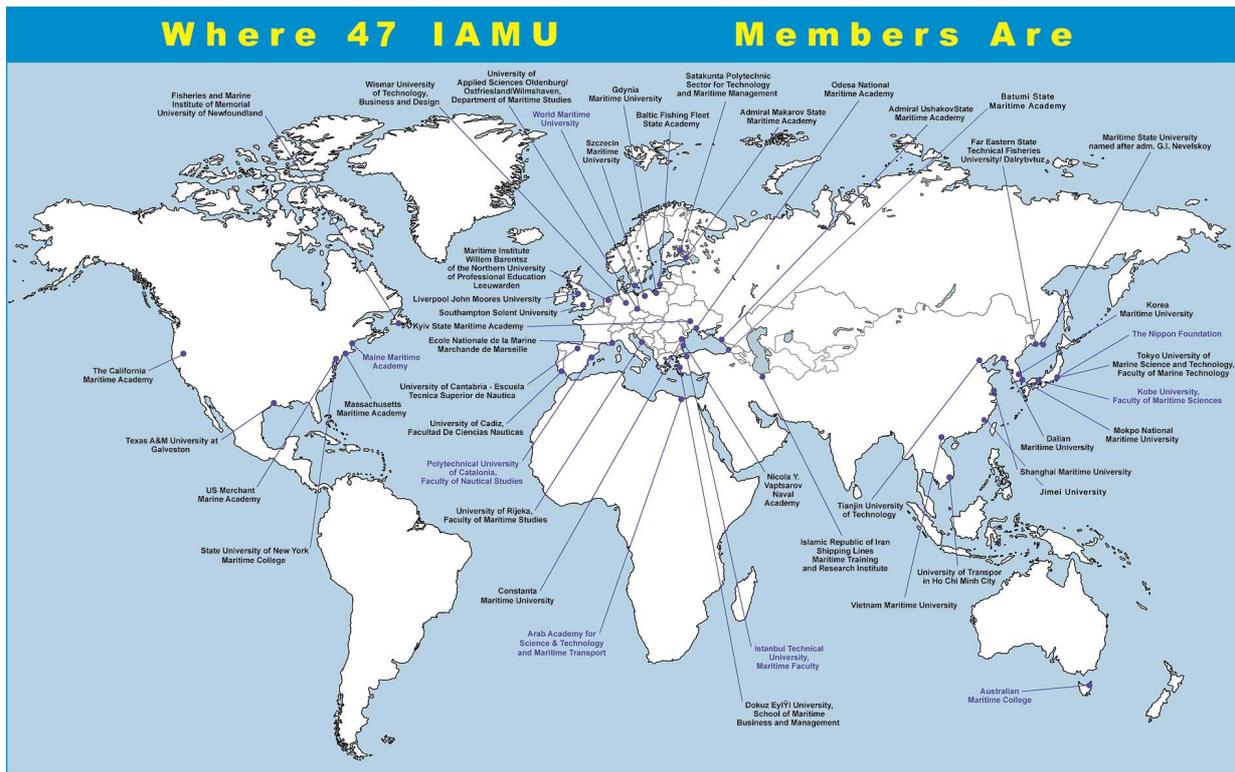
form curriculum for all students. We need to not only introduce the latest information-communications technologies for managing ship safety, but equally importantly, we must develop human resources capable of using them.

The IAMU was established to tackle precisely such issues by improving the level of higher maritime education under a common curriculum. The IAMU's work to improve the competence of LNG seafarers, its academic analysis and studies of maritime English, and other wide-ranging and original educational activities have received worldwide acclaim and led to the IMO granting it NGO status. The IAMU is expected to take the initiative in ensuring a high level of human resource development and international standards for seafarers.

At the same time though, I feel that the IAMU has a number of issues that it needs to address if it is to live up to such expectations.

According to IMO, about 80% or more of marine accidents can be attributed to human error. Amid the global shortage of seafarers, contemporary maritime education seems to place excessive emphasis on cramming students with inadequate knowledge and skills required to operate ships. What this does is to produce seafarers who lack pride in their work, and do not possess a true seaman's spirit. In this respect, I wonder whether the IAMU needs to review the balance of its study themes. I also think that the IAMU needs to make more effort to ensure that the knowledge and skills of seafarers are utilized more effectively by the maritime community at large.

Most IAMU universities are national institutions. This means that you are bound by the laws and certification sys-



Forty-seven countries are now members of IAMU. (Jan.2007)

● IAMU(<http://www.iamu-edu.org/>)

tems of your respective countries. So it may be difficult to respond quickly to issues facing the maritime community on the international level. But maritime universities are expected to play an important role in developing human resources not only at home, but for the global maritime community as a whole. You are expected to fulfill the roles and responsibilities as an influential body in the maritime community.

I believe that the development of well-balanced and highly qualified seafarers is possible only if they are taught the pride and philosophy of being a seafarer, not just the skills and knowledge necessary for safe vessel operation. In addition, to nurture and utilize seafarers who will continue to support the development of the new maritime community, we need to review and raise the standards of the conventional maritime education system. We need to develop a new systematic, integrated curriculum. One that includes comprehensive education about the sea. One that encompasses such fields as marine environment, maritime administration and policy, international law and safety management. This new curriculum will play a key role in developing a new maritime community.

So what can the IAMU do to bring about this necessary

change? It can provide a new forum which will allow universities to engage in transnational activities, transcending national borders and controls. This is where the IAMU can make a real contribution.

I encourage you to continue your efforts to develop the human resources that can make contributions to the global maritime community. People who can respond to changes beyond the confines of states. People whose actions will be based in a passion for the sea, rooted in the world's greatest maritime wisdom and guided by a commitment to a peaceful life. These are already ideals shared by you all.

The development of human resources is the first step in the development of a new maritime community. I think that, together with the efforts of the IMO and all governments, the IAMU is an ideal platform where maritime universities from different countries can cooperate in a global network. Here, we will develop a voluntary and creative framework. Through this structure, we will actively contribute to the maritime community, identifying new maritime activities. We will develop appropriate ways of human resource development, outside the conventional methods and notions. The Nippon Foundation is more than happy to support such positive and active efforts. ■

The Eco-Villages Project in Coastal South India: An Initiative of the International Ocean Institute

R. Rajagopalan

*Member, Governing Board, International Ocean Institute
(Ship & Ocean Newsletter No.154 January 5, 2007)*

IOI, a global NGO, was established in 1972 by the late Professor Elisabeth Mann Borgese. In 1996, IOI decided to begin addressing the problems of the poorer coastal communities. The first project was in India. This article introduces our mission and accomplishments.

The Beginning

I first visited Tiruchendur and the surrounding villages in 1996. I was then a Professor at the Indian Institute of Technology Madras (IITM) in the city of Chennai. I was also the Director of the Operational Centre of the International Ocean Institute (IOI), located at IITM.

IOI, a global NGO, was established in 1972 by Professor Elisabeth Mann Borgese. IOI works for the peaceful and sustainable use of the ocean and the coastal space, as well as the welfare of coastal communities. The IOI Network consists of 25 operational centres across the world and a headquarters in Malta.

In 1996, IOI decided to begin addressing the problems of the poorer coastal communities. The first project was to be in India and I was looking for a deserving target group and a reliable local NGO to implement the project. I found both in the Tiruchendur area. This is a small coastal town on the southeastern part of India, famous for its Hindu temple.

Coastal community

When we talk of the problems of coastal communities, we generally refer to fisherfolk and their difficulties. In India, fisherfolk are well organized and are able to fight for their causes. However, there are many non-fishing communities on the coast whose problems are more serious than those of the fisherfolk. Our project concerns one such community.

The IOI India Project villages are inhabited by dalits (meaning oppressed) who are at the bottom of the social hierarchy and who were considered untouchable until the time of India's independence. About 45 per cent of the population lives below the poverty line, with an income of less than US\$10 per month. The unemployment level is about 50 per cent.

Being landless, the people only find irregular employment as masons or agricultural labourers. In some of the villages, the people collect seashells that are washed ashore and convert them into lime. Many of the women work as domestic servants in the richer households of the area. The dalits are normally not allowed to take up fishing. However, in one or two villages right on the coast, some of the people do limited fishing.

Women and children in these villages are under particular stress. The women have to manage the household, care

for the children, collect water and firewood and also work for low wages. Besides, most of them have to deal with alcoholic husbands. Most of the children go to the government schools, which are in poor condition. In addition, these children also face social discrimination at school. Many children, especially girls, drop out of school before reaching the 10th grade. Many young boys move to cities only to find low-paid work under harsh conditions.

The area suffers from an acute scarcity of drinking water. The traditional ponds and wells are dry and the supply of water through public taps is erratic. The ground water has also turned saline in many villages. The area gets about 600 mm of rain, but this rain occurs over a short period of time and all the water disappears within a month or two.

Collecting water and firewood is a major occupation of the women taking up a considerable amount of their time and energy. They use traditional wood-burning stoves which are not fuel-efficient and which give out smoke, which is hazardous to health. Over the years the green cover in the area has been depleted and yet there is widespread cutting of the few existing trees.

A local NGO, Anawim Trust, had been formed in 1993 by a group of concerned individuals and its target group was these socially and economically disadvantaged communities near Tiruchendur. By 1996, Anawim was active in about 10 of these villages, promoting women's self-help groups and vocational training.

First visit and first impressions

Sometime in October 1996, I took the Pearl City Express from Chennai to Tuticorin, a journey of about 16 hours. The port city of Tuticorin is called Pearl City, because natural pearls were once abundant in this part of the coast. Now, of course, all the pearls are gone, and the only reminder is the ugly and large cement pearl that greets you when you get out of the Tuticorin railway station. From Tuticorin, I took a cab to Tiruchendur, an hour's drive.

Having been an academic and an urbanite for the most part of my life, I had no idea of rural development. However, soon after visiting a few villages and talking to the Mr. Sekhar, the Founder-President of Anawim, two things became clear to me: the people were in dire need of help and Anawim was an extraordinary NGO totally committed to the advancement of the villages. I had earlier seen

equally deserving target groups on the western coast of India, but I had been badly let down by the local NGOs through whom I wanted to implement the projects.

Objectives of the project

Anawim's goal has always been to support the empowerment of the communities, so that they can exercise their rights, have increased access to natural resources, and thus have greater control over their lives and livelihoods.

The specific objectives of the IOI-Anawim projects included the following:

- *Enhancement the socio-economic status of the target communities, especially that of women and children.

- *Creation of awareness among the coastal communities, especially women and children, regarding coastal ecology and the importance of preserving the natural environment.

- *Preservation and restoration of coastal ecology through community action (measures like increasing the green cover, conservation of local biodiversity, rainwater harvesting, conservation of water sources, etc.)

- *Testing and promotion of ecotechnologies like rainwater harvesting, increasing green cover, promotion of fuel-efficient stoves, use of solar energy, spirulina production, etc.

- * Integration of environmental conservation and livelihood issues of the people.

We called our effort as the Eco-villages Project to imply that environmental conservation will be central to all our activities.

From 1997 to 2003, it was a roller-coaster ride for me. I was always busy writing funding proposals, dealing with donors, making detailed plans of activities for Anawim, monitoring the projects, preparing reports, disseminating the experience to the other IOI Centres, and at conferences, etc. I was constantly looking for new ideas as well as opportunities for learning from other organizations. I made it a point to visit the villages at least once a month for three days.

Every proposal faced uncertainty and yet funds kept coming. From 10 villages we expanded our work to 60. Those were heady days, but my mood alternated between hope, satisfaction, and frustration. There was so much to be done and there were also many obstacles.

Achievements

Over the last ten years, the major achievements of the projects have been:

- * Over 120 women's self-help groups have been formed in 60 villages and there are now over 2000 members in these groups.

- * Over 600 toilets have been constructed in the villages



A women's self-help group meeting.



A goat bought using micro-credit.



Environmental education for children.

providing immense relief to the women.

- * A 7-acre organic farm has been set up near Tiruchendur and it includes:

- o A training centre for conducting courses and meetings for women and children.

- o A production centre for women for promoting small businesses like the manufacture of palm leaf products, soaps and whiteners, herbal medicines, spirulina, etc. It has in addition a small printing press.

- o Herbal nursery

- o Laboratory for testing spirulina

- o A central library

- * Over 2500 loans (US\$40 to US\$100) have been given to women for starting micro-enterprises.

- * Evening schools have been established in 30 villages, catering to the needs of over 800 children. The children come to the centre in the evening for games, study and extra-curricular activities.

- * Over 300 training programmes have been conducted for women and children accounting for a total of 16,000 participant-days. The programmes included training in skills, development issues, vocations, and ecology.

- * Children have been trained to conserve the biodiversity of the area and to plant and use herbal gardens.

- * Over 55,000 tree saplings were given to the villages with the women's groups taking responsibility for planting and taking care of them.

- * Water conservation measures including rainwater harvesting have been initiated. Rainwater harvesting tanks of 10,000-litre capacity have been built in several villages and evening schools.

- * Women and children have been trained to operate computers.

- * Sports and cultural programmes have been conducted for women and children.

Tsunami relief and rehabilitation

Five of the villages were severely affected by the tsunami of December 2004. There was no loss of life, but many houses, boats, and limekilns were washed away. The waves also took away the entire collection of shells heaped on the shore. Since the tsunami, seashells have become scarce and fish catch has gone down.

Anawim and IOI provided immediate relief, but were more concerned about long-range rehabilitation of the community. In 2005, IOI was awarded a project by the UNDP Unit for South-South Cooperation for the rehabilitation in one of the affected villages. IOI and Anawim have used the funds to retrain the women in alternative occupations and to provide them with microcredit. This project has been given a special award by the South-South Unit.

Donors

For the projects, IOI India was able to raise funds from private donors and many other sources including the IOI Headquarters in Malta, Asha for Education of USA, Japan Fund for Global Environment, Keidanren Nature Conservation Fund and Aeon Foundation of Japan, and Ocean Science and Research Foundation, Switzerland.

Once the IOI projects started showing results, Anawim was also able to raise funds independently from sources such as the Japanese Consulate, Chennai.

Major problems and lessons learnt

- * Human resource: Finding committed staff to implement the activities has always been a major problem. Often, trained people left us and those who stayed were not the best.

- * Village cooperation: This is a mixed bag, each village being different. In some villages, the women's groups have been active, pitching in to help us move forward. In others, lack of unity, petty squabbles and ego clashes have caused great damage to the projects and to the villagers' wellbeing.

- * Corpus fund: Given the conditions imposed by the donors and the intention of IOI and Anawim to make every rupee reach the people, Anawim could never put together a corpus fund to make its basic operations going. Even now, when projects end, there is no money to retain the services of good resource persons.

- * The last mile: A large number of excellent ideas have been tried and many have shown very good results. However, projects have often ended before we could take an idea to its logical conclusion and ensure long-term sustainability.

Some soul searching

It was my great fortune that I landed in Tiruchendur in the course of my quest. Was Anawim equally fortunate because I decided to work through them? Perhaps yes, because they had run out of funds and their activities were in danger of being slowed down or closed.

Does the term Eco-villages fit the situation? Not really. No doubt, our activities have promoted eco-architecture, created greater environmental awareness, resulted in more trees and conserved some water. However, the villages are not really green with lush forests and flowing water.

Were the villagers fortunate because we brought projects to them? Time alone will provide an answer. After almost a decade of work, I would say that the projects have made some difference to many of them. I cannot, however, say that the people have become free of their social and economic deprivations. It is also not clear whether all the positive changes brought about by the projects will be sustained in the long run.

Perhaps I have got more out of the work than the people themselves. It has been a humbling and learning experience for me. I can truthfully say that my life has changed because of my involvement in the villages. ■

● Prof R. Rajagopalan can be reached by email: rrgopalan2005@gmail.com. He welcomes any interested person in Japan to visit the project or work as an intern with Anawim.

International Progress in the Delineation of the Outer Limits of the Extended Continental Shelf

Shin Tani

*Cabinet Counsellor, Coordination Office for the Continental Shelf Surveys, Cabinet Secretariat, Government of Japan
(Ship & Ocean Newsletter No.157 February 20,2007)*

"Continental shelf," over which a coastal State exercises sovereign rights regarding seabed resources, may extend beyond 200 nautical miles depending on morphological and geological conditions. Countries with potential extended continental shelves are working hard toward the extension as far as possible, reflecting the significance of the seabed resources. This report overviews the current situation of some of the front-runner countries as of February 2007.

1. Provisions of the United Nations Convention on the Law of the Sea regarding the Continental Shelf

The United Nations Convention on the Law of the Sea (UNCLOS), so-called the constitution of the ocean, defines the type and extent of the littoral nations' jurisdiction over the ocean, such as territorial sea and exclusive economic zone. As for the outer limits of the continental shelf (here the words "continental shelf" are used as a legal term, which are different from the definition known in geography, morphology, or geology), they extend up to 200 nautical miles from the territorial base line, but in case the sea bottom is deemed as a natural prolongation of a landmass of a coastal state, they may extend beyond 200 nautical miles. For the outline of the conditions for the extension of the continental shelf, please refer to the article written by me, contained in No. 33 of the Ship & Ocean Newsletter (issued on December 20, 2001).

If a country submits information on the limits of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured to the Commission on the Limits of the Continental Shelf (CLCS), which was set up based on the Convention, and the country established the outer limits of its continental shelf based on the recommendations from CLCS, they shall be final and binding. The deadline of the submission is May 12, 2009 for the 129 countries including Japan (note that the number includes landlocked countries) for which the Convention entered into force before May 13, 1999. Countries for which the Convention entered into force after May 13, 1999, the deadline will be 10 years from the entry into force of the Convention for that State.

2. Status of the Submission of Information on the Establishment of the Outer Limits of Continental Shelves

The countries listed in the table have so far submitted information to CLCS, and only the Russian Federation has obtained the recommendation from CLCS. The recommendation was issued to the Russian Federation in half a year after its submission. It was just a coincidence that the Russian submission was made on the same day as the issuance of the above-mentioned newsletter No. 33. The

■ Status of the Submission of Information on the Delineation of the Outer Limits of Continental Shelves and Their Examination (As of January 2007)

Country	Date of Submission	Date of recommendation or status of examination
Russian Federation	December 20, 2001	June 28, 2002
Brazil	May 17, 2004	Under examination (final stage)
Australia	November 15, 2004	Under examination (final stage)
Ireland	May 25, 2005	Under examination (final stage)
New Zealand	April 19, 2006	has just commenced examination
France, Ireland, Spain, U.K.	May 19, 2006	has just commenced examination
Norway	November 27, 2006	has just received submission

recommendation to the Russian Federation indicated that there had not been enough data to support the Russian claim at the Arctic Ocean. It is known that the Russian Federation is performing additional surveys for re-submission. There was a difference in understanding on the rules of procedures between Russian Federation and CLCS as to whether a coastal State which had made its submission could attend the proceedings in the body at the final stage of the examination, and debate over this point has been ongoing for several years.

With regard to Brazil, which was the second country to submit information, it had been believed that the examination would have proceeded without major problem, as the drafters of the Convention stipulated relevant articles on the assumption of the sea bottom topography of the Atlantic Ocean such as offshore Brazilian coast. However, the Brazilian case revealed that even the extension at an area of the presumed sea bottom topography has debatable points on the interpretation of the Convention regarding the foot of the slope, the ridge, etc., other than the discussions regarding the treatment of notes verbal from other countries, and major modification of submitted information during the examination by CLCS. For these reasons, it is said that recommendations will be issued in March to April 2007 at the earliest.

Australia, which was the third to submit information, has established a joint team which consists of the Department of Foreign Affairs and Trade (diplomats), the Attorney-General's Department (lawyers), and Geoscience Australia (scientists) for the purpose of interpreting every word of the Convention, in some cases using authentic text of the Convention in other languages, and prepare submission documents. The information which Australia submitted is voluminous, amounting to 6,000 pages (eight copies of these

were submitted other than some 100 large charts as well as bulky hard copies of bathymetric and seismic records). It seems that there is an ongoing examination on the Australian submission regarding the foot of the continental slope, ridges, etc. Such is the case the recommendations to Australia will probably be issued no sooner than March to April 2007. While Australia submitted the information on the extension of the continental shelf off the Antarctic coast where it claims, it also submitted a note verbal requesting CLCS not to take any action on the submission with regard to its claimed Antarctic Territory. This note verbal reflects the Antarctic Treaty and its Protocol, which do not recognize territorial rights but forbid mineral resource activities for 50 years. The purpose of the submission on debatable Antarctic area at this moment is said to fulfill the deadline clause of the Convention.

The fourth country, Ireland, made a partial submission, which did not include the northern and southern areas of its continental shelves, where the northern area overlaps the potential extended continental shelves of Norway, Iceland, and the U.K., and the southern overlaps those of Spain, France, and the U.K. As the submitted area is relatively small in size, the time required to finalize the draft recommendation by the subcommission was shorter than the predecessors, and the draft was submitted to the plenary session of CLCS for its consideration in September 2006.

New Zealand, the morphology and geology of the seabed of which is as complicated as Japan, positively publicized its surveys and its interpretations of the Convention over internet in order to increase the acquaintance among international society with its unique tectonic situation. The information submitted by New Zealand was not that voluminous as Australia's, but still of a large quantity, and it is said that the warehouse of the Division for Ocean Affairs and the Law of the Sea, the U.N. Office of Legal Affairs which acts as the secretariat of CLCS, was completely filled with the submissions from these two countries alone.

The information submitted jointly by the four countries, i.e. France, Ireland, Spain, and the U.K., is in regard to the area adjacent to the Ireland's submission at its southern side. As a result of friendly cooperation among the four

countries, information has been created based on the large amount of existing data such as from IFREMER of France and on the data of a joint investigation by survey ships provided by Spain. An interesting point is that the joint submission has made it possible to claim a larger area than the sum of what the respective countries could claim individually.

Following the agreement on the maritime boundary between Norway, Iceland, and Denmark (and the Faeroe Islands) of September 20, 2006, the information on the extension of Norway's continental shelf was submitted to CLCS on November 27 of the same year.

More countries has made submissions in 2006 than ever. This trend is believed to continue in 2007, with several countries such as Mexico, the U.K., and Nigeria are rumored to submit their information to the CLCS.

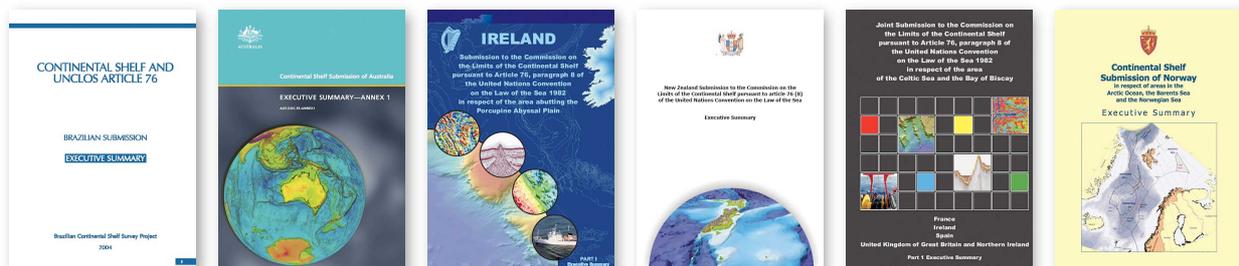
3. Conclusion

Countries with potential extended continental shelves are working hard toward the extension, reflecting the significance of the seabed resources. This holds true to Japan, as seen in the establishment of the Coordination Office for the Continental Shelf Surveys, which is the first organization to deal with ocean affairs in the Cabinet Secretariat. In its early stage of continental shelf surveys, there were media articles that there was no coordination among the relevant Ministries. However, by now, close collaboration among the ministries has been formulated towards the submission of information to CLCS by the deadline. Reflecting such successful collaboration the progress of the continental shelf surveys has been made as just planned. Although typhoons and major low pressure systems have attacked Japanese area in rapid succession in recent years, delays in surveys due to the weather have fallen within the anticipated range for the last two and half years.

To conclude this article, my message to the readers is as follows; a weather report of "A typhoon has just emerged at the far eastern offshore of the Philippines" is not the business of somebody else but our real concern, because the Japanese continental shelf surveys cover the area as well.

Japanese ocean is wide. ■

Information on the Establishment of the Outer Limits of the Continental Shelf Submitted by Respective Countries



Covers of submitted information from the left: Brazil, Australia, Ireland, New Zealand, four countries (France, Ireland, Spain and the U.K.) joint, and Norway

Bring Back the Dugongs to Yae-yama

Noriyuki Otaishi

*Professor, Laboratory of Wildlife Management, Faculty of Environment Systems, Rakuno Gakuen University
(Ship & Ocean Newsletter No.158 March 5,2007)*

At present there are still several dugongs near the Japanese island of Okinawa, but their extinction is only a matter of time. As part of its effort to make the Ryukyu Archipelago a World Heritage site, as well as to help revive the biological diversity in the sub-tropical coastal zone, there is a need to create a Dugong Revival Network stretching from the Philippines to Taiwan, the Yae-yama Islands, and Okinawa Island.

Dugongs of Southeast Asia Being Driven to Extinction

In 1998, Mie University Professor Toshio Kasuya and others announced that "a small double-digit number" of dugongs inhabit the coastal area of Okinawa Island, based on an aerial survey and feeding-sign survey in seaweed beds. Therefore, it was thought that at least 10 dugongs and maybe as many as 20-30 settled permanently near Okinawa Island. However, from the data of a subsequent survey by the Ministry of the Environment, I estimate there are at least 3 dugongs and perhaps 5-7 that make their habitat there.

The writer has been involved in dugong surveys since 2001, and the seaweed bed of the dugong habitat in the north of Okinawa Island has been steadily shrinking. While red clay from civil engineering work, etc., on land buries the seaweed bed, the turbidity of the sea obstructs the growth (photosynthesis) of seaweed. Not limited to Okinawa, for the past 6 years in our survey of dugongs, each time we felt as if we were following the process of the extinction of the dugongs.

The dugong distribution map in Fig. 1 also includes the sea area from which the dugong have become extinct in recent years. It is difficult for the dugongs around Okinawa, whose number has been reduced to but a few, to breed and maintain the herd. Although there is a seaweed bed near an isolated island on the Pacific Ocean side of Taiwan, which is thought to have been a stopping point for the dugongs during their migration between the Philippines and Okinawa,

it has been a long time since they were last seen. Near Hainan Island, there was a case of a single dugong dead from net entanglement in 2003 when we first visited the island, but no reports have been made since then. The former feeding areas of the dugongs near the island have been turned into fish farms, or the seaweed has been destroyed because of the severe contamination from waste water, to the degree that the area is even uninhabitable for fish. Even in the Philippines, there are no longer any habitation reports coming from the central area where development has advanced the most, with the result that the habitat has been divided into northern and southern parts.

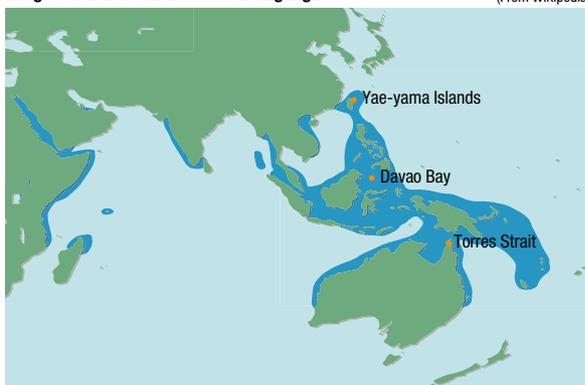
The world population of dugongs was thought to be 80,000 in the oceans around Australia and a total of 20,000 in other places. Although they are protected in Australia, the 20,000 in "other places" may have been reduced to thousands or hundreds since then.

Yae-yama Islands Used to Be the Center of the Dugong Distribution

Our dugong research group, formed by the Grants-in-Aid for Scientific Research (2002-2006) of the Ministry of Education, Culture, Sports, Science and Technology, conducted research in coordination with surveys by the Ministry of the Environment and the Fisheries Agency. The Ministry of the Environment carried out population surveys, seaweed surveys, etc., by means of an aerial census of Okinawa Island, while the Fisheries Agency developed a method to capture the dugong's "voice" and identify their positions in order to prevent their entanglement with fixed nets.

In the research supported by the Grants-in-Aid for Scientific Research, a place appropriate for the survey was found in Davao Bay in the Philippines, where the new finding that dugongs appear in feeding grounds with the lunar period and new knowledge on the amount of feeding were obtained. Since a herd of several dugongs can be observed quite close to the observation tower several times a day, arrangements to conduct eco-tours are being advanced with the local people. In the survey in the Ryukyu Archipelago, although visitation to Amami Oshima Island was confirmed in 2002, there have been no reports since then. In

■Fig. 1 "Former" Distribution of Dugongs (From Wikipedia)



■Fig. 2
Both Kamiji and Shimoji Islands of the Aragusuku Islands
Where Dugong Hunting Used to Be Practiced



places other than Okinawa Island, you only hear "They used to be here a long time ago."

The Utakis on Kamiji Island and Shimoji Island of Aragusuku (Fig. 2) house the dedicated skull bones of dugongs (Fig. 3 Left). The Utaki is a sanctuary that even the local residents are not allowed to approach except for festive occasions. They hesitate not only to touch, but also to view the dedicated bones. However, it was necessary for us to examine the dedicated bones for the protection of dugongs and the restoration of their distribution. It took us 5 years since 2002 to win the understanding and cooperation of the local people (former residents of the island). It is being revealed from an analysis of the dedicated skull bones that over 200 dugongs used to inhabit Yae-yama and that several to a dozen or so dugongs were captured every year by the residents of Aragusuku Island.

Since paddy fields are not possible on Aragusuku Island due to the lack of water, dried dugong skins (sliced and used for court cuisine) were paid to the Ryukyu Dynasty as tax. When the inhabitants of other islands captured dugongs, they were severely punished. This practice continued until close to the abolition of the poll tax in 1901. However, due to subsequent over-hunting, dugongs were rarely seen by the early Taisho era (1912-1926). Based on Okinawa Prefecture fishery data, which recorded the number of captured dugongs, it can be estimated that approxi-

mately 230 dugongs were captured from 1895 to 1913 in Yae-yama. Since the captured number in other sea areas of the Ryukyu Archipelago based on the same data was small, it is thought that Yae-yama used to be the center of dugong distribution in Okinawa. Seaweed beds remained in various places in Yae-yama, and the poaching of dugongs, whose population had been poised to recover during the war, continued in the period of postwar food scarcity.

Revival of Dugongs for the World Natural Heritage Site "Sea Area Management Plan"

It can be said that the Ryukyu Dynasty protected and managed the dugong population in Yae-yama by limiting the annual number of catches to a certain level. It is the same as the modern method of controlling grazers, such as deer. If they increase too much, their feeding area shrinks, reducing their population, and so culling is a wise method of resource management. On the islands of the Torres Strait (Fig. 1) where the Aborigines live, dugong hunting is still practiced and approximately 1,000 of the 20,000 that make their habitat there are captured every year. The Shiretoko World Natural Heritage Scientific Committee is currently preparing a "Multi-Utilization Type Comprehensive Sea Area Management Plan" for Japan's first natural heritage site to include a sea area, where as Professor Yasunori Sakurai of Hokkaido University remarked in a previous issue of this newsletter (No. 141), a basic principle is marine resource management by fishery operators specific to our country.

The next candidate for a World Natural Heritage site after the Ogasawara Islands is the Ryukyu Archipelago. Japan possesses an exclusive economic zone (EEZ) which boasts of the world's highest productivity, has a large amount of resources, and is rich in biodiversity. It is hoped that in the quest for the World Heritage listing an advanced example of sea area conservation can be created of which the world can be proud.

In order to make the Ryukyu Archipelago a World Heritage site, it is necessary to conserve its sub-tropical coastal zone ecosystem and maintain its biodiversity. The survival of the dugong is an indispensable component in this. It is hoped that a Dugong Revival Network stretching from the Philippines to Taiwan, Yae-yama, and Okinawa Island can be created in cooperation with the Philippines and Taiwan. ■



■Fig. 3
Dugong skull bones (left) dedicated on the stone bond of Aragusuku Shimoji Island (Shichi-Mon Utaki) and part of the reassembly work (right) identifying them

Japan! The Time for Action Is Now—Demonstrating Japanese Initiative in Tuna Resource Management

Yuichiro Harada

Managing Director, Organization for the Promotion of Responsible Tuna Fisheries (OPRT)
(Ship & Ocean Newsletter No.162 May 5,2007)

A meeting to bring together all the Tuna Regional Fisheries Management Organizations (RFMOs) in the world for the first time was held in Kobe in January 2007 and adopted a Course of Action for the resource management of tuna stocks. Japan, which has heretofore played a leading role in resolving many issues concerning the conservation and management of tuna resources, should continue to serve as a driving force in the implementation of this Course of Action.

1. Tuna Fisheries Management Organizations: First Joint Meeting

A meeting to bring together all the Tuna Regional Fisheries Management Organizations (RFMOs) in the world for the first time was held on the subject of resource management of the highly migratory tuna from January 22 to 26 this year in Kobe, hosted by the Japanese Government. The meeting included participants from 54 member countries of 5 tuna RFMOs, which have been set up in ocean areas such as the Pacific Ocean, the Atlantic Ocean, and the Indian Ocean, as well as representatives of the Secretariats of the 5 tuna RFMOs, 7 intergovernmental organizations such as the Organization for Economic Cooperation and Development (OECD) and the International Union for Conservation of Nature (IUCN) and NGOs.

2. Objectives of the Meeting

The Japanese Government (Fisheries Agency) has made the announcement: "While tuna resources are being exposed to maximum and even excessive catches in some species in the world despite the efforts of each RFMO for resource management, the demand for tuna continues to increase in many countries. Concerning problems such as the excessive number of fishing boats and illegal, unreported, and unregulated (IUU) fishing, the need has arisen to cope globally, beyond region-specific responses. This meeting will discuss various problems facing each RFMO and will work on concerted responses."

3. Results of the Meeting: "Adoption of the Course of Action" and Its Significance

Everyday saw heated debates and 14 tasks were specified for RFMOs to tackle in concert and, based on these, a "Course of Action" was adopted, demonstrating to the international community the determination with which each RFMO and its member countries are tackling the tasks in a coordinated manner. More specifically, the "Course of Action" states at the outset that "the assembled members of the RFMOs, recognizing the critical need to arrest further stock decline in the case of depleted stocks, maintain, and rebuild tuna stocks to sustainable levels, and deal effectively with overfishing, overcapacity, and IUU fishing

activities, jointly commit to take urgent action," and clearly lays out the schedule to review the status of the implementation of the Course of Action at the next meeting in February 2009 (planned). If in the near future the efforts of RFMOs do not show any progress or are unable to restrain the overexploitation of tuna resources, it is inevitable that the international community will doubt RFMOs' capability to manage tuna resources.

International environmental organizations have already been very critical on the published "Course of Action," that it is a "Course without Substance." If they conclude that RFMOs are incompetent, they can be expected to bring the issue to the United Nations. Like the case in which high sea drift-net fishing was banned internationally (it is still banned) by a U.N. resolution, if an international organization like the U.N., where there are many countries without sufficient expertise or experience with marine resources, fisheries, etc., is to decide measures for the management of tuna resources by majority vote without fully examining the scientific or rational basis, irrational fishery regulations (a blanket ban on fishing, etc.) may be introduced. That is, the principle of sustainable exploitation of marine resources may be undermined. To prevent such a situation, or worse, RFMOs are called on to act with member countries as specialist organizations on the management of tuna resources so that the Course of Action adopted this time is not in vain.



Joint meeting of Tuna Regional Fisheries Management Organizations (RFMOs) held from January 22 to 26, 2007 in Kobe

4. Putting the Measures for Tuna Resource Management into Effect Is No Easy Task

The measures for resource management of the highly migratory tuna will finally become effective only when all the relevant countries share the pain of the regulation that is produced by the resource management measures decided by RFMOs. However, what is actually going on? Here is a recent example.

For the purpose of bringing about the recovery of bluefin tuna resources in the East Atlantic Ocean, it was agreed last year that the total allowable catch be reduced by 20% over 4 years. To implement this agreement, a consultation among relevant governments to determine the reduction of the allowable catch to be distributed to each country was held in January 2007 in Tokyo. Although the distribution quota was determined at last after long hours of deliberation, two countries, Libya and Turkey did not agree, expressing their dissatisfaction with the decision. If both countries may present the objection according to the rule, they can operate without being bound by the allowable catch. If the situation is left unattended, the determined total allowable catch will not be respected and the resource recovery plan will suffer a setback. The RFMO (the International Commission for the Conservation of Atlantic Tunas in this case) is already facing a concrete challenge against the Course of Action adopted in Kobe.

5. The Role That Japan Can Play

It is important in this context that Japan, which has played a leading role in resolving many issues concerning conservation and management of tuna resources, act as a driving force in the implementation of the "Course of Action" adopted in the joint RFMO meeting. If one example in which Japan played a leading role is to be given, it is promoting the "introduction of the measures to eliminate IUU tuna long-liners." More specifically, aiming at the elimination of IUU large tuna long-liners, which used to operate by neglecting the resource management measures decided by RFMOs (as of 1998, there were approx. 250 vessels in the world and Japan used to import all its catches by these vessels), the Japanese Government gained an understanding of the actual conditions by the analysis of import data. It proposed measures to each RFMO to eliminate IUU fishing activities by excluding their catches from the market, and strenuously negotiated with relevant countries. As a result, the positive list system (a system to register legitimately managed fishing boats with RFMOs) was introduced to each RFMO, and, currently, IUU activities by large tuna long-liners are close to being eliminated. In han-

dling this issue, the Japanese tuna fishing industry set up the Organization for the Promotion of Responsible Tuna Fisheries (OPRT) in 2000 and undertakes the project of scrapping IUU tuna long-liners. Also, under OPRT, a mechanism to keep the number of the world's large tuna long-liners from increasing has been created and measures to restrict their fishing capacity are being implemented.

Japan, which imports most of the farmed bluefin tunas in the Mediterranean including those from Libya and Turkey, holds the key to resolve the issue of bluefin tuna resources in the East Atlantic Ocean. The tuna farming fishery in the world has actually developed quickly because of the sashimi tuna market in Japan. If Japan, which is criticized as the main cause of the overexploitation of resources, continues to import farmed bluefin tunas that have been caught over the allowable catch, it will be open to the charge of being irresponsible, and the efforts in hosting the RFMO joint meeting in Kobe will have gone for naught. In the light of Japan's Tuna Law (official name: Law of Special Measures for Strengthening Conservation and Management of Tuna Resources), which clarifies the promotion of international cooperation as one of the means of preserving and managing tuna resources, Japan is called on to play a leading role in this issue and demonstrate the resource management capability of RFMOs. ■

● Organization for the Promotion of Responsible Tuna Fisheries(OPRT), refer to <http://www.oprt.or.jp>

Thinking About the Basic Ocean Law

Enactment of the Basic Ocean Law and its Significance

Tadao Kuribayashi

*Professor Emeritus, Keio University; Co-Chairman, Basic Ocean Law Study Group
(Ship & Ocean Newsletter No.163 May 20,2007)*

A long-awaited Basic Ocean Law has finally been enacted in Japan, which heretofore had set and implemented its ocean policies based on an administrative organization characterized by a vertically divided separation of functions. The Basic Ocean Law will for the first time make clear a basic philosophy and specific measures for a national ocean policy, helping to re-define Japan as a maritime state. It will also establish a new administrative section responsible for comprehensive planning and implementation. How this new Basic Ocean Law regime will fare depends not only on political leadership, but the active involvement of government, industry, academia, and citizens from all walks of life.

Japan's Long Awaited "Basic Ocean Law"

The "Bill for the Basic Ocean Law" was adopted in the Diet after going through the House of Representatives on April 3, 2007 and the House of Councilors on April 20. It is expected to take effect in July, on Marine Day. The fact that the enactment of this law by lawmaker-initiated legislation was based on the approval by an overwhelming majority of almost all parties has also marked a good start. I would like to express my heartfelt respect for everyone involved who worked towards enactment of this very important law.

The enactment of a Basic Ocean Law was talked about rather enthusiastically for a period of time in the 1960s and 1970s. After a blank period, various proposals on an ocean policy began again to be made from the beginning of this century. A major step towards the enactment of the current Basic Law was triggered by the publication of "The Oceans and Japan-Proposal for a 21st Century Ocean Policy," prepared and published in 2005 by the Ship & Ocean Foundation (commonly known as the "Ocean Policy Research Foundation (OPRF)). It was submitted by the chairman of the Nippon Foundation and others to (then) Chief Cabinet Secretary Abe the following year, in February 2006, accompanied by the request that it be considered by all the political parties. In political circles at that time, discussions on and interest in an ocean policy were increasing, and so it was decided that a nonpartisan "Basic Ocean Law Study Group" (chaired by Shigeru Ishiba) would be set up in April by the Liberal Democratic Party, the Komeito Party, and the Democratic Party. The study group had 10 meetings with the participation of a number of people with ties to the ocean in Japan, such as bureau chiefs and division chiefs who participated as observers from 10 related Ministries and Agencies in addition to volunteers from among lawmakers, academic experts, and industry representatives. They reached an agreement in the last meeting, in December 2006, on the "Guideline for Ocean Policy" and the "Outline for a Basic Ocean Law." Unlike other cases of lawmaker-initiated legislation, it was quite a unique

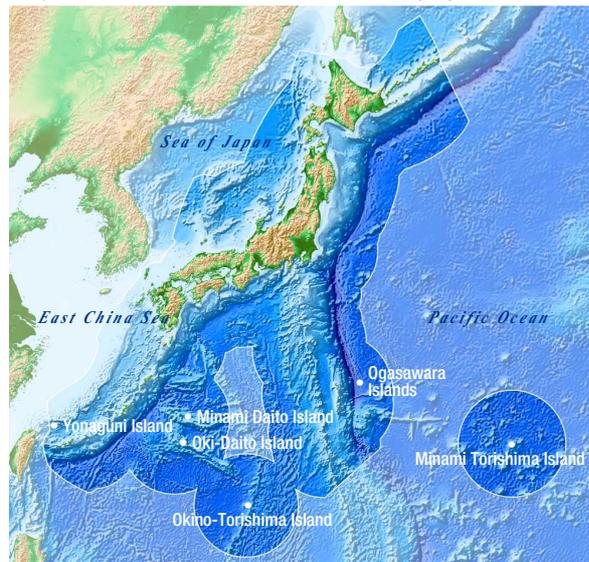
process in which the views and initiatives of a number of ocean stakeholders, including ministries, business, academia, and politicians, were reviewed at the preparatory stage, with the results being reflected in the legislative work of the lawmakers.

When the Bill for the Basic Ocean Law was submitted to the Diet, some newspapers reported it as if disputes with neighboring countries over marine rights were the reason for submission of the bill. It might be true that there was such a perception in some political circles. Moreover, it may not be totally unrelated, as the "Bill on the Establishment of a Safety Zone with regard to Maritime Platforms," which aimed at securing the safety of gas field development in Japan's exclusive economic zone (EEZ) in the East China Sea, was adopted in the Diet simultaneously with the Bill for the Basic Ocean Law. However, whatever background or situation there was, the Basic Ocean Law is not limited to the issue of particular marine rights, but is a comprehensive and fundamental Law for Japan to promote comprehensive and systematic policies on broad and various issues, such as resources, the environment, traffic, security, industry, and education on today's ocean.

Six Basic Principles, 12 Basic Measures and the Establishment of the Headquarters for Comprehensive Ocean Policy

The contents of the Basic Ocean Law define the basic principles of Japan on the ocean, clarify the responsibilities of the national government, local governments, business operators, and citizens, specify the basic items concerning measures on the ocean, and stipulate the establishment of the Headquarters for Comprehensive Ocean Policy for the purpose of promoting these measures in a comprehensive and systematic manner, aiming at realizing a new ocean-oriented nation. Especially significant among these is the stipulation in the statutory form of six basic principles of "harmonization of the development and use of the oceans with the conservation of the marine environment," "securing the safety and security on the oceans," "improvement of

■Japan's 200-Nautical Mile Exclusive Economic Zone (EEZ)



Bathymetric chart provided by Japan Hydrographic Association

scientific knowledge of the oceans," "sound development of ocean industries," "comprehensive governance of the oceans," and "international partnership with regard to the oceans." The fundamental posture of Japan, to contribute to the coexistence of the ocean and mankind, and survive along with the ocean, has here been clearly set forth for the first time. Foreign countries will also take notice of this Law. Hereafter, Japan will take responsibility to formulate and implement measures on the ocean in a comprehensive and systematic manner in accordance with these basic principles, and the government must stipulate a Basic Plan for the Ocean in order to promote them.

Due to limited space, I would like to emphasize only the "comprehensive governance of the oceans" from among the basic principles. We have now entered an age in which we must not only develop and utilize the ocean, but properly "govern" it, and that governance must be executed in a comprehensive manner. The actual content and range of comprehensive governance may differ depending on the issues and fields, but if this fundamental viewpoint is lost, we will not be able to keep up with the current status of quickly developing ocean issues, nor will we be able to overcome the harmful effects of the existing domestic administrative organization characterized by its vertically divided separation of functions.

Furthermore, also of great significance is the fact that the 12 basic measures to be implemented in a concrete manner were put into statutory form as the basis of the formulation of the Basic Plan and the goals for the measures have been generally agreed upon. These are promotion of development and use of ocean resources, conservation of the marine environment, promotion of development of the

exclusive economic zone and other areas, securing maritime transport, securing the safety and security of the oceans, promotion of ocean surveys, promotion of research and development of ocean science and technology, promotion of ocean industries and strengthening international competitiveness, integrated management of the coastal zone, conservation of remote islands, securing international coordination and promotion of international cooperation, enhancement of citizen's understanding of the oceans. The outlines of the basic measures for each item are incorporated into the Basic Law.

As to a new administrative organization to comprehensively promote Ocean Policy, there were two leading alternatives, one for setting up a comprehensive ocean policy council in the Cabinet Office, like the Council on Economic and Fiscal Policy, and one for setting up a headquarters for comprehensive ocean policy in the Cabinet Secretariat. The latter was adopted in the end, and it was decided that two Vice Director-Generals (the Chief Cabinet Secretary and a newly created Minister for Ocean Policy) would be placed under the Director-General of the Headquarters for Comprehensive Ocean Policy (Prime Minister), with all other Ministers of State allotted as members of the headquarters. While the reason given for this arrangement is that, while, for now, the Cabinet Secretariat will be in charge in order to powerfully promote measures in a focused and comprehensive manner, the supplementary provisions prescribe that the form of the organization shall be reviewed approximately five years after the enforcement of the law. In addition, a supplementary resolution prescribes that a council of experts from a broad range of ocean related fields be set up in the Headquarters for Comprehensive Ocean Policy and that their opinions be reflected therein. This is a sensible idea and there is no need to dwell on the significance and importance of such a council.

Hoisting Sail to Become a New Ocean-oriented Nation

The enactment of the Basic Ocean Law is an epoch-making new page in the history of the ocean policy of Japan. However, it is only the first step toward Japan becoming a new ocean-oriented nation. In view of vigorously promoting the planning and execution of a comprehensive ocean policy inside and outside of the country, the question is how effectively the new system based on the Basic Ocean Law will function and how many achievements it can attain. While political leadership is expected, I think it is important for people from the private sector, such as industry, research institutions, and the educational community, to exert a positive influence, to say nothing of the specialist and practical initiatives by administrative organs. ■

Naming Seabed Topography

Tamaki Ura

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(Ship & Ocean Newsletter No.166 July 5,2007)

A pass originally referred to the saddle shaped area through which humans can traverse mountainous areas, and until recently no areas were so designated on the sea floor. However, with today's use of autonomous underwater vehicles (AUV), not only have ocean passes come into being, but a wide variety of underwater regions have been given names. The use of detailed place names makes planning the complicated routes that underwater robots will travel again and again much easier. This article introduces some of the place names we have assigned to distinctive seabed areas.

Why Does the Seabed Need Names?

If we look at a bathymetric chart, we find that large seascape features have names such as Monowai seamount or Congo submarine valley. However, there are hardly any descriptions for smaller terrain features. This is because even if names were given to them, no one would use them, so there is no point in doing so. However, small features in shallower waters have begun to be named. If each boulder and valley is named when scuba divers go underwater, it will be easier to understand when diving there again, and it will be easier for the guide to explain to those diving with him. "Masuda Rock" or "Standing Column of Kuba" in the Kerama Islands are some examples.

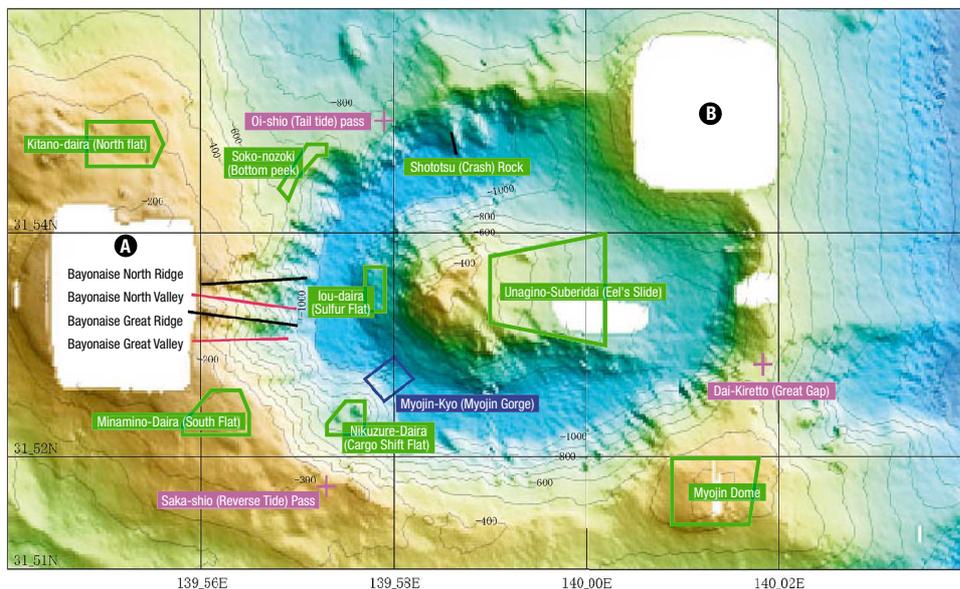
We develop autonomous underwater vehicles (vehicles automatically swimming around under the sea, referred to as AUVs), and put them into the deep sea as part of our research. An AUV travels the same routes many times under the sea. When planning a route, it is typical to plan in such a way that the AUV weaves its way through smaller terrain features. In that case, if the small features were to have names rather than just the whole area of the underwater cruise, it would be easier to understand and communi-

cate when people examine the behavior of the AUV together.

Any approach to deep-sea study has so far been limited to manned submersibles or ROVs (remotely operated vehicles with cables), but they do not explore a large area, and in many cases they do not go underwater very often. Therefore, it seems sufficient for only certain target points to have names. However, since an AUV can frequently enter any sea area and travel long distances, the situation is different. I would like to give names to every peak and valley in advance.

Beware of Strong Tides in the Saka-shio (Reverse Tide) Pass of Myojin Reef

Our state-of-the-art AUV "r2D4" dived underwater in the Myojin reef caldera six times during August 2005, and was scheduled to go underwater again in March 2008. The only place to have a name in the Myojin reef is the central volcanic cone called the Takane Reef. This is not sufficient to convey the course that the AUV will follow. Therefore, I have taken the liberty of giving names to distinguishing places in the caldera and in the inside of it, as shown in Fig. 1.



■Fig. 1
Names in the Myojin reef caldera. Depth data was obtained by a multi-narrow beam sonar of the research ship "Kairei" (JAMSTEC) during its KR05-11 cruise. There are the Bayonaise rocks in Blank A to the west of the caldera, while a volcano that erupted in 1952 is located in Blank B to the northeast.

As the naming of a topographical feature is a reflection of one's taste and culture, it calls for considerable thought. Figure 1 shows the results of linking the terrain with events the AUV carried out.

On August 19, the AUV began its cruise under the sea from the Kitano-daira (North flat), went down to the Soko-nozoki (Bottom peek), advanced southward in the caldera, went over the Bayonaise north ridge, Bayonaise north valley, Bayonaise great ridge, and Bayonaise great valley, made a U turn short of the Nikuzure-daira (Cargo shift flat), went back and forth twice within the caldera, made a vertical descent in Iou-daira (Sulfur flat), approached the bottom, and made a quick turn right short of the Oishio (Tail tide) pass. However, since the course deviated a little to the north, it had a minor collision with the precipitous Shototsu (Crash) rock.

On August 20, the dive course began from the Minamino-daira (South flat) and approached the Saka-shio (Reverse tide) pass at a depth of 300 m. From here, it was scheduled to pass through the Nikuzure-daira (Cargo shift flat) and conduct a survey on the Myojin-kyo (Myojin gorge), but there was a strong southward tide on the pass, and after 30 minutes of struggle, the robot made the judgment that it was too difficult to advance, and so it abandoned the remaining course and came home.

Passing through East Brigitte Protrusion and West Hills in the South Indian Ocean

In December 2006, "r2D4" went out on Segment 15 of the central ocean ridge in the South Indian Ocean. The detailed terrain was measured in advance by the multi-narrow beam echo sounder of the Hakuho-maru. The under sea cruise was performed around the perimeter of the Roger plateau (our naming) in the central part of the segment where hydrothermal activities were expected. The terrain in this area is quite complicated, and various cruise patterns were attempted in order to improve the AUV's performance. The cruise members named the feature, shown in Fig. 2, after a film actress who was the topic of conversa-

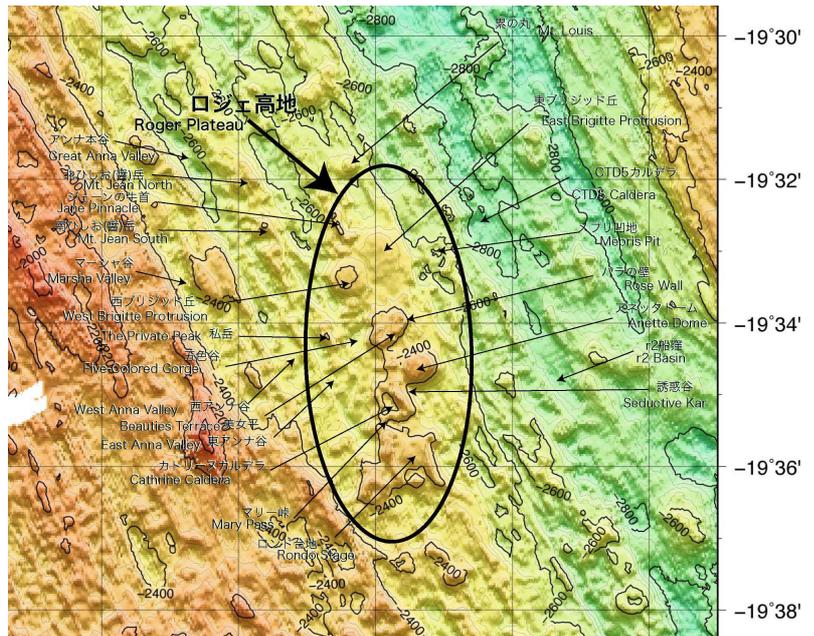


Fig. 2 Names of the Roger plateau
Depth data was obtained by a multi-narrow beam sonar during the KH06-4 cruise of "Hakuho-maru" (JAMSTEC).

tion during lunchtime.

The plan of the 30th cruise under the sea is as follows: Go via Jane's Pinnacle, which has a depth of 2,500 m, conduct a side scan measurement between East and West Brigitte protrusions, reach Beauties terrace, progress west from there, going back and forth three times while gradually going south between the Private Peak, conduct a water observation and side scan measurement in Five Colored gorge, then go south across the center of the Anette dome, and make a quick dive into Seductive Kar. In the 29th cruise under the sea, observations were performed from the Mary Pass to r2 basin. A time limit was also imposed. The robot surfaced on the northern side without going to the Cathrine caldera or to the Rondo stage at the southernmost end of the Roger plateau. Actually, "r2D4" had a collision, being unable to avoid the precipitous Rose wall to the east of the Beauties terrace, and came up without advancing further. In the 31st cruise under the sea on the next day, the robot dived along the Anna valley in the West.

So far, no area on the seabed has been named a mountain pass. A mountain pass is a low point typically in the shape of a saddle between two mountains that people use to pass through to the other side, and a mountain pass under the sea was a nominal designation useful only for military submarines. However, in the present age when AUVs are playing a more active role, for the first time there is a need to call these underwater geological formations mountain passes.

Think up names for these small features on the seabed and let's have our AUVs cruise there!

The state-of-the-art AUV "r2D4", was completed in 2003. It has dived underwater in a number of locations, including dives off of Sado, the Kuro-shima sea knoll, the Rota underwater volcano, the Myojin reef, the central Indian mid-ocean ridge system.



Adaptive Management of Fishery Resources

Toshio Katsukawa

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(Ship & Ocean Newsletter No.170 September 5,2007)

As our knowledge of ocean ecosystems is a fragmentary one, there is a need to develop management policies to reduce risks from indiscriminate fishing based on uncertain data. In recent years, "adaptive management" has received much attention as a robust means for dealing with this uncertainty. Appropriate introduction of a framework for adaptive management would undoubtedly make a large contribution to the sustainable use of fishery resources. Along with defining adaptive management, this paper will examine its possibilities as well as its limits.

Uncertainty in Fishery Resources Management

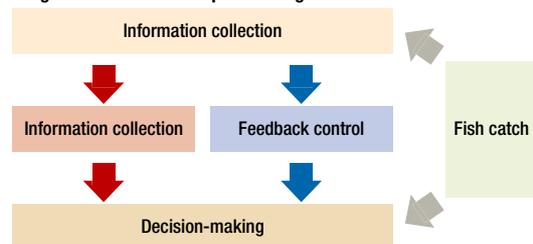
Fishery resources have always played an important role as a food source for human beings. Fish and shellfish make up no less than 15% of the supply of animal protein in the world and approximately 40% in Japan. Fishery resources are a part of the natural ecosystem. If the productive capacity of nature is maintained, resources can be utilized in a sustainable way. If, on the other hand, the resources fall into a state of overexploitation, the productive capacity is severely hindered. The amount of fishery output in the world has been leveling off slightly since the 1990s, and the fall of biological productivity due to overexploitation and environmental destruction is posing a serious problem. According to the FAO (2002), 47% of the resources in the world are caught to the limit of productive capacity and 18% are already in a state of overexploitation.

One of the factors which make the sustainable utilization of fishery resources difficult is uncertainty. Our knowledge of marine ecosystems is fragmentary, with even the life history of the popular fish that are set on kitchen tables every day being not understood satisfactorily. In the present circumstances, it is not easy to judge whether a given resource is being overexploited or not. Previously, it was common not to regulate fishing unless overexploitation was obvious. However, since it is too late in many cases once overexploitation becomes clear, preventive measures have been called for in recent years. In the Rio de Janeiro Declaration of 1992 and the FAO's code of conduct for responsible fishery issued in 1995, it is clearly written: "Conservation and management efforts shall not be postponed due to a lack of scientific information." If repeated experiments could be performed as in medical or pharmaceutical science, we could wait until uncertainty is eliminated. However, the ecosystem is a complex system on which repeated experiments cannot be conducted, rendering it impossible to eliminate uncertainty. In fishery resource management, it is necessary to avoid overexploitation risk using only our present imperfect information.

What Is Adaptive Management?

As a method to manage biological resources that is

■Fig. 1 Framework of Adaptive Management



robust with regard to uncertainty, adaptive management is drawing increasing attention around the world. The importance of adaptive management is emphasized in Japan as well, in the National Strategy for the Conservation and Sustainable Use of Biological Diversity (2002 Version)¹⁾ and in the Report on the "21st Century Wanokuni Zukuri Conference"²⁾, etc. While adaptive management is used in many fields of wildlife management, it was originally a theory devised for the management of fishery resources³⁾. Carl Walters (Univ. of British Columbia, Canada), founder of adaptive management, classifies the contents of adaptive management into two parts: adaptive learning and feedback control.

(1) Adaptive learning

It is unknowable how much fish catch pressure a species can bear unless it is actually caught. Therefore, it is necessary to collect information by conducting fish takes in an experiment manner. Learning for management by practice in this way is called adaptive learning.

Most of our knowledge on the marine ecosystem has been obtained via the fishing industry. With regard to the types of fish that are normally caught, various kinds of information, such as distribution, growth, maturation, feeding habits, and standing stock can be obtained, while only names are known about many types of fish that are not normally sought. Fishing is the most important means for obtaining information on marine life. If fishing is stopped for reasons of uncertainty, information will no longer be available. Slapping a ban on fishing may close the path to sustainable utilization.

(2) Feedback control

The concept of feedback control may be more easily

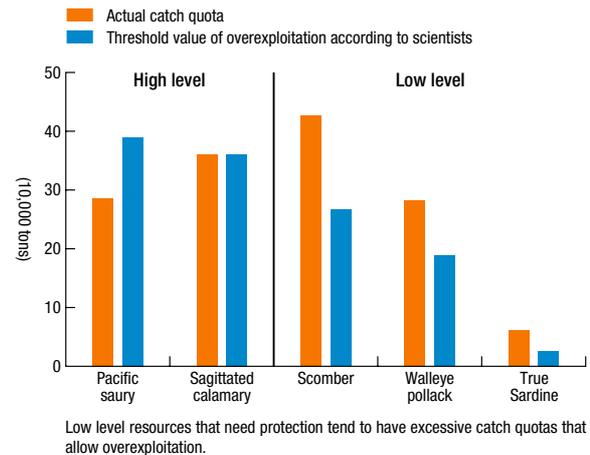
understood if we use the example of an air conditioner. It is possible to control temperature by controlling an air conditioner, so that the temperature sensed by the sensor is brought to the target temperature. In fishery resource management, it is common to decide a target resource quantity and to adjust the fish catch in such a way that the difference between the standing resource quantity and the target resource quantity is small. The idea of feedback control has been applied to the management of Yezo deer in Hokkaido among other places.

Towards the Introduction of Adaptive Management

In other countries, adaptive management is spreading gradually. It is known that the eggs of True Sardines in the ocean near the U.S. have a better chance of survival as the water temperature increases. To adaptively cope with the change of water temperature, for which it is difficult to make long term predictions, the U.S. adjusts the catch quota of True Sardines every year using the average water temperature for the previous three years. Also, regarding the management of True Sardines in South Africa, the catch quota for the period beginning in January of the following year is determined on the basis of a test in December, and the catch quota is adjusted for the period beginning in June based on an investigation in May. By the frequent renewal of catch quota with short time lags, they are coping with the changes of True Sardines that are difficult to predict. The introduction of adaptive management is rather late in Japan.

The current resources management of Japan relies heavily on fishery statistics. Inasmuch as fishery is an economic activity, data tend to be slanted a great deal in temporal and spatial terms. It may be necessary to utilize the information from test operations or the physical environment that are independent of fisheries to correct data biases. Moreover, the time lag in feedback is also a serious problem. Current resource management in Japan decides the catch quota for the next year on the basis of the fish catch statistics of the previous year. A time lag of two years arises between the time the depletion of resources is revealed and the time the brake is actually applied to the fish catch. If measures are discussed only after fish have decreased in number, discussions will only become confused, making it less likely that a consensus will be reached. As a result, the current situation is that the low level resources which need protection

■ Fig. 2 Catch Quota in 2004 and the Threshold Value of Overexploitation According to Scientists



such as True Sardine and Walleye Pollack are given quotas that greatly exceed recommendations by scientists.

Does Adaptive Management Promise Success?

Since there are many failures that can be avoided by adaptive management, the significance of correctly introducing the framework of adaptive management is great. However, it is also true that there are many problems which cannot be addressed by adaptive management.

Parma (1998) criticizes the current boom in adaptive management in a review of adaptive management as follows: "Adaptive management is a buzzword with an ambiguous definition and is confused with a stopgap improvisation ('Act first, worry about science later'). In many cases, the phrase 'adaptive management' is used merely to justify actions the validity of which cannot be examined scientifically." Also, in Japan, there are a number of examples which mistake "adaptive management" for "improvisation."

Although many fishery resources have collapsed thus far, there are many cases where the causes cannot even be specified. Various hypotheses are advanced, such as fish catch pressure, environmental changes, environmental destruction, and the increase of competing species. The hypotheses are too numerous to verify, however, resulting in equivocal conclusions. If the causes cannot be specified, measures cannot be elaborated upon either. We have not learned very much from the extreme phenomenon of resource collapse. We should not overestimate our capacity to learn. ■

1) National Strategy for the Conservation and Sustainable Use of Biological Diversity (2002 Version): Adopted in a meeting of cabinet ministers concerned with conservation of the global environment on March 27, 2002, based on Article 6 of the Convention on Biological Diversity. Refer to: <http://www.biodic.go.jp/cbd/outline/outline.pdf>.

2) Report on the "21st Century Wanokuni Zukuri Conference": The decision to hold a debriefing was made on February 16, 2001 with the approval of the Prime Minister. To make efforts to turn towards a society "which would be sustainable and simple and would place importance on quality" and to realize a "Wanokuni" Japan that would live in harmony with the earth, deliberations were made on the basic position and measures for realization. Refer to: http://www.kantei.go.jp/jp/singi/wanokuni/010710/the_report.html.

3) Carl Walters, "Adaptive Management of Renewable Resources," 1986. <http://www.fisheries.ubc.ca/publications/books/>