CIC NEWSLETTER

NO.4 2003

Center for International Cooperation

Ocean Research Institute

The University of Tokyo

New Years Greeting: From the Nobel Prize to a Field Guide

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As the new director of the Center for International Cooperation (CIC) at the Ocean Research Institute, I am reflecting on this past year of 2002 and how it was gratifying for Japanese scientists because we were excited to hear about the double honors of Nobel Prizes awarded to Dr. Koshiba in physics and Dr. Tanaka in chemistry. That news will encourage young scientists to pursue their aspirations for big discoveries as well as provide an awareness that science in Japan is reaching the highest level of world standards. Although there is no Nobel Prize for marine science achievements, I hope marine science will make great progress in 2003 and help to open a new era of understanding and awareness of the ocean, which is so important to all of humanity.

In the information age, science in general has shown an increase in international cooperation and competition. Marine science is one of the sciences that especially requires global cooperation to be a top priority, because this field of science is based on the ocean, which is the one medium that unites all the various countries and regions of the world. The Ocean Research Institute is the only university institution in Japan that conducts multidisciplinary marine science covering a wide range of various fields. We are striving to be a Center of Excellence that is one of the world leaders in marine science. In this context, our CIC is responsible for playing an important role as an interface between Asian and western countries by facilitating networking among scientists and organizing international cooperative studies.

I have been involved in the activities of CIC as a subcoordinator of Indonesian collaborative research for the Core University Program of the Japan Society for Promotion of Science since 1994. As a scientist as well as a project leader, I participated in a cooperative research project called the Lombok Project, which studied the marine biodiversity of Indonesian waters. The most significant achievement of the project was to publish the bilingual Lombok Field Guide in both English and Indonesian language. This guidebook was widely distributed to the libraries of universities and marine science and fisheries institutions, and scientists in South East Asian countries, and so it has been functioning effectively as an introduction to marine science for young people, as well as a useful guide during scientific surveys of coastal marine organisms. This field guide may be a small steppingstone, but all of us that contributed to this international cooperative project are proud of its usefulness, which includes both beautiful color photos and line drawings, and see it as a big prize in the field of marine science. Although it is of course impossible to cover all aspects of international cooperation in marine science worldwide with the limited resources of the CIC, we will continue to actively promote global information exchange and cooperative research projects, and to make important steps forward like the publication of the Lombok field guide.

Water Circulation and the Process of Material Transport in the Coastal Area and Marginal Seas of the East and Southeast Asia

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Japan Society for the Promotion of Sciences (JSPS) Multilateral Cooperative Research Program - Coastal Oceanography- has started in 2001 and will continue until 2010 under the participation of scientists from Japan, Indonesia, Thailand, Malaysia, Philippines and Vietnam. This program consists of four projects and the title of the first project is "Water circulation and the process of material transport in the coastal area and marginal seas of the East and Southeast Asia" whose principal investigators are T.Yanagi from Kyushu University, Japan and M.Ibrahim from UTM, Malaysia (Fig.1).

The aims of this project 1 are 1) to establish the analysis method of satellite images (NOAA and SeaWiFS) in the Southeast and East Asia, 2) to develop a numerical hydrodynamic model applicable to the Southeast and East Asia and 3) to develop a numerical ecosystem model applicable to the Southeast and East Asia for the successful coastal zone management there.

The first workshop of this project 1 was held on 11 January 2002 at the Research Institute for Applied Mechanics (RIAM), Kyushu University. 19 Japanese and 11 foreign scientists attended this workshop and 13 oral topics were presented. After the presentations and general discussions, the following conclusion was obtained. The research fields for this project 1 are decided to be Manila Bay, Gulf of Tongking, Gulf of Thailand, Malaysia coastal sea, Indonesia coastal sea and the South China Sea. For these research fields we will develop the analysis methd of satellite images and numerical models by the close cooperation of participants.

The second workshop was held in January 2003 at RIAM, Kyushu University.

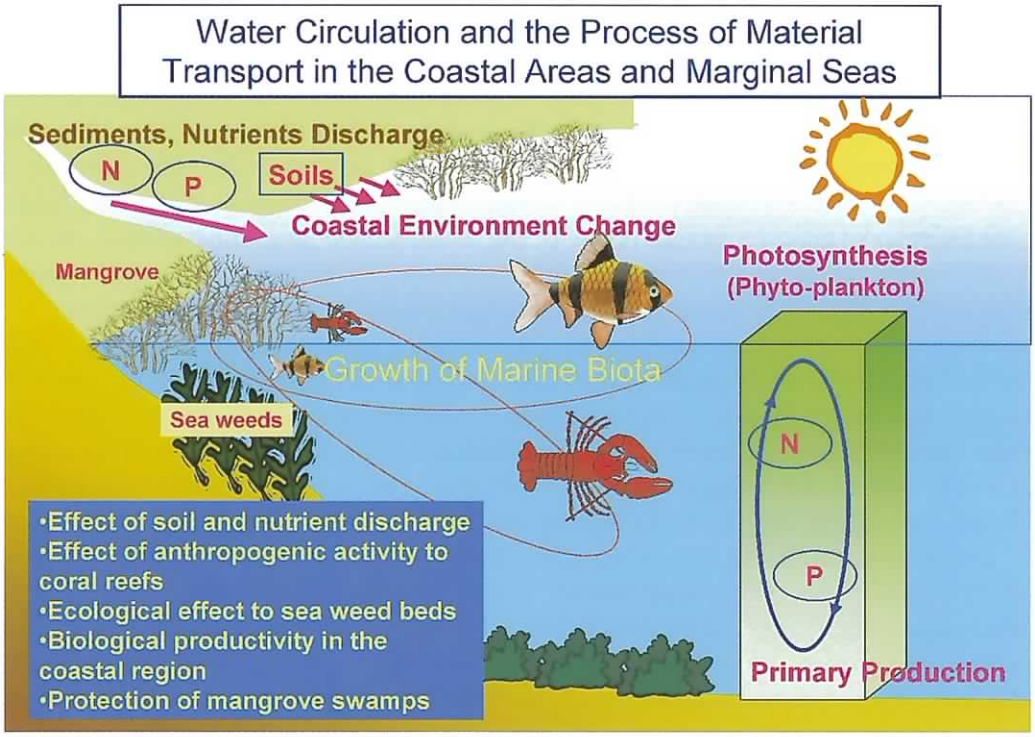

Fig.1 Water circulation and the process of material transport in the coastal area and marginal seas of the East and Southeast Asia.

First Joint Scientific Seminar with Pukyon National University

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Based on the bilateral agreement between Ocean Research Institute of the University of Tokyo and Pukyon National University of Republic of Korea on marine researches, the first joint scientific seminar was held at ORI on August 26-27, 2002. Ten marine scientists from Korean side participated in the seminar and about 20 from Japanese side.

There were 16 presentations on marine sciences including physical, chemical, biological oceanography as well as fisheries sciences. The issues discussed during the seminar were mainly for those in the seas of East Asian regions. They also discussed wide range of issues regarding marine environmental protection from the viewpoint of scientific aspects.

It was concluded in the general discussion among participants that basic information on research activities in the field of marine sciences in both sides was well exchanged through presentations and discussion, and that this kind of meeting be continued not only to further understand mutually with regard to marine sciences but also to promote bilateral collaborative studies. And it was agreed that the next session of this joint seminar will be organized by Pukyon University in the next 2 years.

The titles of presentations in the seminar :

- Coastal upwelling observations off the southeast coast of Korea
- Observation of the intermediate circulation in the Japan Sea by ALACE floats
- Tidal pumping of submarine groundwater into the coastal ocean: environmental and ecological significance
- Trace metals in the Japan Sea
- High resolution profile and physical property of gassy sediment in the southeastern shelf of Korea
- Methane hydrate around Japan
- Distribution of phytoplankton pigments in the Korea Strait
- Pelagic chaetognaths in the Japan Sea
- Upwelling effect on the zooplankton assemblage in the coastal area off Pohang-Ulsan, Southeast of Korea
- Population structure of marine species around the Japanese Islands
- Status and prospect of assessment and management of Korean fisheries resources
- Transport of jack mackerel (*trachurus japonicus*) eggs and larvae inferred from the numerical experiment in the East China Sea
- Otolith chemistry for stock identification and habitat characteristics of Chum salmon
- Reexamination of the traditional taxonomy of freshwater eels, genus *Anguilla*: a modern perspective and Ege's 1939 study
- Effect of ENSO on the distribution of tuna in tropical region of the Pacific Ocean
- Growth and survival of larval and juvenile saury in the Kuroshio and Kuroshio-Oyashio transition areas

A presentation by a Korean scientist

Group photo of the participants at the main entrance of ORI

Modeling Oil Spills in the Sea of Japan and My Activity in the Ocean Research Institute

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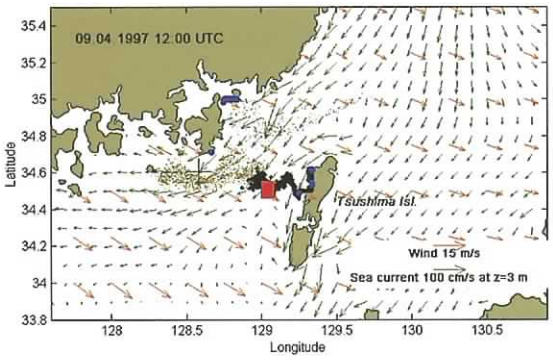
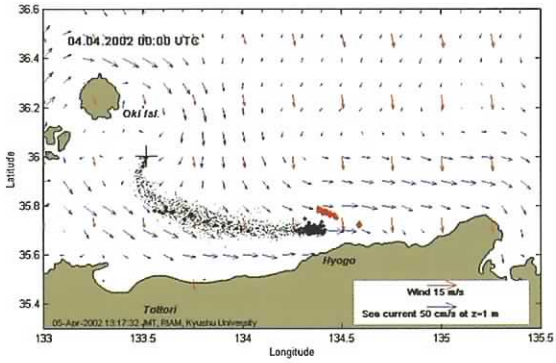
Accidental marine oil spills cause serious damage to the environment and significantly affect the social and economical aspects of human activity in coastal regions. Numerical simulation of oil spreading provides valuable information for planning the countermeasures and spill combat operations.

Number of oil spill accidents in the Sea of Japan recently accelerated the development of oil spills simulation and prediction applications adopted for this region. Recent accidents in the Tsushima Strait area (*Sea Prince*, 1995; *O-Sung No 3*, 1997) and in the central Japan Sea (*Nakhodka*, 1997; *Aige*, 2002) were most serious spills that affected the Japanese coast. Oil spill modeling and prediction system developed in collaboration with my colleagues from Japanese Universities demonstrated quite good skill in simulation and prediction of these accidents. Particles tracking method is adopted for the spill modeling, that included modeling of oil transport by wind and sea currents, buoyancy, three dimensional random diffusion and oil weathering processes. Ocean circulation model is part of the system, when meteorological information is taken from the weather prediction centers like Japan Meteorological Agency.

Left figure below demonstrates simulation results for the tanker *Osung No 3* spill in the Tsushima strait area. Red rectangle marks observed floating oil position as reported by the Korean Maritime Police Agency, and same time oil was found on the coast of the northern Tsushima Island. It is well reproduced by model. Right figure below shows the simulation result for the tanker *Aige* oil spill that happened end of March 2002. Red points demonstrate the observed floating oil position. Details for this oil spill modeling and forecasts experiment could be found on Internet:
http://www.riam.kyusyu-u.ac.jp/~vsm/html/js_2002_oilspill_e.htm





Development of the oil spills simulation system is an example of interdisciplinary activity that requires joint efforts of meteorologists, oceanographers, chemistry specialists etc. So it was a good opportunity for me to work for 6 months in the Ocean Research Institute of the University of Tokyo. Discussions with Prof. T. Sugimoto on the ocean dynamics around the Japan and related drift of fish eggs (that in some way behave similar to the spilled oil), discussion of meteorological processes on the seminar of Prof. H. Niino and other contacts here were very useful for me. During my stay in the ORI I had an excellent opportunity to visit other organizations in Tokyo area. I had a presentations and exchanged modeling experience with specialists of the Japan Meteorological Agency, participated in the International Japan-France meeting on oil spills combating held in the Japan National Maritime Research Institute etc.

I sincerely thank Prof. T. Sugimoto and Prof. M. Terazaki as Director of the CIC for arranging my visit as well as other personnel of ORI for kind help and nice conditions during my tenure in the Ocean Research Institute.

InterRidge Program Next Decade Plan

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InterRidge is an initiative concerned with facilitating international and multi-disciplinary research associated with all aspects of mid-ocean ridges. The Mid-Ocean Ridge system, is the primary site of volcanic activity on the planet, extending more than 56,000 kilometres along the world's ocean floors. The upwelling magma forms new ocean crust as tectonic plates move apart and hydrothermal activity exerts a major influence on the ocean's chemistry. The areas of hydrothermal venting are a potential source of mineral resources, including polymetallic sulphide deposits.

The Ocean Research Institute is hosting InterRidge Office since 2000 to the end of 2003. The author is serving as a chairman of InterRidge Steering Committee for the term. The daily activity of the office heavily depends on Dr. Agnieszka Adamczewska, a fulltime coordinator of InterRidge, and Mr. Marek Kacrzmaz, a part-time assistant. Currently 28 countries are members of InterRidge. InterRidge was initiated in 1992 and made an initial Science Plan for the term of 1993 -2003. Since the introduction of the InterRidge Science Plan the international collaboration for the mid-oceanic ridge research was enormously improved. Specially isolated locations like the Arctic Ridge under tha packed ice of the Arctic and Southwestern Indian Ridge between Africa and Antarctica were explored by a series of international cruises coordinated by InterRidge. InterRidge also enhanced the opportunities for the mid-oceanic ridge research of many countries specially like Japan and Korea who had little chance of activity on the mid-oceanic ridge research before the inception of InterRidge.

The implementation of InterRidge is principally done by organizing workshops for each science program. Scientists from many courtiers discuss and devise an international collaboration program in the workshop and publish a whitepaper science plan. Based on the whitepaper the scientists submit partial proposal to each country's funding agency so that each proposal is more easily funded. Through this scheme InterRidge successfully achieved million dollars' collaborated cruises.

Based on the successful history of the past InterRidge activities, InterRidge steering committee is currently working for preparing Next Decade InterRidge program for the term of 2004 to 2013. Through the n discussion at the Next Decade programming workshop held at Germany last year, the community decided to focus on seven themes; 1. Ultraslow-spreading Ridges, 2. Ridge-Hotspot interaction, 3. Back-arc Spreading Systems, 4. Mid-oceanic ridge Ecosystems, 5. Monitoring and Observatories, 6. Deep Earth Sampling, 7. Global Exploration. Operational working groups composed of multi-countries' scientists are organized for each subject to implement Next Decade InterRidge Plan toward the actual seagoing activities.

InterRidge Office is investing much effort to maintain InterRidge home page. We hope the readers to visit the site at http://www.intrige.org/. Biannual issues of InterRidge News Letter are downloadable from the site as PDF formats.

Status and Future Plans for the SOLAS-Japan

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1. Goal for SOLAS

The Surface Ocean-Lower Atmosphere Study (SOLAS) is a new international research initiative sponsored by International Geosphere Biosphere Program (IGBP), the Commission on Atmospheric Chemistry and Global Pollution (CACGP) of the International Association of Meteorology and Atmospheric Sciences (IAMAS), and the Scientific Committee on Oceanic Research (SCOR). The goal of SOLAS is:

To achieve quantitative understanding of the key biogeochemical-physical interactions and feedbacks between the ocean and the atmosphere, and how this coupled system affects and is affected by climate and environmental change.

2. Current status of SOLAS planning in Japan

Our SOLAS national committee was authorized as one of the IGBP sub-committees by the Science Council of Japan in December 2001. Several SOLAS related project proposals have been submitted and some projects have already started. On 22-23 February 2002, the first meeting of the SOLAS-Japan committee was held at Nagoya University after the joint meeting with the Japan JGOFS members. The figure below shows the structure of the second phase of IGBP and the SOLAS-Japan logo. Each member presented the ongoing project and research interests as the SOLAS-Japan activity. Topics presented were covered the most of the activities under Focus 1 through 3 of the international SOLAS focuses. Which are:

Focus 1 - *Biogeochemical Interactions and Feedbacks Between Ocean and Atmosphere*
Focus 2 - *Exchange Processes at the Air-Sea Interface and the Role of Transport and Transformation in the Atmospheric and Oceanic Boundary Layers*
Focus 3 - *Air-Sea Flux of CO_2 and Other Long-Lived Radiatively Active Gases*

In planning SOLAS-Japan, we agreed that several advantages should be taken into account, such as the geographical location, the unique emission sources (high primary productivity, volcanic emission, Asian dust, sea ice etc.) and the human resources in the fields. Some of issues that we discussed are:

・Observation of emissions of marine biogenic gases from the regions of high primary productivity such as the marginal seas around Japan and the Antarctic Ocean.
・Observation of the effect caused by atmospheric depositions of mineral dust (iron) and anthropogenic nitrogen compounds transported from the Asian continent on marine biological productivity and carbon uptake.
・Observation of carbon uptake by nitrogen fixation marine biota in the Kuroshio region.
・Effects of volcanic gases and aerosols from active Japanese volcanoes to atmospheric and oceanic environment.
・Process of interfacial transfer mechanisms on physical factors within the boundary layers around Japan.

3. Future plans for national SOLAS activities

The committee of the SOLAS-Japan (chair: M. Uematsu) has been functioned as a place to exchange information and integrate accomplishments. We have discussed the possibility to submit proposals to cover the most of the SOLAS activity in Japan by the members of the committee of the SOLAS-Japan. The current funding situation for several projects are going well at least next 2 or 3 years, so now is an appropriate time to start discussion about the strategy for new proposals. International cooperation with other SOLAS national communities is an important key for the success of our SOLAS activities, as well as cooperation with other core projects in Japan.

Solas-Japan

Synopsis of International Conference "Man and the Ocean – Conserving Coastal Environment"

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The International Conference "Man and the Ocean – Conserving Coastal Environment" was held from July 8 through 12, 2002 under the auspices of the United Nations University (UNU), UNESCO, Iwate Prefectural Government, Shimadzu Corporation and the University of Tokyo. A symposium was held at UNU in Shibuya, Tokyo during the first three days. Invited specialists from Japan and abroad exchanged the latest information on the following three main subjects, (1) Endocrine Disruptor Pollution in Asian and the Pacific regions (2) Coastal Management and Sustainable Development and (3) Marine Ecology and Environment. About 50 specialists from 16 countries and 3 international organizations (UNU, UNESCO, European Community) attended the conference. In addition, the conference had approximately 250 participants on the first day, 120 each on the second and third days because it was open to the general public. Aural presentations on 37 subjects and poster sessions on 9 subjects were carried out, some of which are to be published in "Otsuchi Marine Science Vol.28 (2003)".

The world population has currently reached at 6.26 bil. and is expected to increase further. The participants made a vigorous discussion and they pointed out the importance of establishing a total management system of coastal environment in view of sustainable exploitation and environmental protection of coastal areas, considering that 65% of the world big cities with over 2.50 mill. population are located in the coastal areas. Most of the participating scientists are the specialists of the coastal environment problems and they had a hot discussion on how they could provide the society with their latest research results and information in the most effective way. Some of them emphasized how it would be important, to let the public people, fishermen, administrators and policy-makers recognize the latest and accurate information they have got through their studies and to help them understand correctly, let alone to make it public as an academic paper. Furthermore, they insisted that we should build a new ecological education system for the young ones as future citizens.

Otsuchi Marine Research Center took the initiative of an international joint research program on marine environment(1999-2002) which was devised and carried out jointly by UNU, Iwate Prefecture and the Ocean Research Institute of the University of Tokyo(ORI). We have studied three major subjects, (1) coastal ecosystem,(2) nutrient cycles and (3)marine pollution mainly choosing the coastal areas of the Sanriku as our main research field in close cooperation with the Fishery Dept. of Kitazato University, the Marine Technology Center of Iwate Prefecture, Kamaishi Bio-technology Research Institute, Hokkaido University, the University of Tokyo, Ehime University, Kobe Women's College and the National Polar Research Institute. Along with these researches we have made various efforts in social education and in building an international research network. Every year we have held the international workshop on marine environment, inviting young able scientists with big potentialities from countries of Asia and the South Pacific region. At the same time, during the period of the workshop, we have made several lectures for the citizens and conducted special classes for the students of the

A group photo of the International Conference "Man and the Ocean-Conserving Coastal Marine Environment" at the United Nations University on 8 July 2002.

local junior and senior high schools. This time, on the occasion of the final international conference of the three-year program, we have provided the lecture for the people of Iwate, at Morioka, Iwate prefecture on July 11, on the topics of coastal marine researches and reported the results of three-year research activities based on the international joint research program of marine environment by UNU, Iwate Prefecture and ORI ,the University of Tokyo. About 180 people attended the Morioka conference, making nothing of the attack of the typhoon No.6 and they had lively discussions. On the next day, July 12, we have moved to Otsuchi town, where Otsuchi Marine Research center is located, and held the lecture for the pupils of elementary and junior-high schools and the local citizens(about 250 participants). At that time, several scientists told them about the significance of the coastal environment protection and the latest information about marine researches. After the lecture, children in the town had a get-together meeting with the lecturers and the invited 16 foreign scientists.

In this final international conference in July, 2002, the results of three-year joint research by UNU, Iwate Prefecture and ORI were reviewed and discussed thoroughly. These three organizations have been tackling the marine environmental problems from the different standpoints. At that time UNU presented Iwate Prefectural Government and the ORI the shields in appreciation of their cooperative activities. Such a unique joint research program between an international organization, local government, private enterprise and a university would be a remarkable test case in establishing a system to cope with environmental problems. In 1996 Japanese Government ratified the International Law of the Sea Convention, which strongly demanded Japan to develop the ways for sustainable exploitation of marine resources and to establish its rational protection and management system through investigation and researches in territorial waters and Exclusive Economic Zone. I hope that these activities will be a great help for the general public to be more concerned about the coastal environmental problems and will encourage scientists, administrators, policy-makers, etc. to establish and carry out innovative environmental protection measures supported by the citizens.

Otsuchi Marine Research Center, as a research institution open for scientists all over Japan, aims to conduct much more active researches in close cooperation with the domestic institutions involved in coastal environment protection. Furthermore, it expects to expand the scope of its activities as an institution for joint researches of global coastal environmental subjects with foreign institutions. Through the above-stated series of activities, we wish to establish an ideal model of circulating coastal management system and finally make a significant contribution to our society.

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