

CEARAC – its achievements and future potentialities

by the Director of CEARAC, Masanobu Miyazaki



It is my great pleasure to introduce the current CEARAC activities in this newsletter. This issue will also mention the future plans of CEARAC.

Activities in 2004-2005

Activities in CEARAC are generally planned within the duration of two years, so the activities started in 2004 comes to the time to be reviewed. All the CEARAC activities aim at the final goals ; implementation of the marine and coastal environmental assessment in the NOWPAP region (Working Group 3 : Harmful Algae Blooms (HAB)) and development of special monitoring tools and regional cooperative monitoring programmes (Working Group 4 : Remote Sensing (RS)). Here, I would like to introduce the results of CEARAC activities in 2004-2005, focusing on activities of WG3 and WG4.

One of the accomplishments of these Working Groups is compiling the National Reports and the Integrated Report respectively. The National Reports include highly reliable information of the NOWPAP Members, which are submitted by experts in each country. Based on these National Reports, each Working Group will plan to issue the Integrated Reports at the end of 2005.

Besides, WG3 has been working on establishing database on HAB, and WG4 ; a portal site on Remote Sensing. "Step Forward" section in this newsletter explains these activities and some others in details.

Future Perspectives

Recently, marine litter has become a major environmental problem in the NOWPAP Region. The 9th Intergovernmental Meeting (IGM) November 2-4 2004 (Busan, Republic of Korea) also recognized the need to act on the problem of marine litter. The 10th IGM will move onto further discussion based on RCU's proposition, and practical mitigation work plans will be presented there.

Northwest Pacific Region Environmental Cooperation Center (NPEC), hosting operation of CEARAC, has arranged "Research on buried objects and washed-up driftage on the coasts along the Northwest Pacific Region" yearly since 1996. NPEC will also co-host with Ministry of the Environment "The First International Workshop on Marine Litter in the Northwest Pacific Region" on November 14 and 15 in Toyama, Japan. Administrative officers and researchers of the NOWPAP Member countries will participate in the workshop in order to introduce the status of marine litter and its management in each country and exchange information on monitoring techniques, analysis of its data and its assessment, and so on.

Unfortunately, the issue of marine litter is not recognized as an official activity of CEARAC yet, however, I am certain that CEARAC will be able to contribute to the project on marine litter by its experiences and information accumulated by now.

CEARAC will continue its cooperation with other RACs and making efforts on the protection of the marine environment of the Northwest Pacific Region through various activities of WG3 and WG4, assessment and management on land based sources, and so on, and several new issues related to marine litter which will be adopted in the near future under RCU guidance.



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November 2005

New directions of work of NOWPAP RACs

Alexander Tkalin, Coordinator, Northwest Pacific Action Plan (NOWPAP) of UNEP



Dear friends,

The NOWPAP Regional Coordinating Unit (RCU) became fully operational in April 2005 and I am happy to update you on recent developments.

I hope this information will be useful in combination with news about achievements of CEARAC and its working groups dealing with harmful algal blooms and remote sensing applications to the coastal and marine environment monitoring.

As you know, the Northwest Pacific Action Plan (NOWPAP) was adopted in 1994. In 2000-2002, four Regional Activity Centers (RACs) were established in Beijing, Daejeon, Toyama and Vladivostok (one RAC in each member state). The Terms of Reference for these RACs were adopted at the 4th NOWPAP Intergovernmental Meeting (IGM) held in Beijing, China in April 1999 and the Terms of Reference for the RAC Focal Point Meetings were adopted at the 8th NOWPAP Intergovernmental Meeting (IGM) held in Sanya, China in November 2003. Since that time, the activities of NOWPAP have become RAC-based, i.e. implemented mostly through the network of Regional Activity Centers and their experts.

As the establishment of four NOWPAP RACs and their fora (Focal Point Meetings and Working Groups) took several years, there is a need now to consider new directions of work of Regional Activity Centers. Originally, it was envisioned that NOWPAP RACs would deal with the priority environ-

mental problems in the region (including oil spills, harmful algal blooms, atmospheric input of contaminants, pollutant discharges with industrial effluents, sewage and river runoff). Data and information network also had to be established through one of the RACs. During the last several years, all four NOWPAP RACs have achieved substantial results. Nevertheless, new marine environmental issues are emerging. Among many of those issues, I would like to mention just a few. First of all, marine litter became an issue of regional concern in recent years. Persistent toxic substances (PTS), including persistent organic pollutants (POPs), are also recognized now as a major threat to the marine and coastal environment. In order to address these (and some other) issues, the directions of work of NOWPAP RACs should be adjusted accordingly.

The future directions of work of NOWPAP RACs were discussed in detail at the NOWPAP Intersessional Workshop in Seoul, Korea on 25-26 July 2005. NOWPAP RCU has suggested the following new directions of work for NOWPAP RACs (not in the or-

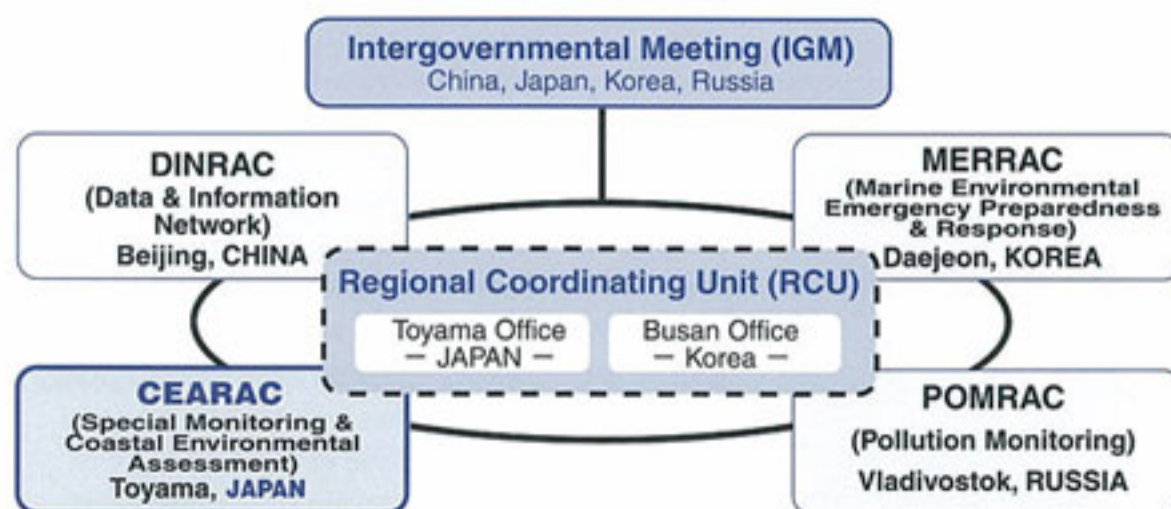
der of priority) :

1. Land-based activities and sources of pollution, including persistent toxic substances ;
2. Marine-based sources of pollution ;
3. Sustainable management of marine litter ;
4. NOWPAP Clearing-House (storage and easy retrieval of data and information related to NOWPAP activities) ;
5. Assessment of the state of marine environment in the NOWPAP region ;
6. Integrated coastal and river basin management.

The Intersessional Workshop participants agreed in principle with these suggestions and prepared several recommendations which will be further discussed and adopted at the coming 10th NOWPAP IGM on 24-25 November 2005 in Toyama, Japan.

I sincerely hope that the new activities to be implemented by the NOWPAP RACs will help in solving many marine environmental problems in the region.

NOWPAP Organization



Step Forward — CEARAC Activities

NOWPAP Working Group 3 (HAB)

NOWPAP WG3 has been mainly conducted (1) compiling of reports on Harmful Algal Blooms (HABs) for the NOWPAP Region, (2) establishing of HAB Reference Database and (3) conducting activities of Cochlodinium

Corresponding Group (CCG) in 2004 and 2005 in order to treat problems of HABs as a part of activities of coastal environmental assessments.

Report of the 2nd NOWPAP Working Group 3 Meeting

Thanks to continuous cooperation of WG3 colleagues, NOWPAP CEARAC successfully held the 2nd NOWPAP Working Group

3 Meeting in Qingdao, People's Republic of China on 25 and 26 November 2004. The meeting reviewed activities and budget for WG3 in 2004 and 2005, and discussed the details of WG3 activities.

Each country of NOWPAP Members had prepared the National Reports on HABs of their own countries in 2004. Each National Report was explained by an expert from each country, and discussed in the meeting. The meeting agreed to publish the National Reports on HABs in the NOWPAP Region in 2005. The meeting also agreed to make the Integrated Report on HABs by the end of 2005, based on the proposed contents and the National Reports.

The prototype of HAB Reference Database was introduced by the CEARAC Secretariat. In order to retrieve reference information efficiently, the meeting mainly discussed categorization of reference and decided to make 6 categories; (1) Occurrence and Monitoring; (2) Mechanism and Environment; (3) Physiology; (4) Taxonomy; (5) Mitigation and Management; and (6) Others.

The meeting agreed to make a homepage and a pamphlet of *Cochlodinium* in cooperation with CCG members. Dr. Hak-Gyoon Kim and Dr. Yasuwo Fukuyo, co-chairs of CCG, made presentations on "Recent Studies on *Cochlodinium polykrikoides* in Korean Waters" and "Biology and Ecophysiology of *Cochlodinium*" respectively. Their presentations helped the meeting participants understand the importance of study on *Cochlodinium* in the NOWPAP Region more deeply.

WG3 activities in 2004 and 2005

(1) Compiling of Reports on Harmful Algal Blooms (HABs) for the NOWPAP Region

The National Reports on HABs are available in November 2005. The National Reports, reporting present situation of HABs in the countries of NOWPAP Members, give the basis for creating common understanding of HABs in the NOWPAP Region. Such common understanding forms a starting point of the discussion about monitoring, assessments, and policies for marine environmental conservation in this region. The Integrated Report on HABs for the NOWPAP Region will be published at the end of 2005. The Integrated Report will show broader perspectives of HAB issues in the whole NOWPAP Region and will address common issues to be tackled.

(2) Establishment of HAB Reference Database

HAB Reference Database was opened in April 2005. The purpose of HAB Reference Database is to establish a focal storage of information and reference materials (papers, reports, data, etc.) which can be used as resources for scientific analyses on red tide and HAB. CEARAC expected the database to be used mostly by researchers and government officers in order to investigate information on HABs in the NOWPAP Region efficiently. It is hoped that this database will promote further studies on red tide and HAB in the NOWPAP Region.

(3) Activities of *Cochlodinium* Corresponding Group (CCG)

Cochlodinium is one of the concerned harmful species in the NOWPAP Region. However, our understanding of *Cochlodinium* is insufficient to make policies and regulations on this species. Therefore, CCG was organized so as to organize a set of information on *Cochlodinium*, and to help policy makers deepen their knowledge. First of all, CCG have made a *Cochlodinium* Homepage and

a *Cochlodinium* Pamphlet to provide basic information on the species to the public. The homepage includes pictures of *Cochlodinium*, explanations of the species, and information of its damage to fishery, and so on.

(4) The 1st International Workshop on HAB in the Northwest Pacific Region

Thanks to cooperation of WG3 experts, the 1st International Workshop on HAB in the Northwest Pacific Region was held in Toyama, Japan on June 30 and July 1 2005. About 30 experts of HAB from the NOWPAP Members participated in the workshop and discussed the situation, monitoring systems, causative species and mitigation measures of HAB in the NOWPAP Region and its related areas. CEARAC and WG3 gathered a wide variety of information on HABs and will utilize the collected information for the future work of WG3.

Announcement of the 3rd NOWPAP WG3 Meeting

The 3rd NOWPAP Working Group 3 Meeting is planned to be held with NOWPAP Working Group 4 Meeting in Republic of Korea in summer 2006.



HAB Reference Database

<http://www.cearac-project.org/wg3/hab-ref-db/>



Cochlodinium Homepage

<http://www.cearac-project.org/wg3/cochlo-entrance/>

List of WG3 members and guest experts

Country	Name	Organization
China	Mr. Jianhui ZHANG	China National Environmental Monitoring Center
	Mr. Mingjiang ZHOU	Chinese Academy of Science
	Dr. Songhui LU	Jinan University
Japan	Dr. Yasuwo FUKUYO	The University of Tokyo Asian Natural Environmental Science Center
	Dr. Osamu MATSUDA	Hiroshima University
Korea	Dr. Sam-Goun LEE	National Fisheries Research and Development Institute
	Dr. Chang-Kyu LEE	National Fisheries Research and Development Institute
	Dr. Hak-Gyoon KIM	Pukyong National University
Russia	Dr. Vladimir SHULKIN	Russian Academy of Sciences
	Dr. Tatiana ORLOVA	Russian Academy of Sciences

NOWPAP Working Group 4 (RS)

WG4 has been working on the development of special monitoring tools for marine and coastal environment. RS (Remote Sensing) is the current target as the new monitoring tools under the Working Group 4 (WG4).

Report of the 2nd NOWPAP Working Group 4 Meeting

Thanks to continuous cooperation of WG4 colleagues, NOWPAP CEARAC successfully held the 2nd NOWPAP Working Group 4 Meeting in Beijing, People's Republic of China on 14 and 15 October 2005. The meeting reviewed activities and budget for WG4, and discussed the details of WG4 activities.

Each country of NOWPAP Members prepared the National Report on Ocean RS and presented their interim progress at the meeting. In order to continue further work of the report, the guideline was reviewed and revised. The meeting agreed to publish the National Reports on Ocean RS in 2005.

Preparation of the Integrated Report was also discussed at the meeting. A provisional table of contents of the Integrated Report was proposed by the CEARAC Secretariat and approved by WG4 experts with minor revision. The meeting agreed to make the Integrated Report by the end of 2005 based on the revised table of contents and the National Reports.

Prototype of Ocean RS portal site was introduced by the CEARAC Secretariat. The Secretariat asked for WG4 members' cooperation to collect information of website links to be integrated into the portal site.

Content and function of website on Oil Spill Monitoring, which was constructed under the MOU between CEARAC and Pacific Oceanological Institute of Russia, was presented by Dr. Leonid MITNIK.

WG4 activities in 2004 and 2005

Based on the discussion of the 2nd NOWPAP WG4, WG4 has mainly conducted (1) preparation of the National Reports of Ocean RS for the NOWPAP Region, (2) preparation of the Integrated Report and (3) establishing RS information network.

(1) National Report

Each country of the NOWPAP Members (China, Japan, Korea and Russia) prepared the National Report on Ocean RS. The National Reports, which report the present situation of Ocean RS, give the basis for creat-

ing common understanding of Ocean RS in the NOWPAP Region. Such common understanding forms a starting point of the argument to establish a cooperative monitoring system by RS for marine environmental conservation, which is the final goal of NOWPAP WG4.

(2) Integrated Report

Based on the National Reports, the Integrated Report has been made in order to provide and to share information on the status of Ocean RS in the NOWPAP Region. The integrated Report will show broader perspectives of the situation of Ocean RS in the whole NOWPAP Region and will address common issues to be tackled through CEARAC activities. The Integrated Report will be published by the end of 2005.

(3) RS information network

Establishment of Ocean RS Portal site

Various information and data on marine environment monitoring by RS are scattered in organizations in every NOWPAP country. Consequently, it is difficult to share common information on the latest research development, case studies on application, and future trends in the NOWPAP region. To improve the situation, a portal site with links to related websites was developed, as an experiment to share information and data.

The portal site started its operation in April 2005 at the following website address and it has been providing links to related websites in the NOWPAP region and major international organizations.

Establishment of website on oil spill monitoring

Website on oil spill monitoring was established and has been open to the public since March 2005.

The website provides basic information associated with oil spill detection and monitoring by RS such as behavior of oil in the sea, features of RS and so on. CEARAC expected the website to be used mostly by researcher and government officer in the NOWPAP Region to study the oil spill monitoring techniques by RS.

Another related activity of WG4

The 3rd International Workshop on Marine RS in the Northwest Pacific Region.

NPEC has been organizing international workshops on RS of the marine environment in the NOWPAP Region since 1999. The aim of these workshops is to contribute to the development of marine environmental monitoring technologies derived from RS. The third Workshop was held in Beijing, China on 11 and 12 October 2004, and experts of relevant countries (China, Japan, Korea and Russia) including NOWPAP



Ocean RS portal site
<http://www.cearac-project.org/wg4/portalsite/>

List of WG4 members and guest experts

Country	Name	Institute or Organization
China	Ms. Xin JING	China National Environmental Monitoring Center
	Dr. Chenghu ZHOU	Chinese Academy of Sciences
Japan	Dr. Ichio ASANUMA	Japan Marine Science and Technology Center
	Dr. Joji ISHIZAKA	Nagasaki University
	Dr. Hiroshi KAWAMURA	Tohoku University
Korea	Dr. Young-Sang SUH	National Fisheries Research and Development Institute
	Dr. Sang-Woo Kim	National Fisheries Research and Development Institute
Russia	Dr. Leonid MITNIK	Russian Academy of Sciences
	Dr. Anatoly ALEXANIN	Russian Academy of Sciences

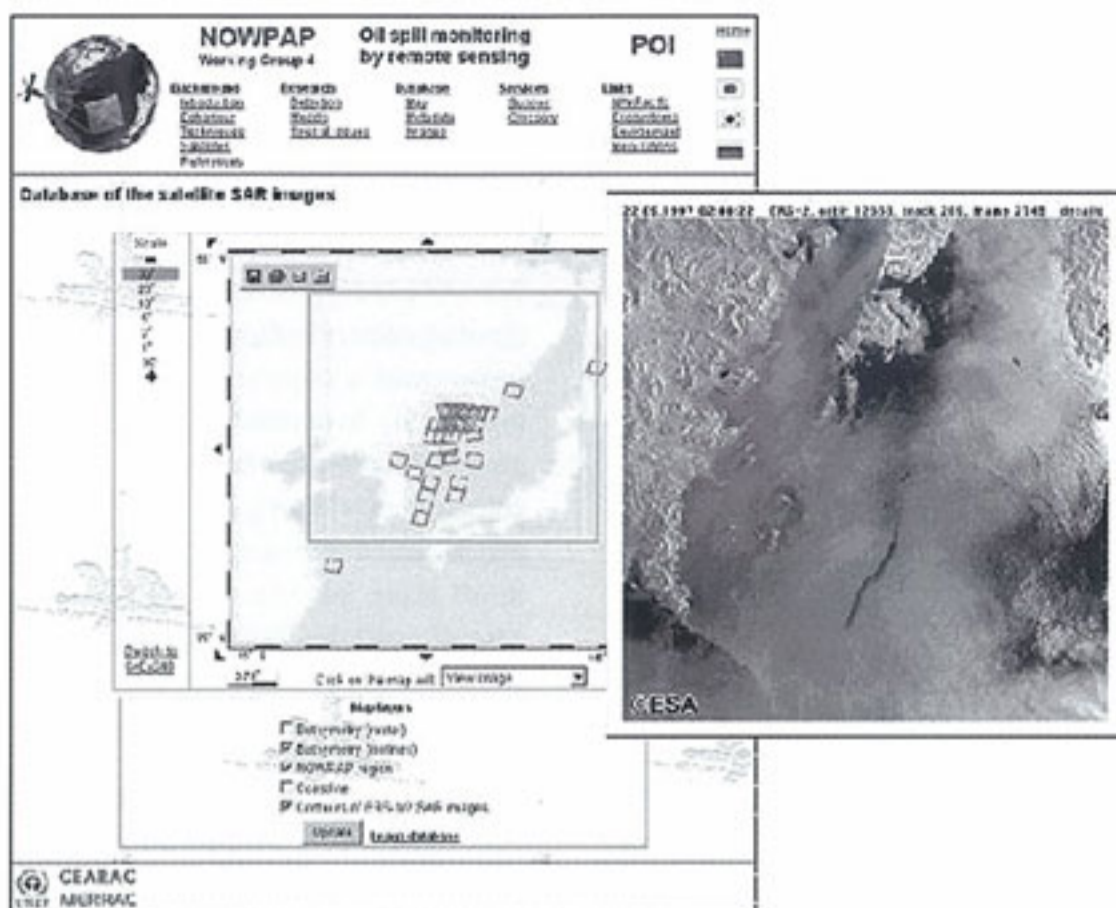
WG4 members attended to make presentations on RS application, examples of marine environmental monitoring, research and development trends, and so on, and they exchanged information.

Announcement of the 3rd NOWPAP WG4 meeting

The 3rd NOWPAP Working Group 4 Meeting is planned to be held with NOWPAP Working Group 3 Meeting in Republic of Korea in summer 2006



Opening of the 3rd international workshop on Marine RS in Northwest Pacific Region



Oil spill monitoring by RS
<http://cearac.poi.dvo.ru/en/main/about/>

Voice from the Region

Recent Activities for Marine Environment Conservation by the Ministry of the Environment, Japan

Norihiko Tanaka, Deputy Director, Global Environmental Issues Division, Ministry of the Environment, Japan (CEARAC Focal Point of Japan)



Global Environmental Issues Division in the Ministry of the Environment, Japan (MOEJ) is responsible for marine environment conservation in the context of international relationship. We deal with negotiation of international agreements such as London Convention and MARPOL Convention, domestic implementation of such international agreements and monitoring of marine environment. Regional activities such as some of NOWPAP projects are also within the scope of our responsibility. Here I introduce our work on marine litter which is one of our recent focuses.

Drifted marine litter to coasts has been becoming more and more serious in Japan these days. A survey by NPEC shows the

current situation of marine litter in Japan. This survey, aiming at grasping the actual status of drifted and buried marine litter and raising public awareness of marine environment preservation, was carried out with the participation of local governments and non-governmental organizations of four countries of Northwest Pacific Region (Peoples Republic of China, Republic of Korea, Japan and Russian Federation).

According to the survey, marine litter of foreign origin has been observed at several coastal areas in Japan, especially areas in the southwest Japan. A prominent example is the case of the west coast of Tsushima Islands, Nagasaki Prefecture where more than 90% of drifted marine litter is supposed to be foreign origin. In August 2005 more than 10 thousands of medical wastes of foreign origin were drifted at number of beaches in Japan and those were reported by several newspapers.

We believe that cooperative actions of NOWPAP members are of vital importance to alleviate the problem of marine litter in this region. MOEJ has embarked on a new project in FY 2005 in order to facilitate the regional cooperation on this issue. In the project, we are going to host an international workshop of marine litter experts from NOWPAP members on 14th and 15th of November in Toyama, Japan. NPEC is the organizing body of this workshop.

Since the establishment of marine litter activity (MALITA) is being discussed at the NOWPAP meetings, we hope our new project will contribute to the enhancement of the activity. I hope CEARAC plays a leading role and function as a liaison between citizens and governments in the implementation of MALITA in cooperation with NPEC which has accumulated wide range of experiences in this field.

Red Tides in NOWPAP

Yasuwo Fukuyo, Professor, Asian Natural Environmental Science Center, The University of Tokyo (CEARAC Focal Points of Japan)



Red tide is discolored sea water due to high concentration of unicellular organisms. It is not a common phenomenon in NOWPAP area, as coastal waters are

not highly eutrophicated. High concentration of nutrients such as nitrate and phosphate from coastal municipalities often drives coastal water eutrophication, and then frequent occurrence of red tides. In the sea of NOWPAP area, however, eutrophicated area has been very limited at some enclosed embayment such as Omura Bay in Kyushu, Japan, and Jinhae Bay in Korea. Therefore red tides have been thought as localized area-specific phenomena. The size of red tide area is about 2-4 km² and the duration is shorter than 4 days.

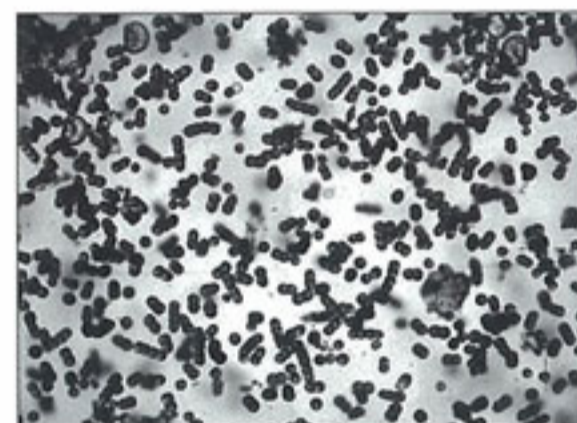
After starting the Working Group 3 activities on Harmful Algal Blooms (HAB), WG members noticed that the theory above mentioned is applicable to most of red tides occurred in NOWPAP area, but at the same time we found that a new type of red tides has occurred also. Red tides caused by a

dinoflagellate *Cochlodinium polykrikoides* forms quite a large scale discoloration detectable by a satellite as high chlorophyll area. It covers more than 400 km of Korean coastal waters during the highest blooming period, and some of red tide area expanded to off shore just like stretching an arm. In case of a red tide in 2003, the tip of expansion reached about 300 km off from the east coast of Korea (Miyahara et al. 2005). It is transported by the Tsushima Current, and along with the fluctuation of the current the red tide area moves slightly, and reached about 100 km off from the Tottori coast of Japan. This type of red tide is not driven by coastal water eutrophication, except its origin area of blooming. The area about 300 km east from the Korean coast and 100 km north from Japan did not have nutrients to sustain the red tide, and therefore it did not last long.

This type of large scale red tide has been known at a coastal area of Florida, USA, facing to the Gulf of Mexico. The causative organism is also a dinoflagellate named *Karenia brevis*. The organism starts blooming about 200 km off coast and by water movement it comes close to coast. The phenomenon is detectable by a satellite.

Different from small scale red tides, the mega scale red tides caused by *C. polykrikoides* and *K. brevis* sometimes give serious damage to coastal environment widely. Both organisms are well known as fish killing species, especially killing fish in aquaculture cages. In NOWPAP area red tides by *C. polykrikoides* must be observed carefully by internationally cooperative observatory systems such as a satellite in order to prevent any kind of harmful consequences. In this context it is necessary and fundamental for us to develop activities of WG on HAB with hoping wide range of support from you.

Miyahara et al. 2005 Bull. Japan. Plankton Soc., 52, 11-18.



Cochlodinium in a drop of its red tide water

Present and future role of CEARAC activity in the ecological issues of Russian Far East.

Vladimir. Shulkin, Head of Geochemistry Laboratory, Pacific Geographical Institute, Far Eastern Branch Russian Academy of Sciences (CEARAC Focal Point of Russia).



Ecological problems and challenges in the coastal areas of different countries are common as a rule. This is especially true for the NOWPAP region where

seas rather join, not divide the countries. Therefore the role of regional cooperation is particularly important and actual. For the enhancement and facilitation of regional co-

operation in the environmental monitoring issues two regional centers were established in 1999: CEARAC in Toyama, and POMRAC in Vladivostok. CEARAC is responsible for the HABs issues and special methods of monitoring (remote sensing), and POMRAC has responsibility for the monitoring of atmospheric, river and direct input of the chemical substances to the seas of the NOWPAP region. Such specialization has led to the activation of regional cooperation during the last years.

The creation of HAB reference database is

one example of real activities helping to share information about HAB issues. Database is very useful for Russia where HABs problems are not very sharp now, but will grow up in the future simultaneously with aquaculture development. To be prepared to the worsening of situation is one of the obvious outputs of CEARAC activities. The same could be said about mitigation measures against HABs. The IT-portal concerning oil spills monitoring by remote sensing created in Pacific Oceanological Institute, Vladivostok, is another example of success-

ful cooperation.

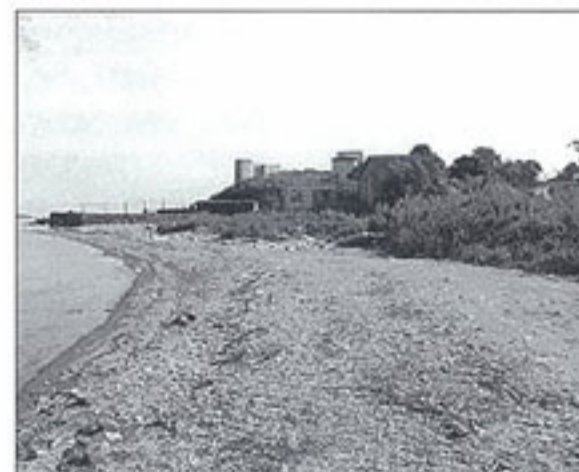
The preparation of the National Reports and the Integrated Reports based on them is an important intermediate goal of CEARAC activities. The next obvious step with share responsibility of CEARAC and POMRAC could be a compilation of the Integrated Reports on the document comprehensively describing ecological problems of coastal waters within the NOWPAP region. All these documents undoubtedly will be very useful for the communities and policy makers of our countries. In Russia, for example, we hope to use Integrated Reports for the acceleration of implementation of state programs concerning HABS issues.

The future fields of CEARAC activities will additionally include problems connected with marine litter, persistence organic pollut-

ants (POPs), and land based sources of pollution. All these issues are extremely actual and important in Russia. Marine litter for example is the first grade problem in many coastal waters in the Russian Far East, especially near big cities, and in many recreational areas. We hope, that MALITA will help Russia to improve the situation through technology and experience exchange. The characteristic of influence of land-based sources of pollution on the ecological issues in coastal waters looks like a logical connection between the present and the future activities of CEARAC.

POPs problems in coastal areas are very diverse and different according to extremely diverse nature of substances included in this simple abbreviation. At the same time obviously there are the substances of interest

for the all NOWPAP countries, including Russia. To outline such POPs, and to help to share information about determination, concentration, and fate of these substances could be a valuable input of CEARAC to this bunch of problems.



Extracting Red Tides Information from Satellite Imagery

Chenghu Zhou, Professor, Chinese Academy of Sciences (NOWPAP WG4 Expert of China)



Red tide is one of the most popular and harmful hazards in the area of coastal ocean, claiming for great economical losses. In the last decade,

more and more researches on the applications of remote sensing to monitoring red tides have been carried out as the red tides hazards become more and more serious in China coastal ocean. A multilateral cooperation within the framework of NOWPAP Working Group 4 (Remote Sensing) is also great to promote the popularization of ocean remote sensing applications through a series of workshops such as Workshop on HAB in the Northwest Pacific Region, expertise exchange, and data and documentation sharing.

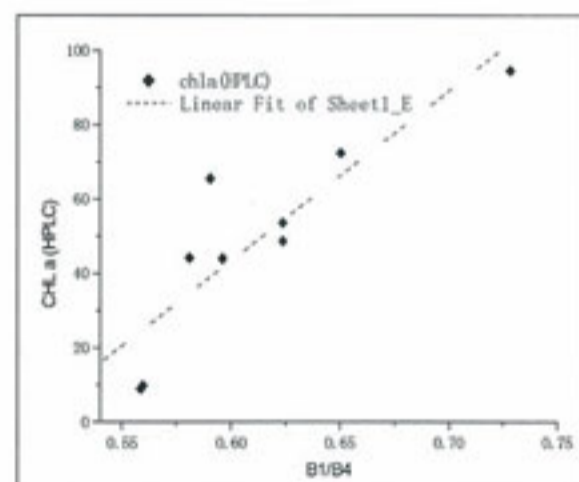
The key to red tide monitoring by remote sensing technology is to build up the relationship between red tide and chlorophyll a concentration. The occurrence of red tides not only results in the change of water color, but also changes the inertial optical properties of sea waters, which founds the basic principle for detecting the occurrence of a red tide and monitoring the dynamics of the red tide evolution by ocean color remote sensing. Much work on the spectral charac-

teristics has been conducted by fluorescence method to measure the spectrum of different alga species, and many field surveys were also carried out to sample the red tide spots in China. All the spectral analysis revealed that all of the algae have a positive correlation relationship.

With such an understanding of the relationship between red tide and chlorophyll a concentration, the algorithms, given a remote sensed image, can be developed. Now ratio model and minus model have been developed for AVHRR images, as shown in Figure one below. As to MODIS images, a ratio model of band 1 and band 2 is widely used to calculate the relationship between the ratio and chlorophyll a concentration. Now a red tide monitoring and warning system has been developed at National Marine Environment Monitoring Center of State Ocean Administration of China on the basis of MODIS and NOAA AVHRR data, which provides quasi-realtime information about the red tides and environmental parameters.

Compared with traditional methods, remote sensing method has such advantages as large-scale synchronous measurement. Our case studies in China coastal ocean indicated that combination of different kinds of satellite images from different satellite will be great helps to the monitoring of red tides. Due to

the complexity of water color of sea water, lots of field test and measures will be needed to further improve the understanding of the red tide characteristics from the images and precision of red tides monitoring. Modern spectral imager provides a new and powerful possibility to precisely detect the red tides. And it is also significantly important to set up regular cooperation program among the member countries in NOWPAP to jointly monitor the environment of the Northwest Pacific Ocean to enhance our ability to deal with the red tides and related ocean hazards.



The relationship between ratio of B1 and B4 and Chlorophyll a concentration

Overview of the Latest Activities in Korea related with NOWPAP WG4 (RS)

Sang-Woo Kim, Senior Researcher, National Fisheries Research & Development Institute (NOWPAP WG4 Expert of Korea)



As activities related with NOWPAP Working Group 4, the followings have been conducted in Korea. KARI (Korea Aerospace Research Institute),

KORDI (Korea Ocean Research & Development Institute), NFRDI (National Fisheries Research & Development Institute) and some universities were carrying out the project from public application research of marine satellite data for 3 years (2002-2004) as a first stage of the project. OSMI (Ocean Scanning Multi-spectral Imager) data has been studied by KORDI, Pukyong and Yonsei University. The application of OSMI satellite data for fisheries oceanography has been studied by NFRDI.

The first Korean exporters meeting of ocean satellite remote sensing was held in NFRDI, Korea in March 2004. In this meeting, 10 Korean experts of satellite remote sensing

attended. The second Japan-Korea Workshop on ocean color remote sensing (JKWOC-II) was held in KORDI, Korea in 19-22 December 2004. Participants of 16 Japanese, 1 Chinese and 16 Korean in the meeting attended and discussed.

NFRDI invited seven experts of domestic ocean remote sensing and the second Korean exporters meeting of ocean satellite remote sensing was held in NFRDI, Korea in April, 2005. For calibration and validation of the ocean color remote sensing data, NFRDI has been observed to use NFRDI's Tangu-1 research vessel in the East China Sea at February, May and August, 2005. NFRDI concluded an agreement with Nagasaki University, Japan in March 2005 about data exchange including researcher interchange etc. NFRDI established the new system for analyzing of Orbview-3 and MTSAT in September 2005. NFRDI will hold the third domestic ocean satellite remote sensing expert workshop in December to subject about "Development of joint research item".

IGARSS 2005 symposiums were held in

July 25-29 2005, Convention & Exhibition Center, Seoul, Korea. Symposium results held by cooperation of Korean society of remote sensing (KSRS) are as following. There was twenty announcement in session of "Ocean color techniques development and applications". In this session, Korea was announced to title of "Development of suspended sediment algorithm for KOMSAT-II MSC" in KORDI. In particular, opening KOMSAT (Korea Multi-Purpose Satellite) I session in the IGARSS 2005 symposiums, presentation of the research results about practical use of Korean Arirang satellite data was 10 papers.

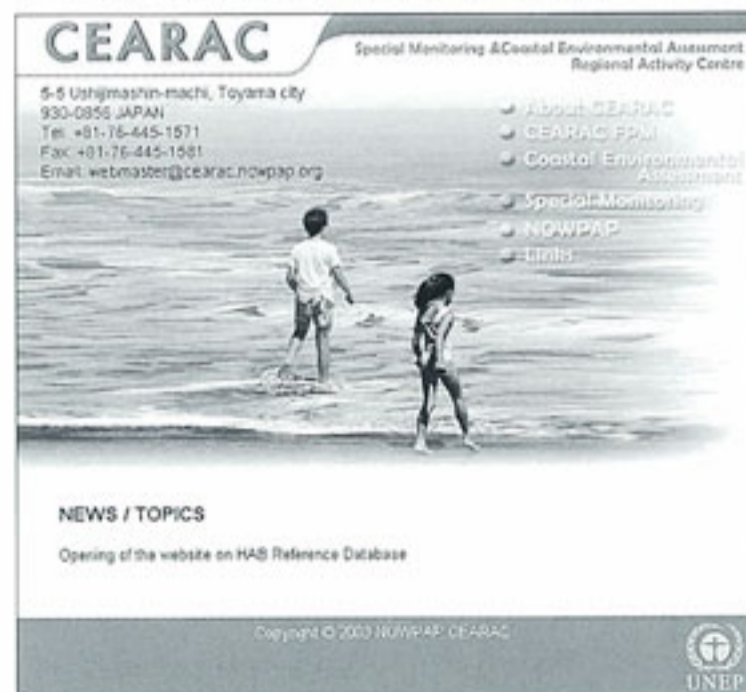
KSRS activities are as following: 2005 spring meeting of KSRS was held in the Korea University in March, and fall meeting of KSRS was held in Cheju Island in October.

Korea is also planning to launch a new Earth observation satellite KOMPSAT-2 with 1m resolution in 2005, one of many new satellite programs.

Visit CEARAC Website

Visit our Website : <http://cearac.nowpap.org/>

The CEARAC Website greatly contributes to the wider publicity for CEARAC and NOWPAP activities together with CEARAC Newsletter.



CEARAC Website
<http://cearac.nowpap.org/>

Announcement

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NOWPAP CEARAC

Northwest Pacific Action Plan
Special Monitoring & Coastal Environmental Assessment Regional Activity Centre

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