



Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional – Global Ocean Observing System (NEAR-GOOS)

Eighth Session
Beijing, People's Republic of China
8–10 December 2003

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(NEAR-GOOS)**

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ABSTRACT

Recent developments in RRTDB include the introduction of a registration disposal system and provision of new products from the Japan Meteorological Agency (JMA). In RDMDB, the total volume of data is about 10 GB, total number of users, 254, and the number of downloaded files, 10,619. A report on the 6th and 7th NEAR-GOOS Data Management Training Courses included lectures on RRTDB, RDMDB, marine biology and chemistry.

In the People's Republic of China programmes are being carried out to improve marine monitoring network with emphasis on coastal observations, commercial ship operations and telecom systems. Its main contributions in the DMDB include: database updating and daily maintenance; development of products; speeding up of network transmission; database application and service; and development and design of more data and graphic products to provide more services to users. Japan's contribution are included in their reports on the RRTDB, RDMDB, and on the 6th and 7th Regional Data Management Training Courses held at JODC in 21 Oct–1 Nov. 2002 and 10–21 November 2003, respectively. The highlights are given above.

In the Republic of Korea KORDIS contains metadata base for promoting oceanographic data and information exchange, the NDMDB for the regional pilot project of GOOS, NEAR-GOOS, and the National ARGO DMDB. KORDI is rebuilding NEAR-GOOS RRTDB to provide data to Korea and other countries in the region. Data are accessible via the Internet: http://kodis.nfrdi.re.kr/near_goos_en/ and <http://kodis.nfrdi.re.kr/argo/>. In the Russian Federation, a special working group on GOOS was established to coordinate and promote national activity under the GOOS project. A version of the RTDB has been created within the website of the Russian Programme, "Integrated System of Information about the World Ocean" (ISIWO), accessible via the internet (<http://www.rus.hydromet.com/~esimo/>). Information from all oceanographic sources is located in the POI website (<http://www.pacificinfo.ru>). More data provided by Pacific Fisheries Research Centre (TINRO centre) and other fisheries research institutes have been added to the database in 2003.

The CC members provisionally approved the Strategic Plan for NEAR-GOOS in its second phase. The plan aims to develop a comprehensive and sustained ocean-observing network in the region's seas and coastal regions.

Other important concerns taken up in the meeting include the development of new generation SST products for users and the science community, strengthening relations of NEAR-GOOS with NOWPAP, SEAGOOS, PICES, IGOS, JCOMM, GODAR-WESTPAC, promoting NEAR-GOOS, and holding a "NEAR-GOOS Workshop on Development of Data and Products in Operational Oceanography" to be held in conjunction with the 6th IOC/WESTPAC International Scientific Symposium in China, 19–23 April 2004.

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SUMMARY REPORT

1. OPENING

1 Prof. Victor Akulich, CC Member, Russian Federation, and Chairman of the Coordinating Committee, NEAR-GOOS, officially opened the Eighth Session of the NEAR-GOOS Coordinating Committee Meeting at 10:00 a.m., Room 40342, Friendship Hotel, Beijing. He welcomed the participants and expressed his appreciation to the Government of the People's Republic of China and in particular, the National marine Environmental forecasting Centre, for hosting the meeting. He further introduced the participants and informed that Dr Evgeniy Karasev, CC Member of the Russian Federation, was unable to attend, and Dr Lin Shaohua is representing Dr Wang Hong, CC Member of China. The Chairman welcomed Dr Hyong-Tack Huh, Chairman of IOC/WESTPAC, Mr Keun-Oh Kim, representative of the Ministry of Maritime Affairs and fisheries, Republic of Korea, Prof. Suam Kim and Mr Jianguo Wang, representatives of PICES and NOWPAP, and the delegation of the Democratic People's Republic of Korea (Mr Su-Man Kim and Mr Il Yang Choe) as observers of the meeting. It was the second time that the DPRK, as observer, was represented at a NEAR-GOOS CC Meeting. The Chairman also welcomed invited experts Dr Angus McEwan and Prof. Hiroshi Kawamura. At the invitation by the chairman, Prof. Zhouwen Yu, CC Member of China and Head of Local Organizing Committee for the meeting delivered his welcoming address.

2. ADMINISTRATIVE ARRANGEMENTS

2.1 ADOPTION OF THE AGENDA

2 **The Committee adopted** the agenda (IOC/WESTPAC-NEAR-GOOS-CC-VIII/1.prov.) (Annex I) as proposed.

2.2 DESIGNATION OF RAPPORTEUR

3 Following IOC Rule of Procedure No.25 (3) and considering the present responsibilities in the meeting of both the Russian Federation and China, **the Committee designated** Dr Lee Dong-Young, CC Member, Republic of Korea, as the Rapporteur. Dr Lee accepted the designation.

2.3 WORKING ARRANGEMENTS

4 Regarding the working arrangements for the Session, the Head of the IOC/WESTPAC Secretariat informed the meeting about the working hours, etc. Though the Committee will work in plenary it was decided that ad hoc sessional working groups might be formed to deal with particular items. The working language of the Session was English.

5 Professor Yu reported on the local arrangements and household facilities. He provided the meeting with a list of participants (Annex II).

3. STATUS OF NEAR-GOOS: REPORT ON ITS OPERATION

6 Reports were presented to give an overall picture of the NEAR-GOOS system, its activities and the implementation of the programme and related programmes at the national and regional levels.

3.1 REPORT BY THE CHAIRMAN

7 Acting-chairman of NEAR-GOOS, Dr Vyacheslav Lobanov, reviewed the progress made in NEAR-GOOS since the 7th Session of the Coordinating Committee in October 2002. Despite some problems in national databases operation and exchange management, he noted the continued progress in Regional Databases and increased number of data contributors, data volume and a number of products, e.g. satellite altimetry became available from RRTDB. He expressed gratitude to agencies (i.e., Japan Meteorological Agency, Japan Oceanographic Data Centre) and persons (i.e., Mr T. Yoshida and Mr S. Sato) for maintaining the systems. The latter agency's successful implementation of the IOC/WESTPAC Training Course on NEAR-GOOS Data Management (21 October–1 November 2002, and 10–21 November, 2003, Tokyo) was likewise acknowledged. He also noted progress in observational system and in particular, the start of large observational platforms operation in the Yellow Sea and in the area east of Korea. Hard effort of Dr Lee Dong-Young on the creation and maintenance of the system is highly appreciated. Dr Lobanov mentioned continued efforts by CC members on awareness rising of the project. NEAR-GOOS was presented at the meetings of I-GOOS, IUGG, CREAMS, NOWPAP, PICES and Regional GOOS Forum and became a member of GRAND project, an EC funded initiative aimed to increase interaction between regional GOOS alliances. A substantial progress was achieved in revision and completion of the draft strategic plan for the 2nd phase of NEAR-GOOS through the correspondence between the CC members, organization of an interim meeting in Sapporo in July 2003 and involvement of the IOC consultant Dr Angus McEwan. Dr Lobanov emphasized that it is a main task of the 8th CC meeting to discuss and approve the strategic plan.

3.2 REPORT BY THE WESTPAC SECRETARIAT

8 The Head of the IOC/WESTPAC Secretariat presented a brief report on activities it carried out and reviewed the implementation of actions contained in the action list adopted by the Seventh Session of the Committee. These actions were discussed and the details are given in Annex III.

3.3 REPORT ON REGIONAL DATA BASE MANAGEMENT

3.3.1 Regional Real Time Data Base

9 Mr Takashi Yoshida, the RRTDB Manager, presented his report on the operation and activities related to RRTDB during the last intersessional period. The highlights in his report were the introduction of a registration disposal system and provision of new products (sea surface heights and sea ice analyses) from the Japan Meteorological Agency (JMA). Details of his report are given in Annex IV.

3.3.2 Regional Delayed Mode Data Base

10 Mr Hiroyuki Yoritaka, on behalf of the RDMDDB Manager, reported on the operation of the RDMDDB since the last intersessional period. The following were the highlights of his report:

11 As of the end of October 2003, the total volume of data is about 10 GB. As of 18 November 2003, the present total number of registration users, 254, is almost the same as that of the last year, 246. In addition, from September 2002–October 2003, 4,360 data files were downloaded, the number of downloaded files at present totals 10,619. The September 2003 file of 30-second interval tide data at Urakawa was downloaded 20 times in October 2003. That file includes Tsunami record generated by the Tokachi-oki Earthquake on 26 Sep. 2003. Details of the report are given in Annex V.

3.4 REPORT ON NEAR-GOOS DATA MANAGEMENT TRAINING COURSE

12 Mr Yoritaka, on behalf of Japan Oceanographic Data Centre (JODC), reported on the 6th and 7th Training Course held from 21 October to 1 November 2002 and from 10 to 21 November 2003, respectively. The following are the highlights of the report. The details are given in Annex VI.

13 The lectures on Regional Real-Time Database and Regional Delayed Mode Database operated by JMA and JODC, respectively, were included in the training course. This was intended to share and transfer new technology and the operation system of the NEAR-GOOS to the entire WESTPAC region. Lectures on research and data management of marine biology and chemistry were for the first time given. After the 8th training course, there will be one training course every 2 years.

14 Dr Summerhayes, Director of the GOOS Project Office, suggested keeping a close association between NEAR-GOOS and GODAR-WESTPAC, so that with the support from JODC, a WESTPAC/GODAR/NEAR-GOOS Workshop or Training Course may be held regularly.

Action Point 1: JODC will organize the 2nd Workshop for GODAR-WESTPAC in 2004 and the 8th IOC/WESTPAC Training Course on NEAR-GOOS Data Management in Nov. or Dec. 2005.

3.5 REPORT ON NATIONAL ACTIVITIES

15 Representatives from member states briefed the committee on the operation and management of NEAR-GOOS databases in their countries:

3.5.1 China

16 Dr Yu made a brief report on China's NEAR-GOOS Real Time Database (RTDB), stating that it contains data, users, and other relevant programmes. Some programmes are being carried out to improve marine monitoring network with emphasis on coastal observations, commercial ship operations and telecom systems e.g. A National Key Project on the Improvement of Marine Disaster Forecasting Techniques, China Argo Programme (in progress).

17 On behalf of Prof. Wang Hong, Dr Lin Shaohua (NMDIS, SOA) reported on China's NEAR-GOOS delayed mode database. In 2003 and in addition to the daily maintenance of the database system, the Working Group of China NEAR-GOOS Delayed Mode Database did much work on product development and in speeding up the network transmission. The main contributions in the intersessional period include: database updating and daily maintenance (e.g. 7 MB data have been added into China NEAR-GOOS DMDB from August 2002 to October 2003); development of products (e.g. edition and publication of Climate Atlas of the South China Sea, release on the COInet (China Ocean Information Network) of tide prediction and short-term forecasting of wave and sea surface temperature in Chinese main harbours, release of the long-term tidal prediction in Chinese and Southeast Asian main harbours within the region, development of WebGIS technology); speeding up of network transmission (from 512KB/s to 10 MB/s); database application and service; and development and design of more data and graphic products.

18 Details of the report, including those of Dr Lin Shaohua's, are given in Annex VII.

Action Point 2: To increase its scope, NEAR-GOOS has to make connections with other IOC programmes, i.e., GLOBEC, CLIVAR, etc. thereby enhancing the NEAR-GOOS database.

3.5.2 Japan

19 Mr Yoshida informed the meeting that the Japanese NEAR-GOOS activities were presented in the report of RRTDB (Annex IV), RDMDB (Annex V), and NEAR-GOOS data management training course (Annex VI). He gave information on the project titled 'Physical, Chemical and Biological Studies on Monitoring of Marginal Seas for Ocean Forecasting' carried out by Japanese Universities and Institutes for four years. The project was finished in March 2003, resulting in the publication of considerable number of scientific articles including studies on ocean monitoring.

3.5.3 Republic of Korea

20 The representatives of the Republic of Korea provided information on the status of their national NEAR-GOOS programme. Highlights of the report are given below and the details are in Annex VII (see also Annex VIII).

21 The Korea Oceanographic Data Centre (KODC) has been carrying out an 8-year project to develop an integrated oceanographic data and information network at the national level: the Korea Oceanographic Data and Information Service System (KORDIS). Dr Hee Dong Jeong reported on the system (see also Annex VII). It contains metadata base for promoting oceanographic data and information exchange, the National Delayed Mode Database (NDMDB) for the regional pilot project of GOOS, NEAR-GOOS, and the National ARGO Delayed Mode Database. These two NDMDBs also provide the geographic-based oceanographic data.

22 The flow of both NEAR-GOOS and ARGO data, as well as the data search procedure in the former, are detailed in the report. Websites for the data types were also given: http://kodis.nfrdi.re.kr/near_goos_en/ and <http://kodis.nfrdi.re.kr/argo/>, respectively.

23 In the future, KODC will focus on the historical oceanographic data rescue, improvement of the NDMDB for NEAR-GOOS and ARGO, and development of the KODIS system for data and metadata distribution. Near real-time or real-time data services will also be carried out.

24 Dr Dong-Young Lee reported the present status of the RTOOS in Korea and RTDB. It was noted that KORDI's Pilot NEAR-GOOS Real Time Database stopped its operation temporarily. Many other websites from different institutes provide real-time data. After a considerable increase in real time data, KORDI is rebuilding NEAR-GOOS RRTDB to provide data to Korea and other countries in the region. After few years of operation, KORDI plans to move it to the Ministry of Maritime Affairs and Fisheries (MOMAF).

3.5.4 Russian Federation

25 Professor Victor Akulichev, the representative of the Russian Federation, provided information on the status of the national NEAR-GOOS programme. The highlights are given below. Details of the report are given in Annex VII.

26 The status and development of NEAR-GOOS in Russia have been discussed at two meetings of the National Oceanographic Committee (23 May and 4 November 2003) in Moscow. Following these discussions, a working group on GOOS was established to coordinate and promote national activity under the GOOS project.

27 Since 1998, the Far Eastern Regional Hydrometeorological Research Institute (FERHRI) has maintained the NRTDB (accessible via <http://www.hydromet.com>). A version of the RTDB has been created within the website of the Russian Programme, "Integrated System of Information on the World Ocean" (ISIWO). These databases are accessible via the internet (<http://www.rus.hydromet.com/~esimo/>).

28 The V.I.II'ichev Pacific Oceanological Institute (POI), Far Eastern Branch of the Russian Academy of Sciences, maintains the NDMDB for NEAR-GOOS. Oceanographic observations in the NEAR-GOOS area were continued in 2003 by POI, TINRO, and FERHRI. The information from all oceanographic sources is located in the POI website (<http://www.pacificinfo.ru>) and now is available in a form of metadata. More data provided by Pacific Fisheries Research Centre (TINRO centre) and other fisheries research institutes have been added to the database in 2003.

4. NEAR-GOOS STRATEGIC PLANNING

4.1 DRAFT STRATEGIC PLAN FOR NEAR-GOOS IN ITS 2ND PHASE (2004-2008)

29 Dr Angus McEwan, the Advisory Consultant of NEAR-GOOS, introduced the draft strategic plan. The plan envisions NEAR-GOOS to be recognized as a key source of integrated marine information, services and products to support sustainable social and economic development, welfare and safety in the region. In its second phase, NEAR-GOOS's mission is to develop a comprehensive and sustained ocean observing network in the region's seas and coastal regions, with a goal to develop a basic integrated ocean observing and operational forecasting system in the NEAR-GOOS region.

30 The discussion was focused on four major points which define the actions and tasks for the coming five years: restructuring NEAR-GOOS, strengthening and refining of the database networks, definition, planning and implementation of NEAR-GOOS-labelled projects, and establishment of a directed Outreach Programme. The highlights of the discussion are given below. A draft of the revised plan is in Annex VIII.

4.1.1 Restructuring NEAR-GOOS

31 The structural diagram was discussed at length and certain modifications were suggested which are incorporated in the final draft. These modifications included: the addition of a box for Bilateral Alliances at the level of Member States; the box for JCOMM was 'clipped' from the database box, linking IOC and the Secretariat; and the label "Regional Experiments and TSC" is replaced by "Project". In the restructuring process, national as well as secretariat support was emphasized. The revised structure is incorporated in the revised draft Strategic Plan (Annex VIII)

Action point 3: Dr McEwan to rewrite the text of Figure 1 in Section 4.4.1 (Restructuring NEAR-GOOS).

4.1.2 Enhancing and consolidating the database networks

32 This item was discussed and recommendations made. The substantive recommendation is given as the Action Point below:

Action point 4: Dr McEwan to redraft this section to incorporate the appropriate sections on enhancing coordination from the CC-7 meeting as suggested by Dr Lee. The list from that meeting will form an annex in the revised plan.

4.1.3 NEAR-GOOS-Labelled Projects

33 Potential projects like the following were discussed: data rescue, satellite remote sensing; coastal NEAR-GOOS, NEAR-GOOS Seas Projects, *in situ* monitoring (Ferry box, etc.)

Action point 5: Include detailed description of the above projects in the Strategic Plan.

4.1.3.1 Towards Operational Forecasting

34 The first bulleted statement under this section was deleted as the activity is already being undertaken by some Member States.

4.1.3.2 Joint Projects with other bodies

35 It is possible to include many projects under this heading. But these may not be NEAR-GOOS labelled. So the question is how to differentiate a NEAR-GOOS-labelled project from a non-so-labelled one.

36 One criterion for the 'labelling' is the project's ability to add value, i.e., a project undertaken cooperatively by Member States compared to one done individually (e.g. the Yellow Sea LME which focuses on doing service for the community —the added value).

Focus of the discussion on this section is the possibility of further collaboration. The following are indicative of the possibilities:

4.1.3.2.1 *North Pacific Marine Science Organization (PICES)*

37 With the capability of the hosts of the databases, NEAR-GOOS is well equipped to commence a study of the climatology and variability of the physical dynamics of these seas. With PICES as a scientifically oriented partner, there is potential both to focus on the dynamics of closest relevance to the ecosystems, to stimulate investigations using remote-sensed data which is (or could be) handled by the national and regional DB's and to define additional non-physical variables that have the highest priority for inclusion in the NEAR-GOOS suite of collected data.

4.1.3.2.2 *Integrated Global Observing Strategy (IGOS)*

38 The Global Terrestrial Observing System (GTOS), a theme initiated by IGOS in partnership with GOOS and the International Geosphere-Biosphere Programme (IGBP) provide an opportunity for NEAR-GOOS to develop projects that will open doors to collaboration with the space agencies and regional observing programmes. During the second phase, workshops and other forums should explore the possibilities for expanding NEAR-GOOS roles to include selected projects that exploit new capacities for remote sensing of vulnerable regional coastal areas.

4.1.3.2.3 *Joint WMO/IOC Technical Commission on Oceanography and Marine Meteorology (JCOMM)*

39 JCOMM deals with intergovernmental coordination, regulation and management of operational marine meteorology and oceanography, integrated operational ocean observing system and data management, and new products and services. It is an implementation mechanism for global GOOS. But it needs strong regional interactions and support. This is where a NEAR-GOOS-JCOMM collaboration may be initiated.

4.1.3.2.4 *The Northwest Pacific Action Plan (NOWPAP)*

40 The objectives of NOWPAP appear to anticipate the subsequent development of NEAR-GOOS and it may now be appropriate to re-visit jointly with UNEP the possibility of a joint database and information management and monitoring projects, with a responsible Regional Coordination Unit of NOWPAP.

4.1.3.2.5 *UNDP/GEF Yellow Sea Large Marine Ecosystem (LME)*

41 A Strategic Action Programme is being developed. This programme will facilitate the participating countries China and the Republic of Korea to better understands how to sustain the ecosystem. Under the programme, DPR Korea will have a national component.

42 Under the section on Outreach Programme, discussion focused on the topics, Government Commitment and Financial Resources. Questions were raised regarding these topics. Dr McEwan will revise this part of the section to reflect the changes.

4.1.4 Reporting and Assessment

43 Dr McEwan reported the importance of a periodic external review. This section was not developed in detail and will be undertaken or be refined during the editing of the plan. An external review by WESTPAC was also needed. There exist guidelines for review as well as the experiences of other GOOS programmes to help facilitate the process.

44 As a way forward and to give guidance to Dr McEwan, it was recommended that the plan adopt a broad framework, considering the higher-level decisions at the CC-7. The consultant's report will not be presenting decisions but issues. It will introduce suggestions on what the CC should do in order to achieve the goals and objectives of NEAR-GOOS in its second phase. Hence, and as adopted by other GOOS programmes, there is the need for NEAR-GOOS partners to build a 'regional' system by:

- Promoting the implementation of NEAR-GOOS in and outside the region;
- Develop and enhance networks and pilot/demonstration projects;
- Adapt existing observing systems and integrate them into a common system;
- Survey users to determine their needs;
- Encourage the development of production line (end-to-end) approach connecting initial observation to final product;
- Increase awareness and foster support; and
- Build the needed capacity

45 As the final decision, **the Committee provisionally approved** the plan. Final and full approval is contingent upon: (i) incorporation of the substantive comments and suggestions made by the committee; (ii) the creation of an editorial committee to refine the objectives of NEAR-GOOS in its second phase; and (iii) further input and review among the CC members on substantive issues in the plan. The editorial committee will comprise Dr Angus McEwan (to act as Chairman), Dr Lee Dong-Young, Dr Zhouwen Yu, Mr Hiroyuki Yoritaka, and Dr Miguel D. Fortes.

Action Point 6: Once the draft of the plan is complete, the Editorial Committee to start discussion or meet to finalize the draft.

Action Point 7: Print the Strategic Plan in time for the NEAR-GOOS workshop within the WESTPAC scientific symposium in China in April 2004.

4.2 DEVELOPMENT OF NEW GENERATION SST PROJECT FOR THE NEAR-GOOS REGION

46 Dr Hiroshi Kawamura provided the committee information on this topic. He stressed the need of high-resolution, cloud-free, quality-controlled daily SST products for the users and the regional science community. Ocean Remote Sensing Programme (ORSP: Programme Leader, H. Kawamura) was established as one of the science programmes in the WESTPAC-V in August 2002, and two-projects are now active under the ORSP. New Generation Sea Surface Temperature Project (NGSST-P: Project Leader, H. Kawamura) is one of the projects and its goal is to generate new SST products responding to the above-mentioned regional needs. Better combination of remote sensing measurements and regional *in situ* observation

systems need to be investigated to achieve sustainable generation of the new SST products. Strategic design plan and implementation procedure were discussed and determined by the project members in early 2003. These members represent research and operational agencies of Japan, China, Republic of Korea, Russia and Taiwan.

47 After a brief discussion, the committee thanked Dr Kawamura and expressed its appreciation on the direct linkage of the project to NEAR-GOOS.

5. RELEVANT DEVELOPMENTS IN RELATED PROGRAMMES

5.1 RECENT DEVELOPMENTS IN THE GLOBAL GOOS PROGRAMME

48 Dr Colin Summerhayes, Director of the GOOS Project Office, gave a presentation on recent developments in GOOS at the global scale. The highlights of his presentation as these relate to NEAR-GOOS are briefly summarized below.

49 Dr Summerhayes presented the need for observations of oceanographic phenomena (i.e., El Nino Southern Oscillations, North Atlantic Oscillations) at the global scale and how they affect the world environment especially the lives of people. These are the kinds of information NEAR-GOOS have to generate to be more receptive to the needs of Member States.

50 For his part, Dr Kawamura presented the “Present Status of Ocean Observing Satellites”. His presentation emphasized that in the last decade, satellite remote sensing has become a mature technology because of continuous data supply, improvement of parameter retrieval skills, and increase of experts in satellite oceanography.

51 He also stressed that use of space-based observations is best when complemented by in situ data. A series of operational and R&D satellite sensors for oceanography has been functioning for more than ten years, i.e., Altimeter, Scatterometer, SST sensors, Sea Ice sensors and Ocean Colour sensor. A new IGOS theme relating to the ocean observing system, The Coastal Theme, was established in 2003, and its first meeting was held in November 2003. The table below summarizes the future plan of operational satellites.

Regional Polar Orbiting Operational Satellite			
	2005	2010	Satellite Products
NOAA(US)	→	→	SST
NPOESS(US)	→	→	Ocean Color
METOP(EU)	→	→	Sea Surface Height
FY3(China)	→	→	VectorWinds
Meteor3MN2(Russia)	→	→	ScalarWinds
Jason	→	→	Sea Ice

Regional Geostational Operational Satellite			
	2005	2010	Satellite Products
GO(Japan)	→	→	SST
FY2(China)	→	→	Sea Ice
GO(Korea)	→	→	

5.2 OTHER ORGANIZATIONS AND PROGRAMMES

- 52 The Chairman noted the interactions with other organizations and programmes in the region, and Members were invited, where appropriate, to suggest ways of strengthening relations between these bodies and NEAR-GOOS.

5.2.1 Northwest Pacific Action Plan (NOWPAP)

- 53 Dr Kawamura reported on the meeting of Working Group 4 (Remote Sensing of Marine Environment in NOWPAP/3 Establishment of a Collaborative Regional Monitoring Programme), which was held in Vladivostok, 1–3 December 2003. It aimed to promote, coordinate and harmonize monitoring of coastal and marine environment by remote sensing in Northwest Pacific and develop cooperation among Member States (Russia, China Korea and Japan). As a Term of Reference, members agreed “To make an effort for the cooperation with other regional programmes in view of coastal and marine environmental monitoring” (eutrophication monitoring and oil spill detection). This ToR links implicitly but directly NOWPAP with NEAR-GOOS.

5.2.2 Southeast Asia Global Observing System (SEAGOOS)

- 54 Dr M.D. Fortes made a brief presentation on the status of SEAGOOS. He stressed the point that although not much has been done since its inception in 1998, the interest on the part of IOC Member States in the region for its development remains high. This culminated with the meeting, “A High Level Consultation Meeting for the South East Asian Global Ocean Observing System (SEAGOOS)”, or the SEAGOOS Summit, held in Kuala Lumpur, Malaysia, 21–23 October 2003 where 19 high officials from 12 SE Asian countries came up with a plan to pursue its establishment. This plan included the formalization of an Interim Working Group and a Coordination Committee, establishment of a SEAGOOS Coordination Office at the National University of Singapore, drafting of a MoU among its members, and schedule of meetings for the next 3-5 years. The summit ended with a Meeting Statement, which ensured the commitment of the participants to cooperate in the implementation of the plan.

5.2.3 North Pacific Marine Science Organization (PICES)

- 55 Dr Kim Suam, the representative of PICES, made a presentation on the nature of the organization, its mandate and how its activities are related to those of NEAR-GOOS. He emphasized the importance of an ecosystem approach in the study of the oceans and recommended that this approach be considered by NEAR-GOOS in its activities.

- 56 Dr Kim shared the views of the PICES Science Board, emphasizing, through their formal relationship with GOOS, the need to develop GOOS-type activities in the North Atlantic in collaboration with ICES. At present they are developing pilot projects in the North Sea, to see what kinds of measurements can be made, how data are transferred and handled, etc. They are having active debates as to what types of information to measure, how to measure them, data protocols, etc. ICES and GOOS are both interested in expanding the set of ‘pilot’ projects to other locations in the world, in particular to the North Pacific and PICES. An obvious candidate is NEAR-GOOS. It is the view of PICES that it would be to its advantage to at least be aware of the activities and pilot projects taking place in the ICES region, and to collaborate as much as possible, recognizing the need and advantage of

coordination and collaboration within PICES pilot projects between NEAR-GOOS, (GEM), and Pacific Coastal Observing System (PaCOS). PICES considers the new strategy of NEAR-GOOS approved by the 8th CC Meeting as an important step towards this goal.

5.2.4 Northwest Pacific Action Plan Data and Information Network Regional Activity Centre (NOWPAP DINRAC)

57 Dr Jianguo Wang, Director of NOWPAP DINRAC reported on their activities, which are relevant to NEAR-GOOS. Among others, an item relevant to NEAR-GOOS is stated in the meeting report (UNEP/NOWPAP/DINRAC/FPM 1/13) which mentioned a decision that DINRAC will develop comprehensive documents on “The Policy and Guideline on Data and Information Sharing” and on the “Principle and Guideline on Metadata Management in NOWPAP Region”. Of interest is the financial aspects of NOWPAP from which NEAR-GOOS may draw some ideas in relation to attracting sources to fund its activities e.g. meetings and projects.

58 He also distributed a booklet, which gives information on his organization. His presentation is in the CD, which was distributed at the meeting. Information about the organization, its activities, and databases are accessible in the internet (<http://dinrac.nowpap.org>; dinrac@zhb.gov.cn).

5.2.5 Northwest Pacific Action Plan Data and Information Network Regional Activity Centre (NOWPAP DINRAC)-WESTPAC Project

59 The decision of the CC members on the GODAR-WESTPAC Project was a request to form a technical steering committee and that the ToRs for the committee members be developed and a list of members of particular steering committee be prepared in the intersessional period and approved at the 9th CC meeting.

6. ADDITIONAL ISSUES

6.1 WORKSHOP ON DATA PRODUCTS OF OPERATIONAL OCEANOGRAPHY

60 Mr Takashi Yoshida, the representative from Japan, presented the proposal, “NEAR-GOOS Workshop on Development of Data and Products in Operational Oceanography”. Referring to the informal discussion in Sapporo, July 2003 and to relevant correspondence, it was agreed that the workshop be held in conjunction with the 6th IOC/WESTPAC International Scientific Symposium to be held in Hangzhou, China, in 19–23 April 2004. The meeting suggested that the proposed workshop be held after the symposium.

61 The **CC members agreed** that a committee of four would take the task of organizing the workshop. They **gave** the committee a mandate to organize and implement it.

Action Point 8: Write the Local Organizing Committee of the symposium for this purpose. Recognizing the urgency and the time constraints, all concerned to communicate to Mr Yoshida right away on matters concerning the workshop.

Action Point 9: Put an announcement of the workshop in the IOC/WESTPAC and NEAR-GOOS web pages and establish a special website.

6.2 PROMOTION OF NEAR-GOOS

62 In the discussion, some suggestions were made regarding how NEAR-GOOS could be promoted regionally and globally. These include: a NEAR-GOOS webpage update, publication of the Strategic Plan (translated into different languages), improvement of governmental commitment to NEAR-GOOS; and drafting a MoU among governments of Member States at the WESTPAC symposium in China in April 2004.

63 **The Committee agreed** to the suggestion that information about NEAR-GOOS be mentioned at the Experts' Meeting of the East Asian Seas Congress (Putrajaya, Malaysia, 11 Dec 2003), and presented at the 2nd GOOS Regional Forum (Fiji, 7–9 February 2004). There was consensus to present NEAR-GOOS in GOOS–COOP implementation.

64 The Chairman inquired about the intention of DPRK to participate in NEAR-GOOS projects in the future and what are required to do so.

Action Point 10: Using the suggested means, promote NEAR-GOOS

6.3 OTHER ISSUES

Workshop Proposal: “Circulation of NEAR-GOOS Seas: What Do We Know and How Good Can We Forecast?”

65 A capacity building workshop to be held in summer 2005 was proposed by Dr Lobanov. The workshop will be co-sponsored by PICES, CREAMS (Circulation Research on East Asian Marginal Seas) and other organizations.

Action Point 11: Dr Lobanov to present the proposal in the coming WESTPAC symposium.

7. DATE AND PLACE OF NEXT SESSION

66 Mr Yoshida announced that the Tohoku University, Sendai, in autumn 2004, would be the potential time and place of the Ninth Session. It will be held in cooperation with Japanese CC members and related scientists and Professor Hiroshi Kawamura of the Tohoku University as the local organizing host. It was also proposed that the WESTPAC ORSP New Generation Sea Surface Temperature Project meeting would be held conjunctively with the CC meeting. The Committee members agreed to Japan's proposal with appreciations.

8. ADOPTION OF THE SUMMARY REPORT

67 **The Committee adopted** the draft Summary Report with minor modifications. **The Committee authorized** the NEAR-GOOS Chair and IOC/WESTPAC Secretariat to submit the Summary Report with all Resolutions and Recommendations therein to the Thirty-Seventh Session of the IOC Executive Council planned for June 2004.

9. CLOSURE

68 The Chairman closed the Session by 14.00 on Wednesday, 10 December 2003.

ANNEX I

AGENDA

- 1. OPENING**
- 2. ADMINISTRATIVE ARRANGEMENTS**
 - 2.1 ADOPTION OF THE AGENDA
 - 2.2 DESIGNATION OF RAPPORTEUR
 - 2.3 WORKING ARRANGEMENTS
- 3. STATUS OF NEAR-GOOS: REPORT ON ITS OPERATION**
 - 3.1 REPORT BY THE CHAIRMAN
 - 3.2 REPORT BY THE WESTPAC SECRETARIAT
 - 3.3 REPORT ON REGIONAL DATA BASE MANAGEMENT
 - 3.3.1 Regional Real Time Data Base**
 - 3.3.2 Regional Delayed Mode Data Base**
 - 3.4 REPORT ON NEAR-GOOS DATA MANAGEMENT TRAINING COURSE
 - 3.5 REPORT ON NATIONAL ACTIVITIES
 - 3.5.1 China**
 - 3.5.2 Japan**
 - 3.5.3 Republic of Korea**
 - 3.5.4 Russian Federation**
- 4. NEAR-GOOS STRATEGIC PLANNING**
 - 4.1 DRAFT STRATEGIC PLAN FOR NEAR-GOOS IN ITS 2ND PHASE (2004-2008)
 - 4.1.1 RESTRUCTURING NEAR-GOOS**
 - 4.1.2 Enhancing and consolidating the database networks**
 - 4.1.3 NEAR-GOOS-Labelled Projects**
 - 4.1.4 Reporting and Assessment**
 - 4.2 DEVELOPMENT OF NEW GENERATION SST PROJECT FOR THE NEAR-GOOS REGION
- 5. RELEVANT DEVELOPMENTS IN RELATED PROGRAMMES**
 - 5.1 RECENT DEVELOPMENTS IN THE GLOBAL GOOS PROGRAMME
 - 5.2 OTHER ORGANIZATIONS AND PROGRAMMES
- 6. ADDITIONAL ISSUES**
 - 6.1 WORKSHOP ON DATA PRODUCTS OF OPERATIONAL OCEANOGRAPHY

6.2 PROMOTION OF NEAR-GOOS

6.3 OTHER ISSUES

7. DATE AND PLACE OF NEXT SESSION

8. ADOPTION OF THE SUMMARY REPORT

9. CLOSURE

ANNEX II

LIST OF PARTICIPANTS

Committee Members:

People's Republic of China

Prof. Zhouwen YU
Honorary Director-General
National Marine Environment, Forecasting Centre
State Oceanic Administration (SOA)
8 Dahuisi, Haidian District, Beijing 100081
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6217 3625
Fax: +86 10 6217 3620
E-mail: yuzw@sun.ihep.ac.cn

Ms Shaohua LIN
Director-General
National Marine Data and Information
Services (NMDIS)
State Oceanic Administration
93 Liuwei Rd., Hedong District
Tianjin 300171
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 22-24010801
Fax: +86 22 2430 4408
E-mail: shlin@mail.nmdis.gov.cn

Japan

Mr Takashi YOSHIDA
Forecaster, Office of Marine Prediction
Marine Division
Climate and Marine Department
Japan Meteorological Agency (JMA)
1-3-4 Otemachi, Chiyoda-ku, Tokyo 1008122
JAPAN
Phone: +81 3 3212 8341 ext 5128
Fax: +81 3 3211 3047
Email: tyoshida@met.kishou.go.jp

Mr Hiroyuki YORITAKA
Deputy Director,
Environmental and Oceanographic Research Division
Hydrographic and Oceanographic Department,
Japan Coast Guard
5-3-1, Tsukiji, Chuo-ku, Tokyo, 1040045
JAPAN
Phone: +81 3 3541 3814
Fax: +81 3 3541 3762
E-mail: yoritaka@jodc.go.jp

Republic of Korea

Dr Dong-Young LEE
Korea Ocean Research & Development
Institute (KORDI)
P.O. Box Ansan 29
Seoul 425-600
REPUBLIC OF KOREA
Phone: +82 31 400 6341
Fax: +82 31 408 5823, 5820
E-mail: dylee@kordi.re.kr

Dr Hee-Dong JEONG
Director
Korea Oceanographic Data Centre (KODC)
Oceanography Division,
National Fisheries Research and
Development Institute
Shirang ri, Kijang up, Kijang gun
Busan 619-900
REPUBLIC OF KOREA
Phone: +82 51 720 2210
Fax: +82 51 720 2225
E-mail: hdjeong@nfrdi.re.kr

Russian Federation

Prof. Victor AKULICHEV (Chairman)
Director, V.I.Il'ichev Pacific Oceanological
Institute (POI)
Far Eastern Branch, Russian Academy of Sciences
43 Baltyskaya Street
Vladivostok 690041
RUSSIAN FEDERATION
Phone: +7 4232 311 400
Fax: +7 4232 312 573, 312 600
E-mail: akulich@marine.febras.ru

Observers:

Dr Angus MCEWAN
Scientific Adviser in Oceanography,
CSIRO Marine Research
300 Sandy Bay, Rd Sandy Bay
Tasmania 7005
AUSTRALIA
Phone: +61 3 622 34 912
Fax: +61 3 622 34 912
E-mail: oceans@iprimus.com.au

Dr Hiroshi KAWAMURA
Centre for Atmospheric and Oceanic Studies
Graduated School of Science, Tohoku University
Aramaki-Aza-Aoba, Aoba-ku,
Sendai, Miyagi 9808578
JAPAN
Phone: +81 22 217 6745
Fax: +81 22 217 6748
E-mail: kamu@ocean.caos.tohoku.ac.jp

Dr Hyung-Tack Huh (Chairman, WESTPAC)
Senior Research Fellow
Korea Ocean Research & Development
Institute (KORDI)
Ansan P.O.Box 29, Seoul 425-600
REPUBLIC OF KOREA
Phone: +82 31 400 6201
Fax: +82 31 408 5934
E-mail: hthuh@kordi.re.kr

Dr Vyacheslav LOBANOV (Acting CC Chair)
Deputy Director
V.I.II'ichev Pacific Oceanological Institute (POI)
Far Eastern Branch, Russian Academy of Sciences
43 Baltyskaya Street, 690041 Vladivostok
RUSSIAN FEDERATION
Phone: +7 4232 312 377
Fax: +7 4232 312 573
E-mail: lobanov@poi.dvo.ru

Mr Xiaoming LI
Director-General, Department of Marine
Environment Monitoring and Protection,
State Oceanic Administration (SOA)
1, Fuxingmenwai Ave., Beijing 100860
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6804 7677
Fax: +86 10 6804 7644
E-mail: yb@soa.gov.cn

Dr Wenxi ZHU
Deputy Director
Division of International Ornazation,
Department of International Cooperation,
State Oceanic Administration (SOA)
1, Fuxingmenwai Ave., Beijing 100860
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6801 9791
Fax: +86 10 6804 8051
E-mail: zzh@soa.gov.cn

Mr Keun-Oh KIM
Deputy Director, Marine Development Division
Bureau of Ocean Policy
Ministry of Maritime Affairs and Fisheries
(MOMAF)
REPUBLIC OF KOREA
Phone: +82 2 3148 6535
Fax: +82 2 3148 6536
E-mail: conti2169@momaf.go.kr

Prof Suam KIM (Representative of PICES)
Department of Marine Biology
Pukyong National University
599-1 Daeyeon 3-dong, Nam-gu, Pusan
REPUBLIC OF KOREA 608-737
Phone: +82 51 620 6268
Fax: +82 51 620 6268
E-mail: suamkim@pknu.ac.kr

Mr Jianguo WANG (Representative of
NOWPAP)
Director, NOWPAP/DINRAC
No.1 Yuhui Nanlu, chaoyan District
Beijing 100029
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 8464 0869
Fax: +86 10 8463 0849
E-mail: jgwang@zhb.gov.cn

Dr Wenjing Fan
National Marine Data and Information
Services (NMDIS)
State Oceanic Administration (SOA)
93 Liuwei Rd., Hedong District
Tianjin 300171
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 22 24010831
Fax: +86 22 2430 4408
E-mail: fanwj@mail.nmdis.gov.cn

Mr Su-Man KIM, Counsellor,
Embassy of the Democratic People's Republic
of Korea (DPRK)
Ri Tan Bei Lu, No.11, Jian Guo Men Wai,
Beijing
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6532 0683
Fax: +86 10 6532 6056

Mr Ryang-II CHAE
Counselor
Embassy of the Democratic People's Republic
of Korea (DPRK)
Ri Tan Bei Lu, No.11, Jian Guo Men Wai,
Beijing
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6532 4036
Fax: +86 10 6532 4036
E-mail: Kcholg@sohu.com

Local Organising Staff Members:

Prof. Jihui YAN
Division of Science and Technology,
National Marine Environment Forecasting Centre
State Oceanic Administration (SOA)
8 Dahuisi, Haidian District, Beijing 100081
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6217 3598
Fax: 86 10 6217 3620
E-mail: yanjh@nmefc.gov.cn

Mr Youchang LAN
Deputy Director
Division of Science and Technology
National Marine Environment Forecasting Centre
State Oceanic Administration (SOA)
8 Dahuisi, Haidian District, Beijing 100081
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6217 3598
Fax: 86 10 6217 3620
E-mail: lanyc@nmefc.gov.cn

Mr Junlong WANG
National Marine Environment Forecasting Centre
State Oceanic Administration (SOA)
8 Dahuisi, Haidian District, Beijing 100081
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 62105796
Fax: 86 10 6217 3620
E-mail: wangjunlong@tsinghua.org.cn

Mr Guodong WANG
National Marine Environment Forecasting Centre
State Oceanic Administration (SOA)
8 Dahuisi, Haidian District, Beijing 100081
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6210 5806
Fax: 86 10 6217 3620
E-mail: guozicn@tom.com

Ms Xiangxiang REN
National Marine Environment Forecasting Centre
State Oceanic Administration (SOA)
8 Dahuisi, Haidian District, Beijing 100081
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6210 5736
Fax: 86 10 6217 3620
E-mail: qikuo81@hotmail.com

Ms Boya LI
National Marine Environment Forecasting Centre
State Oceanic Administration (SOA)
8 Dahuisi, Haidian District, Beijing 100081
PEOPLE'S REPUBLIC OF CHINA
Phone: +86 10 6210 5806
Fax: 86 10 6217 3620
E-mail: boya_li@sina.com

IOC Secretariat:

Dr Colin SUMMERHAYES
Director, GOOS Project Office
Intergovernmental Oceanographic
Commission (IOC), UNESCO
1 rue Miollis, 75732
Paris Cedex 15
FRANCE
Phone: +33 1 45 68 40 42
Fax: +33 1 45 68 58 13
E-mail: c.summerhayes@unesco.org

Dr Miguel FORTES
Head, the IOC Secretariat for the Western
Pacific (IOC/WESTPAC)
c/o National Research Council Thailand
196 Phaholyothin Road
Chatujak, Bangkok 10900
THAILAND
Phone: +66 2 561 5118
Fax: +66 2 561 5119
E-mail: westpac@samart.co.th

Mr Kazuya HASHIMOTO
Associate Expert, GOOS Project Office
Intergovernmental Oceanographic
Commission (IOC), UNESCO
1 rue Miollis, 75732
Paris Cedex 15
FRANCE
Tel: +33 1 45 68 39 74
Fax: +33 1 45 68 58 13
E-mail: k.hashimoto@unesco.org

ANNEX III

**IOC/WESTPAC role on decisions, recommendations and requests of NEAR-GOOS-CC-VII
(Vladivostok, 2–4 October 2002) (with support from the CC Chair and Members)**

Ref	Subject	Decision	Target date	Comments
Item 3.2 para 15	Membership status	To consult with SOA ¹ on the status of Mr Wang Hong's membership in the NEAR-GOOS Coordinating Committee	ASAP	Mr Wang's membership is confirmed
Item 3.2 para 18	Release of ONR datasets	To make further efforts to request the release of ONR datasets for incorporation in RDMDDB	As feasible	Discuss with related principal scientists of the project. Not completed yet
Item 3.2 para 19; Item 5.1 para 57	COOP strategic plan; Relevance to the Global GOOS Programme	To distribute the COOP strategic design plans to the CC members; To ensure that CC members receive a copy of the coastal GOOS Design Plan and other documents considered relevant as input to the strategy planning exercise	ASAP	http://ioc.unesco.org/goos/ GOOSnews/flash_11.htm ; Additional announcement sent to the CC members on Oct. 21, 2003
Item 4.1 para 50; Item 6.2 para 69; Item 6.2 para 70	NEAR-GOOS Strategy Plan Promotion of NEAR-GOOS Promotion of NEAR-GOOS	To draft the 2 nd phase NEAR-GOOS Strategy Plan (2002-2007); To arrange for an attractive layout and subsequent printing of the strategy plan plus accompanying brochure To consider translation and publishing of the strategy plan in the national language	ASAP Appropriate time Appropriate time	Based on the tentative outline agreed in CC-7 Prepared by Dr McEwan
Item	PICES ²	To maintain/increase	Continuous	Presentations on NEAR-

¹ SOA : State Oceanic Administration (People's Republic of China)

5.2.3 para 65 (With Japanese input)		collaboration with other organizations and programmes (especially PICES) in areas of mutual interest	ensuring NEAR- GOOS presence at annual PICES meeting	GOOS status and plans were made at the PICES XII Annual Meeting, CREAMS-III preparatory workshop, NOWPAP RAC meetings (Lobanov) and IUGG Assembly (Sato, Yoshida)
Item 6.1 para 67	Workshop on Data Products of Operational Oceanography	To further elaborate on the scope of and plans for the proposed Workshop on Data Products of Operational Oceanography	ASAP	Steering Committee is nominated, First announcement is prepared

ANNEX IV

REPORT ON THE REGIONAL REAL TIME DATA BASE (RRTDB)

Takashi YOSHIDA, Japan Meteorological Agency

General state of operation

The Regional Real Time Data Base (RRTDB) was suspended at the beginning of the 2003 by illegal access. However, damage or intrusions have not been found at the RRTDB.

User registration

The number of the registered users of the RRTDB is 97 as of November 1st 2003. 127 users have registered since August 2002, and 282 registrations have expired since February 2003. The details of the registered users are: from Japan (61), China (10), Republic of Korea (5), Russian Federation (10), USA (2), India (2), Malaysian (1), Vietnam (1), Germany (1), UK (1) and Canada (3).

Provision of the data to RRTDB

In addition to the data available from the Global Telecommunication System (GTS), the Japan Meteorological Agency and its marine observatories, the Japan Fisheries Information Centre, and the Marine Environmental Data Service (Canada) contribute data to RRTDB.

Data retrieval from RRTDB

Number of access to the RRTDB web pages had a peak of over 14,000 hits/month on July 2003 and an average of around 7,000 as from August 2002. Number of access to the pages for registered users was around 2,000 to 3,000.

Number of ftp data retrieval requests has been around 4,000 to 6,000 since January 2003. The data requested most frequently was SHIP code data in the global ocean. TESAC, BATHY, BUOY and TRACKOB code data in the global ocean and the JMA's sea surface temperature analyses were also requested frequently.

Disposal of the registrations

Because of a security reason, the disposal system of the registrations, which have not been used for 6 months, started on 1st February 2003. The disposal is executed every month by checking the logs of the access to the data and to the limited web pages per users.

New products

(1) Sea Surface Heights Analysis by JMA

Objectively analyzed sea surface height data in the pacific have been available since November 2003. The sea surface heights are analyzed every 5 days by using Jason-1 altimeter data and adopting 3-dimensional optimal interpolation.

(2) Sea Ice data

JMA is planning to provide the sea ice data around the sea of Okhotsk. The sea ice distribution (imaged map) and its concentrations (gridded values) were available from December 2003.

ANNEX V

REPORT ON THE REGIONAL DELAYED MODE DATA BASE (RDMDDB)

Mr Hiroyuki Yoritaka, Japan Oceanographic Data Centre (JODC)

Japan Oceanographic Data Centre (JODC) has been operating RDMDDB since October 1996, based on the recommendation of the first session of the NEAR-GOOS Coordinating Committee held in Bangkok in September 1996.

32 different types of data files are handled by RDMDDB (Table 1). As of the end of October 2003, the total volume of data is about 10GB.

Table 1: Data type and volume of NEAR-GOOS RDMDDB

Type of Data	Description of Data	Data Volume
BATHY	Regional Data Sets of BATHY Report	9.4 MB
BATHY_G	Global	14.8 MB
BUOY	Regional Data Sets of BUOY Report	114.7 MB
BUOY_G	Global	1,489.5 MB
SHIP	Regional Data Sets of SHIP Report	125.3 MB
SHIP_G	Global	947.6 MB
TESAC	Regional Data Sets of TESAC Report	9.9 MB
TESAC_G	Global	84.1 MB
TRACKOB	Regional Data Sets of TRACKOB Report	0.5 MB
TRACKOB_G	Global	4.8 MB
SSTANL(JMA)	Gridded Daily Sea Surface Temperature data in the Western North Pacific	95.7 MB
DAILY SST	Daily sea surface temperature data analysis	68.5 MB
GLBSST	Monthly mean sea surface temperatures, Normal and Standard deviations	1.7 MB
WNPSST	10-day mean sea surface temperature, Normal and Standard deviation	1.7 MB
ADJSUBS(JMA)	Monthly mean subsurface temperatures in seas around Japan (100m, 200m, 400)	4.5 MB
PACSUBS(JMA)	Monthly mean subsurface temperatures in Pacific (100m,200m,400)	7.7 MB
SUBST	Sub surface temperature decode result	314.4 MB
SUBST_ERROR	Sub surface temperature decode error report	4.5 MB
TS	Sea and sub surface temperature and salinity decode	176.6 MB
GLBTS	Global	2,307.9 MB
WIND	Wind decoded Data at RRTDB	84.2 MB
WIND_ERROR	Wind decoded ERROR Report	1.0 MB
WIND2	Wind decoded Data (format ver.2.0)	43.3 MB
GLBWIND	Global	601.1 MB
FERHRI ship	Marine Meteorological observation data on board by FERHRI, Russia	3.7 MB
FERHRI station	Marine Meteorological observation data at the station by FERHRI, Russia	0.2 MB
JAFIC	Sea surface/sub surface temp. data from Japan Fisheries Information Service Centre (JAFIC), Japan	31.6 MB
PALACE	Sub surface temp. profile data observed by PALACE float from Ocean Research Institute (ORI), Univ. of Tokyo, Japan	0.1 MB
TOHOKU Univ.	XBT data observed by Tohoku University	0.1 MB
GTSP	GTSP Quality Controlled Subsurface Temperature and Salinity data provided by MEDS	25.3 MB
NOWPHAS	Coastal wave data by Port and Airport Research Institute	17.1 MB
30s*	30sec. interval sea level data at the tidal station, Japan Coast Guard	3,476.8 MB
Total		10,068.2 MB

The RDMDB has received the wave data at 53 sites around Japan in 2001 from the Port and Airport Research Institute. Such data are now available on RDMDB.

Based on the approval of the seventh session of NEAR-GOOS-CC, it has been possible to download the data from RDMDB without registration, since 8 Nov. 2002. The number of registration users of each country as of 18 Nov. 2003 is shown in Table 2. The present total number of registration users, 254, is almost the same as that of the last year, 246.

Table 2: Number of Registrations

Institution Country	Government	Education	Non-profit Organization	Others	Total
Japan	57	49	17	36	159
China	10	4	1	1	16
Korea	3	13	2	7	25
Russia	24			2	26
USA	1	9		2	12
Others	7	4		5	16
Total	102	79	20	53	254

At the seventh session of the NEAR-GOOS-CC, we reported that the total number of the downloaded data files since the establishment of RDMDB reached 6259 as of August 2002. After the last report, 4360 data files were downloaded from September 2002 to October 2003. As a result, the total number of downloaded files reaches 10619 as of the end of October 2003. The monthly download numbers from each country are shown in Table 3.

The file of 30-second interval tide data at Urakawa in September 2003 was downloaded 20 times in October 2003. That file includes Tsunami record generated by the Tokachi-oki Earthquake on 26 September 2003.

Table 3: Number of data files downloaded every month from each country

	2002				2003										Total
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Japan	166	162	168	42	62	21	22	604	91	151	68	8	3	148	1716
Russia	24	65	35	4	24	2	34	31	11		8	4	29		271
Korea		4							1			4		5	14
China					642	635						37			1314
Netherlands			145												145
Canada											14	210			224
Indonesia											14			13	27
USA														45	45
Germany														4	4
Unknown		41	9	7	4	3	4	48	22	50	39	41	54	278	600
Total	190	272	357	53	732	661	60	683	125	201	143	304	86	493	4360

ANNEX VI

REPORT ON NEAR-GOOS DATA MANAGEMENT TRAINING COURSE

Mr Yoritaka, Japan Oceanographic Data Centre (JODC)

Since 1997, the IOC/WESTPAC Training Course on NEAR-GOOS Data Management has been held at the JODC under the auspices of Japan-UNESCO Funds in Trust. During the intersessional period, the 6th and 7th Training Courses were held at JODC. One of its purposes is share and transfer new technology and the operation system of the NEAR-GOOS to the entire WESTPAC region. In this context, the lectures on Regional Real-Time Database and Regional Delayed Mode Database operated by JMA and JODC, respectively, were included in the training course.

The 6th Training Course was held from 21 October to 1 November 2002 in Tokyo. Seven participants from the following countries attended the course: China, Fiji, Indonesia, Malaysia, Republic of Korea, Russian Federation, and Thailand. Lectures on research and data management of marine biology and chemistry were for the first time given during the course in view of the importance of biology and chemistry in the study of the marine environment and the importance of managing the data. JODC has a long experience in marine biological data management and also has a responsibility for data management and exchange for JGOFS project in Japan since 1993. These experiences of JODC were presented in the lecture.

Mr Robert Gelfeld, WDC Silver Spring for Oceanography, was invited as a lecturer. He talked on WDCs, IODE system, GODAR (Global Oceanographic Data Archaeology and Rescue), and WOD (World Ocean Database).

The Seventh Training Course was held from 10 to 21 November 2003 in Tokyo. Seven participants from the following countries attended the course: China, Indonesia, Philippines, Republic of Korea, Russian Federation, Thailand, and Vietnam. The course programme is given in ANNEX 4.

During the Course, Mr Sydney Levitus, Director of WDC Silver Spring for Oceanography, stayed in Japan to participate in the First Argo Science Workshop, which was held in Tokyo, 12-14 November 2003. He gave a special lecture on GODAR and WOD. The other lecturers invited were from Japan Coast Guard, Japan Meteorological Agency, Ocean Research Institute of University of Tokyo, and Marine Information Research Centre of Japan Hydrographic Association.

As future plans, JODC will organize the Second Workshop for GODAR-WESTPAC in 2004, as mentioned in the report on the development of GODAR-WESTPAC. Due to the limited manpower and budget, JODC cannot organize both the training course and the workshop for GODAR-WESTPAC in one year. JODC plans to hold the eighth IOC/WESTPAC Training Course on NEAR-GOOS Data Management in 2005.

COURSE PROGRAMME

*Seventh IOC/WESTPAC Training Course on NEAR-GOOS Data Management
(10 – 21 November 2003, at JODC, Tokyo, Japan)*

Monday, 10 November 2003

Morning Opening Ceremony and Course Orientation
Afternoon Lecture on Outline about IOC, WESTPAC, NEAR-GOOS and other Projects by using the IODE resource Kit

Tuesday, 11 November 2003

Morning Lecture on NEAR-GOOS Regional Real Time Data Base
Afternoon Study Visit to Japan Meteorological Agency
 Special Lecture on GODAR and WOD by Mr Sydney Levitus

Wednesday, 12 November 2003

Morning Study Visit to the First Argo Science Workshop
Afternoon Country Report Presentation; Introduction of Oceanographic Data Management in the Participants' Countries

Thursday, 13 November 2003

Morning Lecture on CTD and BT Data Processing
Afternoon Study Visit to Survey Vessel

Friday, 14 November 2003

Study Visit to: National Research Institute of Fisheries Science
 Japan Marine Science and Technology Centre

Monday, 17 November 2003

Morning Lecture on Marine Chemical Data Processing
Afternoon Lecture on Marine Biological Data Processing

Tuesday, 18 November 2003

Morning Lecture on Tidal Data Processing
Afternoon Lecture on Ocean Current Data Processing

Wednesday, 19 November 2003

Morning Lecture on Oceanographic Data and Information Management in JODC
Afternoon Practice in NEAR-GOOS Delayed Mode Data Exchange System and J-DOSS (JODC Data On-line Service System)

Thursday, 20 November 2003

All Day Practice in Data Quality Control and Data Management by using the IODE Resource Kit

Friday, 21 November 2003

Morning Course Evaluation and Closing Ceremony
Afternoon Customized Special Study

ANNEX VII

REPORT ON NATIONAL ACTIVITIES

REPORT ON CHINA NEAR-GOOS DELAYED MODE DATABASE

Prof. Wang Hong NMDIS/SOA/China (Reported by Dr Lin Shaohua, Beijing, Dec. 8-10, 2003)

Besides daily maintenance of the database system to guarantee its daily running, the Working Group of China NEAR-GOOS Delayed Mode Database did much work on the product development in 2003. They also did a lot in speeding up the network transmission. Their main contributions in the intersessional period are summarized as follows:

Database Updating and Daily Maintenance

On the one hand, various kinds of data and information were updated and added duly, on the other hand, a large number of data from other relevant websites were downloaded and provided. Daily maintenance of the database system was done to guarantee its running.

7MB data have been added into China NEAR-GOOS Delayed Mode Database from August 2002 to October 2003, including all the real-time data from China NEAR-GOOS Real time Database, the delayed data from Chinese marine stations and the real time observational data released by the participating countries of NEAR-GOOS. All kinds of data were updated monthly. The increased data are showed in the following table:

Data types	Increased data quantity
Tide Forecast	200 (KB)
Buoy data of China	52.1 (KB)
Ship Data of China	2.11 (MB)
Ship Data of Russia	1.21 (MB)
Station Temperature and Salinity Data	315 (KB)
Station Wave and Wind Data	2.84 (KB)
The Coastal Station Data of China	87.6 (KB)
The Coastal Station Data of Russia	438 (KB)
Total	7.177 (MB)

Development of Products

In order to provide users with better service, the Working Group has always made efforts to develop more data products and graphic products.

At present, scientists from the National Marine Data and Information Service (NMDIS) and other institutions under the State Oceanic Administration (SOA) of China are engaged in the edition and publication of Climate Atlas of the South China Sea. The Atlas will contain the monthly distribution charts, annual variation charts and statistical parameter charts of all kinds of climate elements, and the distribution charts of typhoon and tropical storm. The climate elements include wind, air temperature, air pressure, cloudiness, visibility and weather phenomena. The statistical parameters are vector of wind stress coefficient, vector of evaporation coefficient, sea-surface specific humidity and so on. At the same time of its publication, the Atlas will be released on the website.

The tide prediction of Chinese main harbours, as well as short-term forecasting of wave and sea surface temperature thereof, has been released on the COInet (China Ocean Information Network). The long-term tidal predication of Chinese and Southeast Asian main harbours within the NEAR-

GOOS region has been released in the column of Data and Data Product Service on the website of China NEAR-GOOS Delayed Mode Database.

In addition, the development of WebGIS technology is being carried on for the statistical graphic products of marine hydrology, meteorology and so forth.

Speeding Up Network Transmission

The network route was updated to speed up the network transmission. Now, the transmission speed increases to 10MB/s from 512KB/s, almost 20 times faster than before.

Database Application and Service

Since it was set up, more than 13400 users have visited the website of China NEAR-GOOS Delayed Mode Database. The visitors were from universities, colleges and research institutions both domestic and abroad, as well as from the international organizations, enterprises and individual scientists. They visited the database website mainly for the purpose of study, research and analysis, information inquiry, data access and education. According to the approximate statistics, the data was applied in the GTSP data processing research, marine pollution research, and research and analysis on air-sea interactions and El Nino.

Development Design

In order to provide more services to users, more data and graphic products will be developed and issued on the website, including more and more important metadata. ARGO data are from a lot of countries in the world. The NMDIS of China has done a lot of work on the delayed processing of ARGO data. Some achievements have been made. The quality of these data is much better than that of real time data. They would like to share their achievements with the neighboring countries. The processed ARGO data will be released on the website when its operational system is accomplished.

JAPAN

Please refer to the National Report of Japan (Item 3.5.2 of Section 3.5: Report on National Activities, p. 10) for a summary of its accomplishments. The country report of Japan comprises the reports given in ANNEXES IV, V and VI.

REPUBLIC OF KOREA

Introduction

Korea Oceanographic Data Centre

The Korea Oceanographic Data Centre (KODC) was established in 1974 by the Ministry of Science and Technology (MOST) in accordance with the resolution adopted by the IOC of UNESCO. KODC is now hosted by the National Fisheries Research & Development Institute (NFRDI) since 1980. NFRDI is a branch of the Ministry of Maritime Affairs and Fisheries (MOMAF) and conducting oceanographic observation and research on the long-term variability in oceanographic conditions and ecosystem for the seas around Korea, and operating the national environmental monitoring system in Korean coastal areas for the efficient management and conservation of fisheries resources.

The Roles and Responsibilities of KODC

- Acquisition of data and inventories from national and international sources.
- International data exchange and providing data to users on request.
- Publication of oceanographic data and information acquired.
- Managing historical datasets for the seas around Korea.
- Developing management systems for oceanographic data and metadata.

Data Management and Service Activities of KODC

Considering the multi-disciplinary nature of the ocean development and its long term prospect, KODC has been carrying out 8 year project to develop an integrated oceanographic data and information network at the national level, the Korea Oceanographic Data and Information Service System (KODIS). KODIS contains Metadata Base for promoting oceanographic data and information exchange, the National Delayed Mode Data Base (NDMDB) for the regional pilot project of the Global Ocean Observing System (GOOS), the North-East Asian Regional GOOS (NEAR-GOOS), and the National Argo Delayed Mode Data Base. These two NDMDBs also provide the geographic-based oceanographic data.

DATA FLOW

NEAR-GOOS Data

Data sources of the National Delayed Mode Data Base are the serial oceanographic data observed bimonthly and the coastal oceanographic data observed daily by NFRDI. Serial oceanographic data are primarily compiled and edited in Excel sheet file, and these are automatically imported into the database after completing QA/QC procedures. Coastal oceanographic data are primarily compiled and edited in ASCII file, and also automatically imported into the database. User data services are carried out by internet homepage.

RUSSIAN FEDERATION

The status of NEAR-GOOS and approaches to its development in Russia has been discussed at two meetings of the National Oceanographic Committee held 23 May and 4 November 2003 in Moscow. Following these discussions, a special working group on GOOS was established to coordinate and promote national activity under the GOOS project.

Both NRTDB and NDMDB have been continuing their activities in 2003. Since 1998, the Far Eastern Regional Hydrometeorological Research Institute (FERHRI) has maintained the former system, accessible via <http://www.hydromet.com>. FERHRI continues to provide operational data from 3 coastal stations and ship meteorological observations to Regional RTDB for NEAR-GOOS. A version of the RTDB has been created within the website of the Russian Programme, "Integrated System of Information About the World Ocean" (ISIWO). It contains information on NEAR-GOOS, websites of organizations connected with it, and metadata on operational and historical meteorological and oceanographic data sets on the Pacific Ocean. These databases are accessible via the internet (<http://www.rus.hydromet.com/~esimo/>).

The NDMDB for NEAR-GOOS has been maintained by the V.I.Ilichev Pacific Oceanological Institute (POI), Far Eastern Branch of the Russian Academy of Sciences. The base includes data of historical Russian and foreign observations of temperature and salinity in the Northwest Pacific including NEAR-GOOS seas and the data set of POI, FERHRI, and the Pacific Fisheries Research Centre (TINRO-Centre) marine expeditions (hydrology, chemistry, and biology).

The information from all oceanographic sources is located in the POI website (<http://www.pacificinfo.ru>). More data provided by TINRO and other fisheries research institutes have been added to the database in 2003. A catalogue of the cruises implemented by Russian oceanographic vessels in the NEAR-GOOS seas has been developed. The cruise scheme, hydrographic sections and brief reports are provided in each cruise.

Oceanographic observations in the NEAR-GOOS area were continued in 2003 by POI, TINRO, and FERHRI. POI continues a monitoring programme of the area south of Primorye coast, Russia, since 1999. Three cruises with around 120 stations of CTD, chemical, Chl-a and phytoplankton observations were implemented in February-March and October-November 2003. Main repeated stations are located along 131-30 E, 132-20 E and 134 E. Operational data were provided 2 times a day to GTS via Russian hydrometeorological service. Final data are located at POI database and the metadata are available through DMDB.

Representatives of TINRO and POI had attended the 6th and 7th IOC/WESTPAC Training Courses for NEAR-GOOS Data Management organized by JODC in 2002 and 2003. The effort of JODC in supporting these courses is highly appreciated.

ANNEX VIII

A STRATEGIC PLAN FOR NEARGOOS IN ITS SECOND PHASE (2004–2008)

The primary aim of NEARGOOS in its First Phase was to facilitate the sharing of oceanographic data gathered by agencies of the partner countries using the Internet, to support the daily mapping of conditions in the marginal seas bordered by the partner countries (<http://ioc.unesco.org/goos/neargoos.htm>). Following a modest beginning, it succeeded in consolidating a functional two-mode ‘distributed’ Internet-based database structure in the partner countries as a workable model for the enhancement and handling of oceanographic data at national level. It linked this structure with two Regional Databases that are responsible for the receipt and merging of data concerning the NEARGOOS region as a whole, thus creating a regional database system, which is part of the GOOS. It likewise adopted and practiced a free and open data exchange policy, predating the formulation of such a policy for GOOS as a whole. In addition, it implemented a coordinated and approved data exchange management training for regional participants.

As it enters its Second Phase, NEARGOOS faces two great challenges: that of ocean science being brought to bear on some of the most pressing regional and global environmental problems; and how its programmes and activities be strategically developed to deliver benefit and utility of its ocean data-gathering effort to its member states. Meeting these challenges require more direct involvement and coordinated efforts of the agencies concerned and the recruitment of a wider range of organizations and disciplines. These concerns provided the main impetus for the development of The Strategic Plan for NEARGOOS in its Second Phase (2003-2008).

The Strategic Plan was provisionally approved at the 8th Session of the NEARGOOS Coordinating Council (Beijing, December 2003). After incorporation of all comments, the final version was approved and the Plan was adopted for implementation at an ad hoc meeting of the Coordinating Council Members at the NEARGOOS Workshop in WESTPAC-VI International Scientific Symposium (Hangzhou, April 2004).

THE MISSION OF NEAR-GOOS IN ITS SECOND PHASE

‘To develop a comprehensive and sustained ocean observing network in the North-East Asian regional seas and coastal regions, especially focused on observations, monitoring and other activities that cannot be easily implemented by countries acting independently. This network will embrace a wide range of data types and will be accompanied by pilot observing experiments, trials and demonstrations, training and useful products for use by the participating members and as a contribution to the GOOS and other global observing initiatives.’

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1. BACKGROUND

1.1 DEVELOPMENT OF INTERNATIONAL MARINE DATA EXCHANGE NETWORKS

The conduct of any maritime activity inevitably involves the use of observational data. Among the more obvious applications are navigation, marine safety, naval operations, weather and climate forecasting, commercial operations (such as fishing and offshore oil production) and coastal environmental management and protection. Scientific and technical knowledge underpin the effective use of such data and together provide the framework for managing and exploiting the marine environment in a way that secures its future.

Historically, the collecting, analyzing and collating of marine data focused on the specific interests and objectives of the individual or the organization collecting the data. As scientific knowledge grew and the users of data developed interests extending beyond the scope of the data they could collect, it was realized that data could be gathered with multiple purposes in mind and not just for its original proposed use. Moreover, in view of the high cost of collecting data, often under extremely difficult conditions, it was seen that data, once collected, should be archived so that the reference database could gradually grow and the original investment could be fully exploited. The notion of a “climatology” based on the mean of all available data also encouraged a more systematic approach to archiving data.

Apart from a few instances, such as tidal prediction, where theoretically based interpretation was possible, the application of data to real problems was based on the interpretation of such climatologies or on specific events as they occurred, as with marine weather, storm surges or algal blooms.

Over the last two decades the advent of satellites for remote measurements and autonomous observing instrumentation has vastly increased the quantity, complexity and geographical coverage of observed marine data. The revolution in storage media and the methods used to handle data have fundamentally changed the scope of data activities and enabled functions and capabilities that were hitherto impossible or the domain of only the most advanced operations. The Internet has made the worldwide distribution of datasets not only feasible but also potentially accessible from everywhere and relatively cheap to communicate. This in turn has made it possible to combine data from many sources and countries within networks of international coordination. Much of the international distribution of oceanographic data is now undertaken through such networks.

This development toward international networks has been driven by the recognition that science can be brought to bear on some of the most pressing environmental problems. However, for useful outcomes, extensive, quantitatively accurate and sustained observations are required. Such requirements can only be met through the coordinated efforts of many countries.

1.2 THE GLOBAL OCEAN OBSERVING SYSTEM (GOOS)

1.2.1 The Establishment of GOOS

With the factors outlined in 1.1 in mind and in response to Agenda 21 of the Rio Summit on Sustainable Development in 1991, the Intergovernmental Oceanographic Commission (IOC) of UNESCO formally established the Global Ocean Observing System (GOOS) with the joint sponsorship of the WMO and (later) UNEP. From a set of initial plans for observing ‘modules’ defined by perceived end use, GOOS has evolved along two major themes:

- Ocean and Climate (involving physical open ocean and trans-basin observation systems, and linked with the international weather forecasting networks) and

- Coastal Systems (incorporating the observation types needed for coastal management and protection, the conservation and sustainable use of coastal marine resources and coastal maritime operations).

Guidance for development of these themes is provided in separate plans. A large range of training, awareness raising and technical development activities has also been undertaken with the guidance of the GOOS executive bodies and by the GOOS Project Office within the IOC Secretariat, which is part of UNESCO, centred in Paris.

1.2.2 The GOOS Principles

One of the strongest unifying factors in the development of GOOS has been the declaration of the GOOS Principles, which define both the essential features of design of activities intended to become contributions to GOOS and the requirements with which the contributors should expect to comply. The Principles (1), reproduced in Appendix SP1, have been generally adopted for the large variety of ocean observing activities worldwide that are now considered to be part of GOOS. It is noteworthy that the Principles appear to have been widely accepted without compromising the diverse objectives and operating arrangements of these activities.

1.2.3 Oceanographic Data Exchange Policy

At the 22nd Assembly in June 2003 the IOC resolved (IOC Resolution XXII-6) to adopt a policy for the international exchange of oceanographic data. The Policy (2) set out in Appendix SP2 in particular states in Clause 1 that ‘Member States shall provide free and unrestricted access to all data, associated metadata and products generated under the auspices of IOC programmes.’ Since IOC is the primary intergovernmental sponsor of GOOS, this clause will apply to all data contributed to the GOOS network. However it should be noted that Clause 4 of the Policy ‘acknowledges the right of Member States [of IOC] and data originators to determine the terms of such exchange [of data from all sources] in a manner consistent with international conventions, where applicable’.

Together with Resolution 40 of the World Meteorological Organization (WMO), which has similar provisions for the exchange of ‘essential data’ and ‘additional data’ for meteorological purposes, the IOC Resolution marks a milestone on the road towards an international system that unites the observation of the seas for the benefit of all nations.

1.2.4 The regional development of GOOS

1.2.4.1 Development of Regional Alliances

The realization of the GOOS is completely dependent on the interest of countries and national agencies and their willingness to contribute part of their ocean observing effort to the GOOS framework of organization. Many international parts of the Oceans and Climate Theme are already underway on a semi-operational basis and meteorological and oceanographic services worldwide are now gaining benefit from the increased coordination provided through the IOC/WMO Joint Commission for Oceanography and Marine Meteorology (J-COMM) as well as the International Oceanographic Data Exchange (IODE) of IOC and its network of Responsible National Oceanographic Data Centres.

However, a national commitment to the underlying GOOS concept in those observing functions for which there is no pre-existing support, depends first and foremost on a perceived direct benefit to each country concerned. Cooperative benefit is most evident in issues of common concern to a region and this has led to the development of GOOS Regional Alliances (referred to as GRAs), for example, EUROGOOS. The Alliances are seen as a most appropriate and easily implemented means by which groups of countries (and/or their participating agencies) are able both to test their interest in GOOS as a medium of international cooperation and to establish the foundations of regional centres

that will gain from the access to greatly increased data and technical resources while raising the capacity of their personnel to apply these resources to issues of national priority.

1. The broad objectives of a Regional Alliance in the Asian region

- Promote implementation of GOOS in Asian coastal oceans;
- Develop operational networks between and within regional organizations;
- Develop pilot/demonstrator projects;
- Adapt existing observing systems and integrate them into a common system;
- Determine regional needs by surveying and interacting with the main users of marine data;
- Encourage the development of a 'production line' (end-to-end) approach connecting initial observations to the final products;
- Increase awareness and foster support;
- Build regional capacity

2. Regional Alliance 'pilot projects' or experiments.

Regional Alliances have taken different forms of governance. However the general approach has been to build from pilot projects or experiments of limited scale and duration. The projects have typically developed and adopted new forms of cooperative interaction and agreement on issues such as the use of common, merged datasets, liberalized data exchange and common goals and objectives for the research and technical development that will lead to use of these data as predictive and management tools. As confidence builds in the collaborative approach and more durable foundations of support are gained, it is expected that these pilot projects will ultimately become cornerstones of a sustained, 'permanent' observing network.

3. Regional Policy

To guide new initiatives, the Intergovernmental Committee for GOOS (I-GOOS) has recently adopted a Regional Policy (4) that maps out the necessary requirements of alliances to be incorporated into the GOOS framework. However, it is assumed that the partners themselves are best able to determine their working arrangements, the projects needed and how they are to be conducted. This policy therefore does not constrain the composition or functions of such partnerships and alliances, which are effectively autonomous. The GOOS organization is however concerned that those regional initiatives bearing the GOOS label will, to the best degree, preserve the essentials of international cooperative action towards a common GOOS vision, principles, planning, standards, exchange policy and sustainability of the planned activity. It also aims to ensure that such bodies see themselves as part of a wider global framework that confers mutual benefits and obligations. Among the key requirements of the Policy deserving emphasis are:

- The intention to adhere to the stated GOOS Principles, policies and practices;
- Participation, representation and reporting of the GRA activities at the bi-annual sessions of I-GOOS and at GOOS Regional Forums

These requirements are intended to ensure coordinated and coherent development of GOOS at both a global and regional level.

1.3 NEAR-GOOS IN ITS FIRST PHASE

1.3.1 Establishment

North East Asian Regional GOOS (NEAR-GOOS) is a Northeastern Asian regional ocean observing initiative being undertaken in partnership between China (PRC), Japan, the Republic of

Korea (ROK) and the Russian Federation (RF), in association with the Global Ocean Observing System (GOOS).

NEAR-GOOS was conceived in 1995 and initiated in 1996 upon the formal adoption of the NEAR-GOOS Implementation Plan and Operational Manual by the 29th Executive Council of the Intergovernmental Oceanographic Commission following a recommendation from the WESTPAC Regional Sub commission of IOC earlier in the year. It became one of the first regional pilot projects of GOOS and predated much of the detailed planning and organization of GOOS itself.

1.3.2 Primary aim in the first phase

The primary aim of NEAR-GOOS in its first phase was to facilitate the sharing of oceanographic data gathered by agencies of the partner countries using the Internet, to support the daily mapping of conditions in the marginal seas bordered by the partner countries (5). Although it was anticipated that this should eventually lead to improvement in the availability of information and ocean services for all kinds of beneficial purposes (in particular maritime weather and storm forecasting, fishing operations, pollution monitoring and coastal management), it is important to note that these flow-on outcomes were not specific goals for the first phase.

1.3.3 Implementation

1.3.3.1 Establishment of two types of database

With the primary aim defined in such simple terms and without requiring the planners to consider in detail the downstream applications of the data being gathered, the implementation of NEAR-GOOS was effected with impressive speed. The strategy to achieve the foregoing aim was to establish two types of database, each operationally linked:

1. Real-Time Databases (RTDB), receiving and distributing its data through the WMO Global Telecommunications System (GTS) or by other electronic means;
2. Delayed-Mode Databases (DMDB), to which data accumulated more gradually or by non real-time modes of transmission would be submitted. It was envisaged that whole datasets from the RTDBs would be binned and periodically transferred to the DMDBs to form a permanent archive.

Data types were confined to physical data such as temperature, salinity, current and wind-waves, and it was intended to include in-situ data from moored surface buoys, drifting buoys, towers, coastal stations, research vessels and volunteer observing ships. Also, satellite remote-sensed data from geostationary, polar-orbiting satellites and earth-observation satellites were intended for inclusion as this became possible.

1.3.3.2 National and regional custodian agencies

In practice it proved appropriate and necessary for each member country to establish (or identify) its own National RTDB and DMDB within a national custodian agency, each being responsible for periodically transmitting its data holdings to a corresponding NEAR-GOOS Regional RTDB (RRTDB) or NEAR-GOOS Regional DMDB (RDMDB).

In the case of Japan, the National databases also serve as nominated Regional databases. Thus, the NEAR-GOOS RRTDB was established by the Japan Meteorological Agency, which hosts a Regional Telecommunication Hub of the GTS and also serves as a Specialized Oceanographic Centre associated with the Joint IOC/WMO Commission for Oceanography and Marine Meteorology (J-COMM).

The Japan Ocean Data Centre undertook to host the NEAR-GOOS RDMDB. This centre is also a Responsible National Oceanographic Data centre of the International Oceanographic Data Exchange (IODE) network of IOC.

Table 1: NEAR-GOOS custodian agencies (host organizations)

Country	Japan/ i.e. Regional	Peoples Republic of China	Republic of Korea	Russian Federation
RTDB Host	JMA http://goos.kishou.go.jp/	NME Forecasting Centre www.coi.gov.cn/ehyzh/	KORDI	FERHRI http://www.hydromet.com
DMDB Host	JODC http://near-goos1.jodc.go.jp/	NMDIS/SOA	MOMAF/KODC http://kosi.nfrdi.re.kr/HTML/near_goos/html/index.htm	POI http://www.pacificinfo.ru/en/NEAR-GOOS

In order to satisfy national requirements for autonomy, it has been necessary for the national centres to continue to function independently and to provide data at their discretion to the regional databases. While this has been a retreat from the original concept of completely merged data holding, it has in fact facilitated the release and exchange of delayed-mode data, by preserving the autonomy of the National agencies.

By November 2003, the total volume of data held by the RDMDB in Japan was about 10 GB, with 254 users. 10,619 files had been downloaded. The data volume and number of products had steadily increased, and for example now included satellite altimetry available from the RRTDB. Many coastal stations in China and the Republic of Korea were now contributing in near real time. The construction of a large observatory tower is currently underway in the East China Sea. The Russian database includes the data of historical domestic and foreign observations of temperature and salinity in the Northwest Pacific including NEAR-GOOS seas and the data sets of POI, FERHRI and TINRO Centre marine expeditions (hydrology, chemistry, and biology).

In Korea, MOMAF re-established the Korea Oceanographic Commission (KOC), which consisted of 20 experts of related organizations and universities to support IOC, WESTPAC and NEAR-GOOS activities in Korea. MOMAF also established the Korean Argo Subcommission under KOC to take part in the Argo Project. KODC has a 4 years (1999-2002) project to develop an integrated oceanographic data and information network at the national level as part of its NEAR-GOOS commitment.

1.3.4 Successes

The most important successes of NEAR-GOOS in its first phase have been:

1. The consolidation of a functional two-mode 'distributed' Internet-based database structure in the partner countries as a workable model for the enhancement and coordinated handling of oceanographic data at national level;
2. The linking of this structure with two Regional Databases that are responsible for the receipt and merging of data concerning the NEAR-GOOS region as a whole, thus creating a regional database system which is part of GOOS;
3. The adoption and practice of a free and open data exchange policy, predating the formulation of such a policy for GOOS as a whole;

4. The implementation of coordinated and approved data exchange management training for regional participants.

1.3.5 Concerns

Success has been tempered by the following factors:

1. The range and amount of data submitted to the national databases appears to be limited (although increasing) and does not include data from many of the national ocean observing sources of the region;
2. Data is submitted at the discretion of the involved agencies of each country and there is not a uniform vision or plan of what data should be commonly shared for best effect;
3. There are sometimes long delays in the exchange of data between Centres;
4. There is not uniform national acceptance for the nominated databases to be regarded as part of the international NEAR-GOOS structure and philosophy and NEAR-GOOS is implemented in parallel with other national and international database networks dealing with the same data. In some quarters there appears to be a declining commitment to participation in the structure implemented;
5. Processing time for real-time access is sometimes a problem;
6. There are not yet systematic protocols in place for the management of data;
7. Strategic planning and operational management roles of the Coordination Committee and national personnel and organizations responsible for the database functions are not clearly separated and delineated;
8. There has not been much action to identify specific applications where improvement in performance (in terms of predictions or ameliorative action, for example) could be the result of the enlargement of the data resource, its integration within NEAR-GOOS or through the stimulation of scientific study. The claims of the benefits of NEAR-GOOS remain largely rhetorical and untested.

1.3.6 Future directions for NEAR-GOOS

As it enters its second phase greater attention needs to be placed on how NEAR-GOOS should be strategically developed to deliver benefit and utility of its ocean data-gathering effort to its member states. This might involve a greater range of data types and the deriving of generic 'products' such as model analyses and synthesized maps. For this to be possible, it will also require more direct involvement of the agencies concerned and the recruitment of a wider range of organizations and disciplines.

2. A STRATEGY FOR THE SECOND PHASE OF NEAR-GOOS (2004–2008)

2.1 THE VISION OF NEAR-GOOS

'Through the coordination of ocean observations and associated research in the North–East Asian regional coasts and seas, NEAR-GOOS will become recognized as a key source of integrated marine information, services and products to support sustainable social and economic development, welfare and safety. The system will be operational in nature, aiming to provide data, products and services on an ongoing basis. It will provide information on the past and present state of the marine and coastal environment, on marine ecosystems and on the role of the ocean in weather and climate variability. It will stimulate international cooperation and the building of the scientific and technical skills of personnel and the capacity of the regional agencies to acquire and use ocean data effectively.'

2.2 THE MISSION OF NEAR-GOOS IN ITS SECOND PHASE

‘To develop a comprehensive and sustained ocean observing network in the North-East Asian regional seas and coastal regions, especially focused on observations, monitoring and other activities that cannot be easily implemented by countries acting independently. This network will embrace a wide range of data types and will be accompanied by pilot observing experiments, trials and demonstrations, training and useful products for use by the participating members and as a contribution to the GOOS and other global observing initiatives.’

2.3 GOALS OF NEAR-GOOS IN ITS SECOND PHASE

‘Development of a basic integrated ocean observing and operational forecasting system in the NEAR-GOOS area adhering to the GOOS Principles and building on the data management and exchange mechanisms developed in the first phase through the inclusion of additional parameters, increased coverage in space and time, the generation of a generic suite of data products and adequate quality control and quality assurance procedures.’

Specific goals are:

1. To meet the perceived needs of the participating agencies of the Member States for integrated and coordinated collection, processing and archiving of oceanographic and marine observations and data in the seas of the Northeast Asian region and products derived from these data. Particular requirements are given in Appendix SP5.
2. To facilitate the coordinated and cooperative development of scientific and technological capacity, knowledge and expertise within the Member States. This will involve the selective implementation of projects in order to acquire, use and interpret these data and data from other sources for the purposes above and any other purposes that are socially, environmentally and economically beneficial to the countries of the region;
3. By publishing and making widely known the purposes and benefits of integrated and coordinated ocean observation within the NEAR-GOOS framework in each of the Member states to:
4. Increase the number of national agencies participating in and contributing to NEAR-GOOS activities, thus compounding the value of the individual marine observing and research efforts of such agencies;
5. Enhance the awareness of the relevant government bodies of the mission of NEAR-GOOS and to encourage their greater commitment to its objectives;
6. On the basis of mutual interest and benefit, strengthen cooperative relationships between NEAR-GOOS projects and other ocean observing activities in the region and throughout the world, especially those linked with GOOS, the Integrated Global Observing Strategy (IGOS) and the North Pacific Marine Science Organisation (PICES).

2.4 OBJECTIVES OF NEAR-GOOS IN ITS SECOND PHASE

In accordance with the overall mission and its goals, four major objectives will define the actions and tasks for the coming five years:

- (i) Restructuring NEAR-GOOS to provide a more comprehensive and flexible and expandable operational capability appropriate to a phased development from a regional pilot experiment to a durable regional alliance;
- (ii) Enhancing and consolidating the Database Networks established in Phase 1, to better equip them to deliver data and useful products for Goal 1 above;

- (iii) Defining, planning and implementing NEAR-GOOS-labelled Pilot Projects and Experiments. This will include a reclassification of the present activities and will enhance the range of parameters observed, the spatial coverage, the range of data products and that will consolidate systematic quality assurance, assimilation and usage. Such projects will also be a prime vehicle for the implementation of other joint sub-regional research and development initiatives that bring the greater involvement of research scientists as clients and serve as pilots for more durable international collaboration.
- (iv) Developing outreach programmes directed towards awareness raising, stakeholder recruitment (including more national agencies and participating experts), training and capacity-building.

2.4.1 Objective (i): Restructuring NEAR-GOOS

To ensure that NEAR-GOOS in its second phase undertakes activities that align with negotiated and agreed priorities for cooperative action between the partners, it is proposed to create a revised two-tier organizational structure in which the Coordinating Committee (CC) with revised Terms of Reference as given in Appendix SP3, assumes an overall coordination and strategic development role. In particular the CC is charged with the responsibility of strengthening coordination mechanisms. The functions of detailed technical design, planning and implementation of specific initiatives are organized as NEAR-GOOS Pilot Projects, carried out on behalf of advisory Technical Subcommittees (TSCs) whose membership is selected for the purpose. The new structure is illustrated in Figure 1.

By separating the functions of coordination and implementation, the two-tier structure enables the participation of member countries in projects to vary according to the priorities and interest of the participants. In particular, it enables experiments and pilot projects with different objectives and different groups of participating countries to be conducted in the different seas of the region, without requiring each to be commonly mandated by all of the countries of NEAR-GOOS. On the other hand, each of the projects can gain benefit from its association with NEAR-GOOS, its use of the NEAR-GOOS databases, principles and standards and the international mandate conferred by the intergovernmental status and sponsorship of GOOS.

The proposed structure is easily altered or expanded to accommodate new initiatives and collaboration and to enable projects to be undertaken jointly with other organizations.

PARTNERS

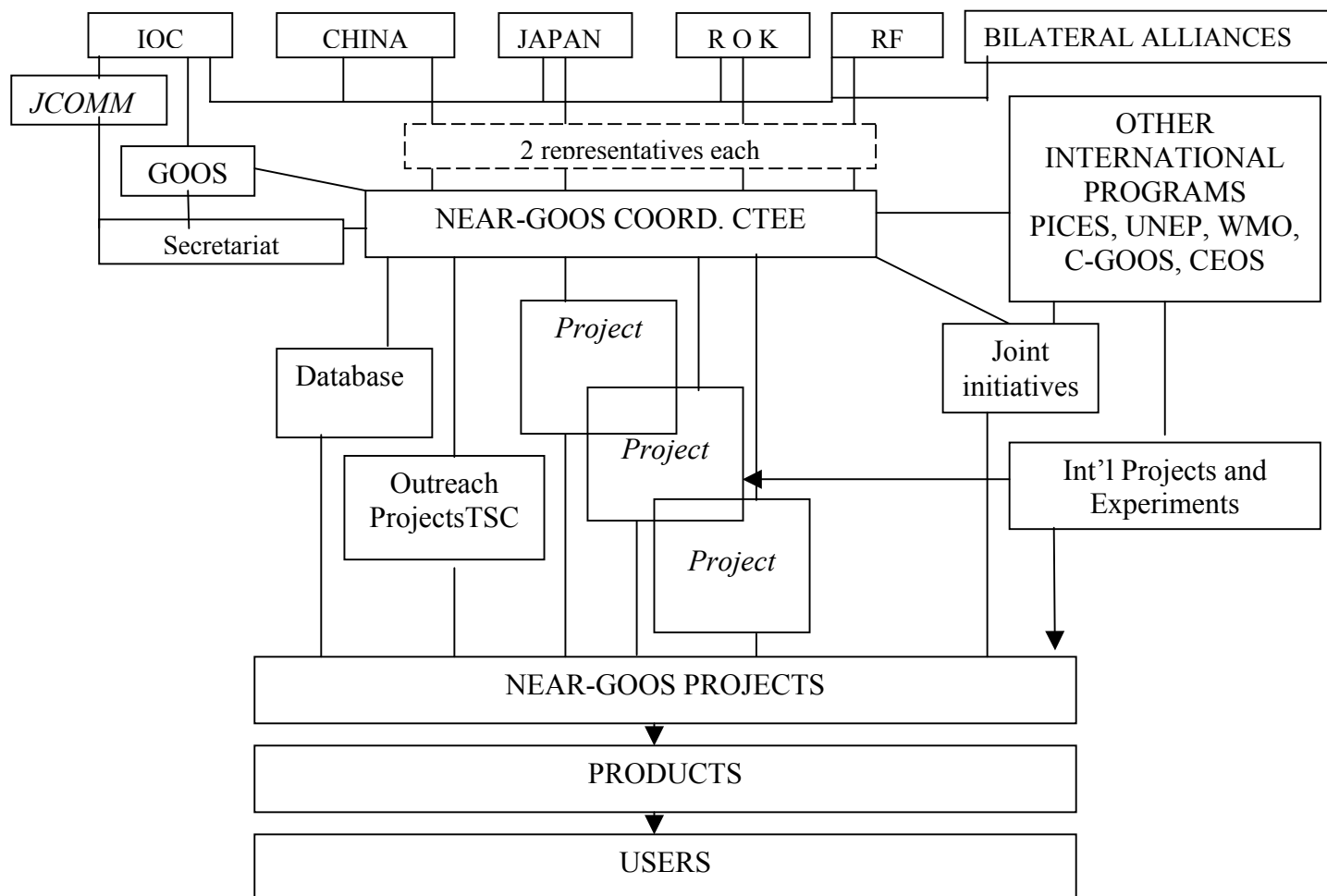


Figure 1: Conceptual Structure of NEAR-GOOS (Second Phase)

2.4.1.1 NEAR-GOOS Coordinating Committee

The NEAR-GOOS Coordinating Committee (CC) will be composed of two designated members from each of the participating countries, who will be senior representatives of relevant participating departments or agencies of the member countries, qualified to advise on the strategic directions of the programme elements of NEAR-GOOS and its relationship with external entities such as those outlined in this plan. The CC will be responsible for advising the sponsoring countries, agencies and international programmes and especially GOOS on the broad strategic directions and themes of NEAR-GOOS, developing strategies for attracting national and international support, cooperative action and a common culture between member countries and for overseeing the development of NEAR-GOOS Projects as designed, supervised and reported by their respective TSCs.

Terms of reference of the CC, which were decided at the seventh meeting of the Coordination Committee in 2002, are given in Appendix SP3.

2.4.1.2 Technical Subcommittees (TSCs) and NEAR-GOOS Pilot Projects

The work of NEAR-GOOS is organized into functionally separate but (where necessary) interacting 'Projects' defined by scientific purpose, geographic region or, in the case of the Data Centres, by cross-organizational relevance. Each of these is directed by a separate Technical Subcommittee (TSC) composed of appropriate technical expert representatives of each of the participating countries, agencies or programmes. If necessary for reasons of size or differing objectives, projects may be subdivided and provided with separate TSCs. Each TSC is individually responsible for the design, planning and implementation of its Project and for reporting to the CC. Projects may, depending on their content and objectives, include countries and agencies that are not NEAR-GOOS members and where appropriate, their TSCs need not include all NEAR-GOOS member representatives. However every NEAR-GOOS designated project must have the ongoing endorsement of the NEAR-GOOS CC.

Draft General Terms of reference of the TSCs are given in Appendix SP4.

2.4.2 Objective (ii): Enhancing and Consolidating the Database networks

It is envisaged that the Database framework established in the First Phase of NEAR-GOOS would become the first of the NEAR-GOOS projects identified in 2.4.1 above, perhaps separated into real-time and delayed-mode projects.

Appendix SP5 lists a number of high-priority strategic tasks for the second phase, identified by the Coordinating Committee at its 7th Session (5). These are, briefly, (i) introduction of new parameters; (ii) increase in spatial and temporal coverage; (iii) data products; and (iv) data Quality Assurance/Quality Control. It is appropriate to examine the organizational structures needed to address these tasks.

2.4.2.1 Working towards a functionally integrated Database network

The harmonizing of procedures within and between participating agencies is essential if the benefits of the global revolution in data generation and access are to be realized nationally, and this can be efficiently brought about through the harmonization and cooperative development of the common functions of data management. The intention is not to substitute for the data-gathering roles of the national agencies but to improve the efficiency and cost-effectiveness of these roles by the concentration of expertise, the integration and quality control of data, the identification of gaps in national data acquisition, products and services and the elimination of duplication. These are all functions that in a 'distributed system' can be divided or shared between the participating host agencies. It should also result in an effective interface to international data sharing and exchange mechanisms and access to best practice, and facilitate the application of both national and international data in a cross-disciplinary and holistic approach to important national problems and issues.

As is already the case, the Database Project will function as a 'Distributed Data Network' exploiting the Internet and modern technologies, eliminating the need for geographic co-location. Participating agencies will not be required to deposit or reproduce original data in a centralized archive but users would either be able to download merged data and data products from the National Databases or access information about these data (i.e. metadata) and using this information, negotiate with the source agency to gain access to the data itself.

The Database Project will require a focus for liaison between partners, coordination and other functional and administrative activities. It is also important that there is identified coordination of NEAR-GOOS involvement in international activities, such as the coordinated development and application of standards and protocols (including guidance from international sources such as IODE and J-COMM). Depending upon the resources required it might also take a direct role in the generation of useful products and innovations enhancing the accessibility and usefulness of the data.

The CC should, as one of its initial tasks, address the appropriate organizational mechanism to provide the foregoing functions on behalf of all the NEAR-GOOS Partners. Since some of these functions overlap those of the CC it will be necessary to define the areas of responsibility relative to those of the TSC for the project. The roles of the TSC are outlined below in 2.4.2.2.

2.4.2.2. A Consolidated NEAR-GOOS Data Management Programme

Steps in implementation should be taken during the second phase to move to an ongoing operational status. Its foundations are firmly established and the main initial tasks of the Technical Subcommittee of the new body would be to:

- Work towards the development of a functionally integrated Database Network;
- Review and if necessary, develop a practical management process;
- Outline the data-gathering and data management objectives to better reflect the individual priorities of the partners while accommodating the goals of NEAR-GOOS;
- Clarify the role and responsibilities of the Regional Databases relative to those of the National Databases and especially to examine the ways these can be combined and integrated to make a whole system that comprehensively serves the member countries and is more than a sum of the parts;
- Explore the resources required to properly distribute key tasks of the project among and between the NEAR-GOOS membership;
- Define and implement pragmatic and workable training programmes to ensure that the databases are managed by, and can hold on to, skilled and dedicated personnel. Under this project it would also be appropriate to consider enhancements to the databases and incorporate strategies to
- Recruit national data-generating bodies not presently involved in NEAR-GOOS;
- Expand the range and quantity of data incorporated, especially those appropriate to the new participants and to the needs of joint experiments;
- Address value-adding enhancements and derived products accessible to users, such as fields, maps and climatologies.

2.4.3 Objective (iii): NEAR-GOOS-Labelled Pilot Projects and Experiments

2.4.3.1 NEAR-GOOS-initiated Pilot Projects

The development of a suite of pilot and/or development projects that are complementary to the Database Project (2.4.2) is seen as an essential (and perhaps the only feasible) vehicle for NEAR-GOOS to achieve its goals. It must be borne in mind however that many such activities are additional to the remit of NEAR-GOOS in its first phase and in order to attract support and interest from governments and scientists, they will need to have the following characteristics from the start:

- High relevance to regional problems and needs;
- Relevance to the NEAR-GOOS vision and objectives for the second phase;
- Capacity to recruit new participants (especially scientists);
- Capable of phased development from modest beginnings, with growth dependent on the attraction of new resources;
- Phases of development of limited and defined time span with regular performance review;
- Having foreseeable and quantifiable outcomes and/or 'products';

- Exploiting and building upon already existing interests and skills of the NEAR-GOOS members and/or prospective joint partners.

To expand the scope of possibilities according to these criteria, projects should be undertaken jointly or in collaboration with other bodies or programmes wherever possible.

It is important that projects are not undertaken only on the basis of perceived common interest of a few individuals or of transient opportunity and that the number of projects is restricted and matched to the manpower and financial resources available to sustain progress at a reasonable rate, especially during start-up. The CC will have an important role in the critical evaluation of proposals and the prioritization of their implementation.

The adoption of NEAR-GOOS-labelled or NEAR-GOOS-associated projects should follow careful review by the CC. Projects cannot be detailed in this present plan because of the need for evaluation in terms of the foregoing requirements but examples for consideration are summarized in Appendix SP6.

2.4.3.2. Joint Projects with other bodies

There are strong reasons for developing projects linking NEAR-GOOS ocean observing activities with research. Given that the present NEAR-GOOS agencies are focussed on data management, one effective vehicle may be through joint alliances with other agencies, under the umbrella of existing external regional programmes and international frameworks of cooperation.

It is important that any programme to which NEAR-GOOS is linked is appropriately labelled. One criterion for the 'labelling' is the project's ability to add specific value in the region, for example, a project undertaken cooperatively by Member States compared to one done individually (e.g. the Yellow Sea LME which focuses on doing service for the multi-national community). Possibilities for joint projects that have potential and worthwhile links with NEAR-GOOS are summarized in Appendix SP7.

2.4.4 Objective (iv): Outreach programmes

2.4.4.1 The Promotion of NEAR-GOOS

2.4.4.1.1 Promotion to the scientific and technical user community

The promotion of NEAR-GOOS in its second phase is important in gaining increased support, participation and sponsorship and should be the subject of a separate implementation plan developed by the appropriate TSC. The following are matters for inclusion, based on suggestions arising at recent CC meetings.

- Redesign of the NEAR-GOOS webpage to reflect the new structure, and regular updating of the content, together with semi-popular 'brochure' style material, mounted on the website, that can also be used in vectored distribution during events such as workshops, conferences and exhibitions; an example would be a web publication similar to the GOOS Products Bulletin (see <http://ioc.unesco.org/gpsbulletin/>);
- Preparation of graphical and visual material to explain specific Pilot Projects, including maps, numerical statistics and outcomes and products;
- Publication of the Strategic Plan, translated into several regional languages.

2.4.4.1.2 Recruitment of partners to NEAR-GOOS

The present participating agencies in NEAR-GOOS are strongly if not exclusively focussed on marine data acquisition and management. This remains a key activity but to enlarge the ambit and achieve the long-term goals, there needs to be participation and commitment to NEAR-GOOS and respect of its function by a much wider range of national agencies of the region, especially those to which national responsibility falls for implementing the stages of integrating and scientific value-adding (e.g., technology development, modelling, validation, product development). The task has several elements:

- Raising Awareness. This might be initiated by visits and informational presentations by NEAR-GOOS Steering Committee members to targeted national organizations that might already be users of NEAR-GOOS data but do not see it as part of a mutually supportive system;
- Vectored workshops and symposia. To raise the interest of working scientists, meetings should be arranged at different national venues (the WESTPAC Scientific Symposia are a prime example) on topics that indicate a path to the NEAR-GOOS-labelled Projects (see 2.4.3). NEAR-GOOS should also maintain its participation in GOOS regional forums as a means of informing the ocean observing community.
- Exploring user needs from the perspective of project-implementing bodies and scientists to identify observing priorities and critical variables for these bodies to be incorporated in the NEAR-GOOS data suites. This point has particular relevance to Coastal NEAR-GOOS projects.
- Publications. It is important to keep the 'Non-NEAR-GOOS' community continually informed of the NEAR-GOOS activities and products. These should be technical and specific in content (see 2.4.4.1.1 above) and capable of incorporation in international lists and inventories.

2.4.4.2 Capacity-building and training

NEAR-GOOS, through its partner agencies, has maintained an active programme of training and information-sharing events. Japan has conducted seven successful Data Management training courses, Korea has hosted a Marine Environment Forecasting Workshop in Seoul 27-30 Aug. 2001 as part of a project promoting oceanographic data and information exchange on a national and international basis.

For the second phase, it has been proposed that excepting data management, the scope of training courses could be widened. For example, training could include methods and technology or other fields directly related to NEAR-GOOS activities. Also, NEAR-GOOS workers might benefit from a small-scale workshop related to NEAR-GOOS capacity building.

In general, it appears that the main thrust should be a comprehensive forward action plan for training in the second phase that

- (i) Anticipates new needs emerging from the enlarged data management tasks and responsibilities and the demands of new Pilot Projects, including technological advances
- (ii) Evaluates the personnel requirements of the participating national organizations to take on new NEAR-GOOS-related work and builds these requirements into a 'vectored' or focused series of training courses or workshops
- (iii) Takes account of the basic training needs of new participants and national agencies in NEAR-GOOS and other regional data-gathering and data-using projects (such as

might arise from SEAGOOS or Pacific GOOS) and build these needs into introductory courses

- (iv) Identifies suitable training programmes from potential partner organizations that may offer the NEAR-GOOS community opportunities to learn about specific aspects pertinent to NEAR-GOOS functioning, to increase the value and effect of the training provided.

The development of such an action plan should be a primary task for the TSC for Outreach Projects.

3. FINANCIAL RESOURCES

For NEAR-GOOS to expand its scope, resources additional to those committed presently by the participating agencies will be required. The new structure, arranged in terms of 'pilot projects and experiments', should assist in attracting sponsors who are interested in specific activities while enabling them to control the extent and duration of their commitment to the overall framework of NEAR-GOOS.

3.1 CONSOLIDATING GOVERNMENTAL INVESTMENT IN NEAR-GOOS

Of great importance in securing resources for the continuation and expansion from a pilot experiment to an ongoing operational regional system is the interest and confidence of governments. If the benefits of this form of regional coordination and integration are to be realized, governments need to be aware of them and develop national positions concerning their support in the intergovernmental arena and in the pursuit of international conventions and treaties.

There is much current interest (especially in the global change context) paid to the importance of observing systems. This recognition needs to be selectively followed forward where possible toward the advancement of NEAR-GOOS goals. Some feasible approaches are:

- Ensure that the delegations of Partner countries to intergovernmental bodies are kept informed of NEAR-GOOS initiatives and developments. The international GOOS organization can provide complementary action;
- Invite high level governmental representation when holding NEAR-GOOS meetings and symposia;
- Ensure that a brief and up-to-date hand-out sheet outlining the goals and activities of NEAR-GOOS is always available;
- Involve the scientific media at the start of any noteworthy new initiative;
- Using direct personal contact, recruit the interest of the heads of the NEAR-GOOS partner agencies and inform them not only of successes but also of difficulties being encountered.

3.2 DRAWING ON RESOURCES FROM PARTICIPATING PARTNER COUNTRIES

National agency objectives are sometimes necessarily narrowly focused. To draw resources for any new NEAR-GOOS project, confidence must be won specifically in terms of relevance, feasibility, efficiency and effectiveness.

Commitments will always be made primarily in the national interest, but nevertheless they may be acceptable in terms of NEAR-GOOS providing there is alignment with GOOS Principles such as access and standards of quality. Reciprocal benefit will arise from global information and expertise applied to the solution of local problems.

Project-specific meetings and workshops (to which national specialists and representatives of the targeted user groups or industries are invited) are an effective starting mechanism to develop understanding and appreciation of how projects can be applied to local and regional problems.

Thus an essential part of the strategy for the implementation of pilot projects should be the convening of such meetings, followed by direct approaches to relevant national agencies and/or industries for commitment. It is appropriate that the WESTPAC Regional Office should be called upon to assist in organizing these meetings, and to find international resources where required.

3.3 ASSISTANCE BY INTERNATIONAL ORGANIZATIONS

The international GOOS infrastructure can assist by supporting the participation of international experts, and during the implementation of the pilot projects by assisting the sharing models, information and techniques. The international community can also assist in training of personnel and capacity building, to yield benefit for the programme overall.

Organizations such as IODE and J-COMM, which are supported by nations through their contributions to the IOC and WMO, can also be called upon as part of their mandate to assist NEAR-GOOS projects and can facilitate the secondment of personnel and the use of national facilities to carry out parts of the projects. The TSCs of Pilot Projects should be encouraged to negotiate with these bodies to enlarge the resources for implementation and to gain visibility and standing of the projects in the international arena.

3.4 INDUSTRIAL SUPPORT

Industries in many forms (agribusiness, energy, insurance, fisheries, construction, telecommunications and so on) may be not only users of GOOS products and services but also providers of GOOS data, information, products, and services. NEAR-GOOS should welcome their involvement and give attention to their advice and requirements.

Without direct industrial relevance, cash support is unlikely. Efforts to build links to industry should be carefully targeted on selected companies who are major users of marine information in the main sectors: oil and gas; shipping; fisheries; construction; telecommunications; and insurance.

Some industries (fisheries in particular) maintain their own data-gathering networks. A primary goal should be to persuade such industries to contribute their holdings of often highly localised data to NEAR-GOOS databases, which can offer advantages in low-cost archiving and retrieval. In accepting such data NEAR-GOOS centres would seek to ensure that the data were provided along with appropriate metadata (information regarding the collection of the data), appropriate quality assurance, and freedom of distribution.

At present, commercial shipping and fishing operations provide access to ships for the collection of marine information through the J-COMM Ship of Opportunity Programme (SOOP) and the WMO Voluntary Observing Ship (VOS) programme. Regional industries could in similar fashion contribute at little cost or inconvenience to NEAR-GOOS projects. The Ferry-box project is a good example.

An advantage to service industries and their users in supporting NEAR-GOOS is that this could, with strategic development, provide the basis for the creation of advanced commercial services and products that are beyond present capabilities.

4. REFERENCES

The GOOS Principles (last updated 16 January 1999), available: <http://ioc.unesco.org/goos/princip.htm>

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GOOS, (last updated: 27 November, 2002), North-East Asia Regional GOOS [Online], available: <http://ioc.unesco.org/goos/NEAR-GOOS/NEAR-GOOS.htm> [22 March, 2004].

IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional Global Ocean Observing System (NEAR-GOOS) Seventh Session, Vladivostok, Russian Federation, 2-4 October 2002, Intergovernmental Oceanographic Commission Reports of Meetings of Experts and Equivalent Bodies GOOS Report 132, UNESCO.

Appendix Strategic Plan SP1. The GOOS Principles

These are detailed and explained in Reference 1.

I. DESIGN PRINCIPLES

1. GOOS is based on a plan designed to meet defined objectives on the basis of user needs.
2. The design assumes that contributions to GOOS are long term.
3. The design will be reviewed regularly.
4. The design allows for flexibility of technique.
5. GOOS is directed towards global problems and/or those ubiquitous problems benefiting from global observing systems.
6. The design covers the range from data capture to end products and services.
7. The management, processing and distribution of data will follow a specified data policy.
8. The design takes into account the existence of systems outside GOOS that can contribute to and/or benefit from GOOS.
9. The design takes into account quality assurance procedures.

II. PRINCIPLES OF INVOLVEMENT

1. Contributions to GOOS will be compliant with plans developed and agreed on the basis of the Design Principles.
2. Contributions will be compliant with a defined GOOS data policy.
3. Contributions should reflect intent for sustained observations.
4. Standards of quality will apply to GOOS contributions.
5. Implementation will be effected using existing national and international systems and organizations where appropriate.
6. Implementation will be incremental and progressive, bearing in mind the long-term goals.
7. Participation in GOOS implies an undertaking to help less-developed countries to participate and benefit.
8. Participants will have full autonomy in the management of their contributions to GOOS.
9. Contributing nations and organizations will reserve the right to determine and limit their contributions to GOOS.
10. Use of the GOOS 'label' implies conformity with the relevant principles of GOOS.

Appendix SP2. The IOC Oceanographic Data Exchange Policy

(Endorsed at the twenty-second Session of the IOC Assembly, Paris, July 2003, see Ref 2)

PREAMBLE

The timely, free and unrestricted international exchange of oceanographic data is essential for the efficient acquisition, integration and use of ocean observations gathered by the countries of the world for a wide variety of purposes including the prediction of weather and climate, the operational forecasting of the marine environment, the preservation of life, the mitigation of human-induced changes on the marine and coastal environment, as well as for the advancement of scientific understanding that makes this possible.

Recognizing the vital importance of these purposes to all humankind and the important role of IOC and its programmes in this regard, the Member States of the Intergovernmental Oceanographic Commission agree that the following clauses shall define their policy for the international exchange of oceanographic data and its associated metadata.

CLAUSE 1

Member States shall provide timely, free and unrestricted access to all data, associated metadata and products generated under the auspices of IOC programmes.

CLAUSE 2

Member States are encouraged to provide timely, free and unrestricted access to data and associated metadata from non-IOC programmes that are essential for application to the preservation of life, beneficial public use and protection of the ocean environment, the forecasting of weather, the operational forecasting of the marine environment, the monitoring and modelling of climate and sustainable development in the marine environment.

CLAUSE 3

Member States are encouraged to provide timely, free and unrestricted access to oceanographic data and associated metadata, as referred to in 1 and 2 above, for non-commercial use by the research and education communities, provided that any products or results of such use shall be published in the open literature without delay or restriction.

CLAUSE 4

With the objective of encouraging the participation of governmental and non-governmental marine data gathering bodies in international oceanographic data exchange and maximizing the contribution of oceanographic data from all sources, this Policy acknowledges the right of Member States and data originators to determine the terms of such exchange, in a manner consistent with international conventions, where applicable.

CLAUSE 5

Member States shall, to the best practicable degree, use data centres linked to IODE's NODC and WDC network as long-term repositories for oceanographic data and associated metadata. IOC programmes will cooperate with data contributors to ensure that data can be accepted into the appropriate systems and can meet quality requirements.

CLAUSE 6

Member States shall enhance the capacity in developing countries to obtain and manage oceanographic data and information and assist them to benefit fully from the exchange of oceanographic data, associated metadata and products. This shall be achieved through the non-discriminatory transfer of technology and knowledge using appropriate means, including IOC's Training Education and Mutual Assistance (TEMA) programme and through other relevant IOC programmes.

DEFINITIONS

‘Free and unrestricted’ means non-discriminatory and without charge. **“Without charge”**, in the context of this resolution means at no more than the cost of reproduction and delivery, without charge for the data and products themselves.

‘Data’ consists of oceanographic observation data, derived data and gridded fields.

‘Metadata’ is "data about data" describing the content, quality, condition, and other characteristics of data.

‘Non-commercial’ means not conducted for profit, cost-recovery or re-sale.

‘Timely’ in this context means the distribution of data and/or products, sufficiently rapidly to be of value for a given application

‘Product’ means a value-added enhancement of data applied to a particular application.

Appendix SP3. Terms of Reference for the NEAR-GOOS Coordinating Committee

These terms of reference were affirmed at the seventh meeting of the Coordinating Committee (Vladivostok, 2002, Ref 5), Resolution SC-WESTPAC-NEAR-GOOS-VII.1

REVISED TERMS OF REFERENCE

As part of the revised organizational structure for NEAR-GOOS in its second phase, the NEAR-GOOS Coordinating Committee will operate with the following general Terms of Reference:

Composition:

The Committee shall consist of representatives of all member countries. Each country shall designate two members, preferably with one person coming from the operational meteorological/oceanographic community. The Committee shall elect a Chairperson among the members. The Chairperson of the Coordinating Committee will act as NEAR-GOOS Coordinator. The Committee shall meet to the extent possible in regular annual sessions at the expense of the participating countries. Other countries and appropriately affiliated organizations can attend the sessions as observers.

It is recommended that members of the committee do not stay on the committee for longer than three successive intersessional periods. In case a Member is unable to attend, his or her government will try to send a suitable replacement, so that there is continuity of representation.

Responsibilities:

- a) Coordinate the development of applications in operational oceanography that demonstrate the usefulness of regional collaboration;
- b) Encourage the increase the volume of quality-controlled data available to the NEAR-GOOS Community through the respective national and regional databases, where possible with the smallest time delay possible;
- c) Inventory and analyse existing activities relevant to NEAR-GOOS including operational systems and programmes, organizations, scientific programmes, services and products, commercial interests, and training and capacity building;
- d) Coordinate to produce integrated comprehensive data sets and data products that conform to the principle of end-to-end data management;
- e) Prepare a NEAR-GOOS Strategic Plan that highlights the direction of NEAR-GOOS over the next five years that incorporates the economic, social and environmental protection needs of the region with a clear approach to enhancing the coordinating mechanism of NEAR-GOOS;
- f) Publicise and disseminate NEAR-GOOS plans and information to regional governments and the general public;
- g) Recommend scientific and technical activities to support NEAR-GOOS implementation by coordinating new pilot projects and providing linkages to existing projects and programmes;
- h) Produce guiding documents for the near real time data collection and exchange in the NEAR-GOOS region;
- i) Advise and consider sources of funding for pilot project development with various funding agencies and in consultation with pilot project leaders;
- j) Liaison with national NEAR-GOOS committees, J-COMM, GOOS Project Office and other GOOS-related bodies as appropriate;
- k) Develop linkages with existing relevant organizations, programmes and projects in the region.

Appendix SP4. Draft General Terms of Reference for Project Technical Sub-Committees (TSCs)

As part of the revised organizational structure for NEAR-GOOS in its second phase, a TSC will be created for each Pilot Project or Experiment to provide leadership and technical guidance in its implementation. To facilitate the preparation of a proposal to develop a NEAR-GOOS project, a TSC may be created in advance of implementation.

The following are the general Terms of Reference for the TSCs. These may be adapted or refined for the specific requirements with the approval of the NEAR-GOOS Coordinating Committee.

Composition:

Representatives of one or more of the participating agencies or organizations selected for their technical expertise in the subject area and/or mandated authority to represent each organization concerned. Membership may change by consensus and representatives need not be members of the participating agencies.

Chair:

A chairperson, selected from the representatives by consensus, for a term mutually agreed, who will be responsible for representing the Sub-committee and reporting to the CC.

Responsibilities:

- a) Develop and maintain detailed design, implementation and action plans for the project, as required;
- b) Facilitate negotiation between the participating bodies, as required;
- c) Determine resource requirements and propose plans to gain resources;
- d) Organize meetings and workshops to develop common plans and goals and to recruit partners;
- e) Advise the CC as required on the project, including resourcing and difficulties and recommend actions to facilitate progress.

Appendix SP5. Specific Objectives of the Database Pilot Project

- a) Seek optimal monitoring and observation strategies in terms of spatial and temporal coverage (platform location and frequency) through coordination at the national level and international level, and the introduction of innovative methods of data gathering (e.g. new sensors, joint platforms, ferry boat monitoring, modelled data, remote sensing and automated buoy systems or an integrated approach);
- b) Assess the feasibility of the inclusion of critical environmental and ecosystem parameters for operational purposes; establish demonstration projects in these fields;
- c) Provide ground truthing data for operational remote sensing to the extent possible;
- d) Establish a coordinating mechanism to facilitate the development of generic suite of basic data products;
- e) Stimulate the use of Quality Assurance/Quality Control standards and protocols, preferably through harmonization of existing technologies, joint development of new standards, and calibration exercises;
- f) Providing a focus for data and information preservation and archiving;
- g) Further develop and improve as required the existing data exchange mechanism introducing the concept of merged and combined data sets, including version control;
- h) Pursue end-to-end data management with particular emphasis on (near-) real-time processing of data for operational applications;
- i) Reduce the delay in data transmission from data collection to their use in specific applications;
- j) Where possible, encourage the use of a meta data standard, giving insight in the quality assurance procedures used, data sampling, long term data availability and other necessary elements to enable interdisciplinary use of data among the data providers taking into account IODE initiatives;
- k) Conduct a needs assessment for capacity building in NEAR-GOOS and develop the future capacity building programmes suitable for those needs.
- l) Provide, on behalf of the participating agencies, a centralised, effective and balanced response to national and international bodies on data management issues; and,
- m) Provide unified feedback and reporting in I-GOOS and other international forums on behalf of the NEAR-GOOS members.

Appendix SP6. Representative NEAR-GOOS Pilot Projects

1. DATA RESCUE PROJECT

IOC established the GODAR project in 1993. GODAR seeks to increase the volume of historical oceanographic data available to climate change and other researchers by locating ocean profile and plankton data sets not yet in digital form, digitising these data and ensuring their submission to national data centres, and the world Data Centre System.

The importance of promoting the GODAR programme in the region was recognized at the International Conference for the International Data & Information Exchange in the WESTPAC region 1999 (ICIWP'99) held in Langkawi, Malaysia, Nov. 1999. So far, however, the response from countries other than Japan has been minimal. This is partly because many countries in the WESTPAC region do not have a properly functioning National Oceanographic Data Centre, nor is there assigned responsibility for the implementation of a regional GODAR programme.

A decision was made at the 16th Session of the IOC committee on International Oceanographic Data & Information Exchange (IODE-XVI) in Lisbon, Portugal, Nov. 2000 to promote the GODAR project in the WESTPAC region (GODAR-WESTPAC)

JODC organized the International Workshop for GODAR-WESTPAC during 5-7 March 2002. The Workshop adopted the revised Work Plan for GODAR-WESTPAC. The Project Office of the GODAR-WESTPAC is now developing a project web site (<http://www.jodc.go.jp/project/GODAR/index.htm>). It provides information on the project activities and results. JODC has published a brochure describing the GODAR activities in the region as a mechanism to promote the project within ocean research institutes in the region.

The decision of the CC members on the GODAR-WESTPAC Project was a request to form a technical steering committee and that the ToRs for the committee members be developed and a list of members for the steering committee be prepared in the intersessional period and approved at the 9th CC meeting.

By making this a properly constituted NEAR-GOOS Pilot Project guided by a TSC composed of appropriate national experts, the project could be initiated in the coming phase by commissioning an inventory of the national agencies and organizations likely to hold un-archived data or data in disorganized forms, and the types of data they hold. With an idea of the scale of the task and with the assistance of IODE, a strategy could then be developed to begin to process and digitise these data and incorporate them into the RDMDDB.

2. SATELLITE REMOTE SENSING

During the last decade, satellite measurements of sea surface temperature have matured considerably and several instruments provide unprecedented daily views of the structure and dynamics of the ocean surface with astonishing accuracy. New microwave instruments are now entering service, providing global measurements that are free from the corrupting influence of clouds and stratospheric aerosols (contaminants that have perpetually frustrated infrared measurements from space). Global networks of moored and drifting buoys report in situ sea surface temperature in real time via satellite link and the Global Telecommunications System. In situ radiometer systems, providing precise measurements of the surface skin temperature, capable of autonomous deployment aboard commercial ships for extended periods are emerging, promising for the first time, the possibility of an extensive data resource for the proper validation of sea surface temperatures from infrared satellite sensors.

While the measurement of even such a basic variable as sea surface temperature, fundamental challenges remain. Satellite sea surface temperature products are of varied heritage, assembled using many different approaches and algorithms, often with considerable duplication of effort in different countries. Extensive data sets are derived from multiple sensors, sampling at different times of the day and thus introducing regional and temporal biases associated with diurnal stratification of the upper ocean. In some cases, precessing satellite orbits compound this problem, although little progress has been made to address these effects. In practice, the accuracy, sensitivity, and sampling resolution of global sea surface temperature products is far from optimal.

All these issues present worthwhile challenges for scientific development in the NEAR-GOOS context. An Ocean Remote Sensing Programme (ORSP: Programme Leader, H. Kawamura) has been established as one of the science programmes in the WESTPAC-V in August 2002, and two-projects are now active under the ORSP. New Generation Sea Surface Temperature Project (NGSST-P: Project Leader, H. Kawamura) is one of the projects and its goal is to generate new SST products responding to the above-mentioned regional needs. A better combination of remote sensing measurements and regional in situ observation systems need to be investigated to achieve sustainable generation of the new SST products. A strategic design plan and implementation procedure were discussed and determined by the initial members in early 2003.

During the second phase an opportunity exists for this programme to be complemented by, or combined with a NEAR-GOOS Pilot project that brings in researchers from the Partner agencies.

3. COASTAL NEAR-GOOS

GOOS has recently released the 'Integrated Strategic Design Plan for the Coastal Observations Module of the Global Ocean Observing System' (IOC Information Documents Series No 1183, 2003). This addresses the difficult task of defining the approach to integrated and systematic observations in the coastal zone. It acknowledges the key role that GOOS Regional Alliances such as NEAR-GOOS will have in ensuring both the regional relevance of observations and their incorporation in an integrated system.

It is not appropriate here to reproduce the content of the document, but to mention some salient concepts. The approach is focussed on in situ observations with stress on the complementary use of satellite remote sensing and hence indicates a relationship to the IGOS projects foreshadowed in Appendix SP7. From a list of variables that make possible the detection of state and the prediction of change in the coastal zone, it describes a procedure for ranking of these in relation to particular purposes or functions that are specific to a region.

Such a ranking exercise could be a worthwhile exercise for NEAR-GOOS with the participation of all members, as an essential preliminary for the coordination of coastal observations. This would aid common appreciation of the priorities and a multi-national 'ownership' of the projects subsequently chosen.

The plan goes on to discuss the linking of observations with models, which is an essential step in the fulfilment of the goals of NEAR-GOOS. It examines the kinds of models required for different applications and addresses the organizational implications in bringing an 'observations/models' system to an operational status.

As part of a 'scoping' exercise for a coastal project, NEAR-GOOS would need to undertake an analysis of this step in terms of the prospectively feasible data types and the technical and scientific capabilities of the Partners.

4. SUB-REGIONAL SEAS PROJECTS

These would be collaborative projects for data collection, such as ferry boxes or jointly operated buoys or drifter programmes. The deployment of offshore monitoring platforms or buoys is expensive, yet necessary to 'ground truth' remote sensing applications, and to calibrate and validate many models. Such types of observations could well be implemented as joint collaborative pilot experiments in which the countries share in the cost and burden for the operation of the platforms.

The initiation of collaborative offshore ocean data gathering projects through the cooperation of the participating countries could form an essential and new contribution to GOOS. For geopolitical and practical reasons, it may be desirable to create separate projects, each with its own TSC, for the specific marine regions, for example, the Yellow Sea Large Marine Ecosystem Project. This project has commenced with the participating countries China and the Republic of Korea, and is directed to better understand how to sustain the ecosystem. Under the programme, the DPR Korea will have a national component. At this stage it is not recognised as a NEAR-GOOS project.

Three meetings will be held this year organized by the CKJORC that aim at establishing an operational oceanographic capacity in the Yellow Sea. Following the establishment of the project office and hiring of the Programme Director, drafting will commence on Strategic Action Programme.

5. PROJECT TOWARDS OPERATIONAL FORECASTING

Such a project could be directed to the evolution of activities that in the first five years, demonstrate the value of operational oceanography and, for the next phase, will become tools for an operational capability in the NEAR-GOOS region. They could include:

- Circulation modelling and forecasting. This is still largely in a research phase, and there is a definite need for more and especially good data sets from across the region. Recognizing the defined role for NEAR-GOOS in regional coordination, the initial focus could be on basin-scale circulation models for the marginal seas, with contributions from each member state as appropriate. The time scale of forecasting will depend on what is realistically feasible;
- Ecosystem modelling. Not much progress has yet been made in the development of GOOS initiatives worldwide, but it is important to the strategic development of NEAR-GOOS to incorporate at least one project directed to the acquisition and use of ecologically relevant variables.

Important considerations when prioritising activities are the ultimate utility of the product, and the ways by which the NEAR-GOOS community can obtain and deliver good data sets.

An issue requiring resolution by the CC is whether NEAR-GOOS should focus on the delivery of forecasting products or on the delivery of good data sets. Several observers have indicated a preference for forecasting products in view of the regional emphasis and a need to focus on outcomes that depend on cooperative action between the partners, which NEAR-GOOS is uniquely designed to provide. In principle NEAR-GOOS should follow the concept of an end-to-end system and therefore it is necessary to have a clear understanding of the potential users. Ideally, NEAR-GOOS would yield generic products at the intermediate level that can be adapted, modified and packaged for specific uses by relevant agencies and institutions (including for commercial purposes) as appropriate.

Appendix SP7. Projects with other programs and organizations

The following are representative of the possible frameworks for joint projects with other organizations.

1. NORTH PACIFIC MARINE SCIENCE ORGANIZATION (PICES)

The formal relationship between the ICES Science Board and GOOS has resulted in an identified need to develop GOOS-type activities in the North Atlantic in collaboration with ICES (International Council for the Exploration of the Sea). ICES and GOOS are both interested in expanding the set of 'pilot' projects to other locations in the world, in particular to the North Pacific and PICES. An obvious candidate partner is NEAR-GOOS.

Of all the international marine organizations operating in the region, PICES is probably the most multi-faceted and active potential user of NEAR-GOOS capability. It also has among its membership, all of the NEAR-GOOS member countries. There is therefore a strong justification for developing joint projects that exploit the respective strengths of both. For some time mutual interests have been stressed by PICES. Noteworthy PICES activities are the Technical Committee on Data Exchange, Committee on Physical Oceanography and Climate, and the Monitor Task Team. It should be borne in mind that the focus of PICES is on an ecosystem approach applied to the survival and health of the ecosystems in the North Pacific region under the pressure of global change. To this end PICES is a co-sponsor of the PICES/GLOBEC Climate Change and Capacity Programme and conducts a very active programme of workshops, conferences and publications. For example, recent activity included a workshop (9-10 October 2003) to review the 'Variability and Status of the Yellow and East China Sea Ecosystems'.

NEAR-GOOS is well equipped to commence a study of the climatology and variability of the physical dynamics of these seas, using the existing capabilities of the Database host Agencies. With PICES as a scientifically oriented partner, there is potential both to focus on the dynamics of closest relevance to the ecosystems, to stimulate investigations using remote-sensed data which is (or could be) handled by the national and regional DB's and to define additional non-physical variables that have the highest priority for inclusion in the NEAR-GOOS suite of collected data.

2. INTEGRATED GLOBAL OBSERVING STRATEGY (IGOS)

IGOS is a conceptual framework for the worldwide coordination of organizations and programmes directed to improving and gaining maximum benefit from the observation of the Earth. A particular advantage of involvement is the link it enables between in-situ observation systems and satellite observing systems, with the objective of optimizing both systems.

IGOS is organized into 'Themes'. The first of these created is the 'Oceans Theme', formulated in 1999. The Team Membership for this theme includes several of the major national space agencies and GOOS, which represents the in-situ ocean observing system elements, while J-COMM is responsible for in-situ implementation. The Theme has already achieved success in developing the transition between research and operational monitoring, with several of the space agencies committing to support the continuation of precision ocean altimetry following the Jason-1 mission.

Recently, IGOS has initiated a Coastal Theme in partnership with GOOS, the Global Terrestrial Observing System (GTOS) and the International Geosphere-Biosphere Programme (IGBP), and is seeking to integrate and coordinate observing activities in the coastal zone.

Both of these themes provide an opportunity for NEAR-GOOS to develop projects that will open doors to collaboration with the space agencies and regional observing programmes. During the second phase, workshops and other forums should explore the possibilities for expanding NEAR-GOOS roles to include selected projects that exploit new capacities for remote sensing of vulnerable regional coastal areas.

3. NORTHWEST PACIFIC ACTION PLAN (NOWPAP)

The Northwest Pacific Action Plan was drafted in 1992 by UNEP as a component of the Regional Seas Programme with the purpose of guiding the use and development of the marine environment and coastal zones of (what became) the member countries of NEAR-GOOS. Among its objectives (see <http://www.nowpap1.org/2-NOWPAP.htm>) were:

- i) 'coordinating and integrating monitoring and data-gathering systems on a regional basis...' and
- ii) 'To collate and record environmental data and information to form a comprehensive database and information management system....'

In particular it is noted that the second of these objectives envisages the creation of a linked system of national Geographic Information Systems (GISs) and a review of electronic databases developed by international agencies as a starting point for the development of a comprehensive regional GIS.

These objectives appear to anticipate the subsequent development of NEAR-GOOS and it may now be appropriate to re-visit jointly with UNEP the possibility of a joint database and information management project, with the NEAR-GOOS organization designated a Regional Coordination Unit.

A meeting of Working Group 4 (Remote Sensing of Marine Environment in NOWPAP/3 Establishment of a Collaborative Regional Monitoring Programme) was held in Vladivostok from 1-3 December 2003, aiming to promote, coordinate and harmonize monitoring of coastal and marine environment by remote sensing in the Northwest Pacific and develop cooperation among Member States (Russia, China Korea and Japan). As a Term of Reference, members agreed "To make an effort for the cooperation with other regional programmes in view of coastal and marine environmental monitoring" (eutrophication monitoring and oil spill detection). This ToR links NOWPAP with NEAR-GOOS implicitly but directly.

Northwest Pacific Action Plan Data and Information Network Regional Activity Centre (NOWPAP DINRAC);

At its first NOWPAP/DINRAC Focal Points meeting in Shanghai, November 2002 (UNEP/NOWPAP/DINRAC/FPM 1/13, see <http://dinrac.nowpap.org>) it was decided to develop comprehensive documents on "The Policy and Guideline on Data and Information Sharing" and on the "Principle and Guideline on Metadata Management in NOWPAP Region". Of interest is the financial aspects of NOWPAP from which NEAR-GOOS may draw some ideas in relation to attracting sources to fund its activities e.g. meetings and projects.

4. JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)

JCOMM deals with intergovernmental coordination, regulation and management of operational marine meteorology and oceanography, integrated operational ocean observing system and data management, and new products and services. It is an implementation mechanism for global GOOS. But it needs strong regional interactions and support. NEAR-GOOS should remain alert to opportunities for collaboration and for strategic involvement in the JCOMM management bodies.

5. UN DEVELOPMENT PROGRAMME/GLOBAL ENVIRONMENT FACILITY

The Global Environment Facility and the United Nations Development Programme are going to launch Large Marine Ecosystem (LME) project for the Yellow Sea and there are plans for similar project covering northern area of the NEAR-GOOS.

ANNEX IX

PROPOSAL FOR CAPACITY BUILDING WORKSHOP FOR SUMMER 2005

Japan/East Asia Circulation: What Do We Know and How Good Can We Forecast?"

**Dedicated capacity building workshop
Summer 2005, near Vladivostok, Russia**

Dr Vyacheslav B. Lobanov

Abstract

Ocean circulation dynamics is an important factor for physical processes, ecosystem dynamics and human activity. With an understanding of the importance of operational oceanographic information, including forecasts (e.g. in relation to the development of regional coastal components of GOOS, like NEAR-GOOS, and activity of PICES on North Pacific Ecosystem Status Report and possible PICES pilot projects, CREAMS programme development etc.), it is timely to ask what do we know, how valid are our numerical models, and how can we make reliable forecasts of the circulation in JES. Intensive field observations over recent years brought new knowledge on circulation dynamics there. At the same time, there have been vigorous developments in numerical modelling. How do these correspond to each other? What are the achievements and gaps? What is an approach to create reliable, regional models, for research and operational oceanography?

Purpose

- Produce assessment and synthesis of existing circulation models and contemporary knowledge based on recent operational programmes;
- Training in modelling (for young scientists)

Modus operandi

- Review of observed properties of JES (seasonal circulation, mesoscale variability, wintertime convection, inter-annual variability, etc.) to produce an evolutionary dynamical scenario;
- Review of forcing functions in use for winds, heat flux, moisture flux, through flow, tides, etc.
- Review of model simulations: standard case (s), other cases;
- Other topics: data assimilation, diagnostic studies, and forecasts.

Possible sponsors

IOC/WESTPAC, PICES, CREAMS, ONR-Asia, Russian Academy of Sciences.

Co-chairs

C.N.K. Mooers (USA), V.B. Lobanov (Russia), K.Kim (Korea).

Request

Travel and accommodation support.

ANNEX X

LIST OF ACRONYMS

CC	Coordinating Committee
CKJORC	China-Korea Joint Ocean Research Centre
COInet	China Ocean Information Network
COOP	Coastal Ocean Observation Panel
CREAMS	Circulation Research of the East Asian Marginal Seas
DMDB	Delayed Mode Data Base
DPRK	Democratic People's Republic of Korea
FERHRI	Far Eastern Regional Hydrometeorological Research Institute (Russian Federation)
FTP	File Transfer Protocol
GEF	Global Environment Facility
GIS	Geographic Information System
GODAR	Global Oceanographic Data Archaeology and Rescue
GODAR-WESTPAC	GODAR project in the WESTPAC region
GOOS	Global Ocean Observing System
GRA	GOOS Regional Alliance
GTOS	Global Terrestrial Observing System
GTS	Global Telecommunication System
IGBP	International Geosphere-Biosphere Programme
I-GOOS	Intergovernmental Committee for GOOS
IGOS	Integrated Global Observing Strategy
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IODE	International Oceanographic Data Exchange (IOC)
ISIWO	Integrated System of Information on the World Ocean
JAFIC	Japan Fisheries Information Service Center
JCOMM	Joint IOC/WMO Technical Commission for Oceanography and Marine Meteorology
J-DOSS	JODC Data Online Service System
JMA	Japan Meteorological Agency
JODC	Japan Oceanographic Data Centre
KODC	Korea Oceanographic Data Centre
KODIS	Korea Oceanographic Data and Information Service System
KORDI	Korea Ocean Research and Development Institute (Rep. of Korea)
LME	Large Marine Ecosystem
MOMAF	Ministry of Maritime Affairs and Fisheries (Rep. of Korea)
MOST	Ministry of Science and Technology
NDMDB	National Delayed Mode Database
NEAR-GOOS	North-East Asian Regional GOOS
NFRDI	National Fisheries Research and Development Institute (Rep of Korea)
NGSST-P	New Generation Sea Surface Temperature Project
NMDIS	National Marine Data and Information Services
NMDIS	National Marine Data and information Service
NOWPAP	North-West Pacific Action Plan
NOWPAP DINRAC	Northwest Pacific Action Plan Data and Information Network Regional Activity Center
ONR	Office of Naval Research (U.S.A.)
ORI	Ocean Research Institute (University of Tokyo, Japan)
ORSP	Ocean Remote Sensing Programme

PaCOS	Pacific Coastal Observing System
PICES	North Pacific Marine Science Organisation
POI	Pacific Oceanological Institute (Russian Federation)
QA	Quality Assurance
QC	Quality Control
RDMDB	Regional Delayed Mode Data Base
RRTDB	Regional Real Time Data Base
RTDB	Real Time Data Base
SEAGOOS	Southeast Asia Global Observing System
SOA	State Oceanic Administration (China)
SOOP	Ship of Opportunity Programme
TEMA	Training Education and Mutual Assistance
TINRO	Pacific Scientific Research Fisheries Centre (Russian Federation)
TSC	Technical Subcommittee
UNDP	United Nations Development Programme
WESTPAC	Regional Committee for the Western Pacific
WMO	World Meteorological Organisation
WOD	World Ocean Database
ICIWP	International Conference on the International Oceanographic Data and Information Exchange in the Western Pacific

In this Series, entitled

Reports of Meetings of Experts and Equivalent Bodies, which was initiated in 1984 and which is published in English only, unless otherwise specified, the reports of the following meetings have already been issued:

1. Third Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
2. Fourth Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans S. Fourth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' (**Also printed in Spanish**)
4. First Session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
5. First Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
6. First Session of the Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
7. First Session of the Joint CCOP(SOPAC)-IOC Working Group on South Pacific Tectonics and Resources
8. First Session of the IODE Group of Experts on Marine Information Management
9. Tenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies in East Asian Tectonics and Resources
10. Sixth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
11. First Session of the IOC Consultative Group on Ocean Mapping (**Also printed in French and Spanish**)
12. Joint 100-WMO Meeting for Implementation of IGOSS XBT Ships-of-Opportunity Programmes
13. Second Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
14. Third Session of the Group of Experts on Format Development
15. Eleventh Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
16. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
17. Seventh Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
18. Second Session of the IOC Group of Experts on Effects of Pollutants
19. Primera Reunión del Comité Editorial de la COI para la Carta Batimétrica Internacional del Mar Caribe y Parte del Océano Pacífico frente a Centroamérica (**Spanish only**)
20. Third Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
21. Twelfth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of South-East Asian Tectonics and Resources
22. Second Session of the IODE Group of Experts on Marine Information Management
23. First Session of the IOC Group of Experts on Marine Geology and Geophysics in the Western Pacific
24. Second Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources (**Also printed in French and Spanish**)
25. Third Session of the IOC Group of Experts on Effects of Pollutants
26. Eighth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
27. Eleventh Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (**Also printed in French**)
28. Second Session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
29. First Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
30. First Session of the IOCARIBE Group of Experts on Recruitment in Tropical Coastal Demersal Communities (**Also printed in Spanish**)
31. Second IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
32. Thirteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asia Tectonics and Resources
33. Second Session of the IOC Task Team on the Global Sea-Level Observing System
34. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
35. Fourth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
36. First Consultative Meeting on RNODCs and Climate Data Services
37. Second Joint IOC-WMO Meeting of Experts on IGOSS-IODE Data Flow
38. Fourth Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
39. Fourth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
40. Fourteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics and Resources
41. Third Session of the IOC Consultative Group on Ocean Mapping
42. Sixth Session of the Joint IOC-WMO-CCPS Working Group on the Investigations of 'El Niño' (**Also printed in Spanish**)
43. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
44. Third Session of the IOC-UN(OALOS) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
45. Ninth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
46. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
47. Cancelled
48. Twelfth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans
49. Fifteenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies of East Asian Tectonics and Resources
50. Third Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
51. First Session of the IOC Group of Experts on the Global Sea-Level Observing System
52. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean
53. First Session of the IOC Editorial Board for the International Chart of the Central Eastern Atlantic (**Also printed in French**)
54. Third Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (**Also printed in Spanish**)
55. Fifth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
56. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean
57. First Meeting of the IOC *ad hoc* Group of Experts on Ocean Mapping in the WESTPAC Area
58. Fourth Session of the IOC Consultative Group on Ocean Mapping

59. Second Session of the IOC-WMO/IGOSS Group of Experts on Operations and Technical Applications
60. Second Session of the IOC Group of Experts on the Global Sea-Level Observing System
61. UNEP-IOC-WMO Meeting of Experts on Long-Term Global Monitoring System of Coastal and Near-Shore Phenomena Related to Climate Change
62. Third Session of the IOC-FAO Group of Experts on the Programme of Ocean Science in Relation to Living Resources
63. Second Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
64. Joint Meeting of the Group of Experts on Pollutants and the Group of Experts on Methods, Standards and Inter-calibration
65. First Meeting of the Working Group on Oceanographic Co-operation in the ROPME Sea Area
66. Fifth Session of the Editorial Board for the International Bathymetric and its Geological/Geophysical Series
67. Thirteenth Session of the IOC-IHO Joint Guiding Committee for the General Bathymetric Chart of the Oceans **(Also printed in French)**
68. International Meeting of Scientific and Technical Experts on Climate Change and Oceans
69. UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System
70. Fourth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
71. ROPME-IOC Meeting of the Steering Committee on Oceanographic Co-operation in the ROPME Sea Area
72. Seventh Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' **(Spanish only)**
73. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico **(Also printed in Spanish)**
74. UNEP-IOC-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs
75. Third Session of the IODE Group of Experts on Marine Information Management
76. Fifth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
77. ROPME-IOC Meeting of the Steering Committee for the Integrated Project Plan for the Coastal and Marine Environment of the ROPME Sea Area
78. Third Session of the IOC Group of Experts on the Global Sea-level Observing System
79. Third Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
80. Fourteenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans
81. Fifth Joint IOG-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
82. Second Meeting of the UNEP-IOC-ASPEI Global Task Team on the Implications of climate Change on Coral Reefs
83. Seventh Session of the JSC Ocean Observing System Development Panel
84. Fourth Session of the IODE Group of Experts on Marine Information Management
85. Sixth Session of the IOC Editorial Board for the International Bathymetric chart of the Mediterranean and its Geological/Geophysical Series
86. Fourth Session of the Joint IOC-JGOFS Panel on Carbon Dioxide
87. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Pacific
88. Eighth Session of the JSC Ocean Observing System Development Panel
89. Ninth Session of the JSC Ocean Observing System Development Panel
90. Sixth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
91. First Session of the IOC-FAO Group of Experts on OSLR for the IOCINCWIO Region
92. Fifth Session of the Joint IOC-JGOFS CO₂ Advisory Panel Meeting
93. Tenth Session of the JSC Ocean Observing System Development Panel
94. First Session of the Joint CMM-IGOSS-IODE Sub-group on Ocean Satellites and Remote Sensing
95. Third Session of the IOC Editorial Board for the International Chart of the Western Indian Ocean
96. Fourth Session of the IOC Group of Experts on the Global Sea Level Observing System
97. Joint Meeting of GEMSI and GEEP Core Groups
98. First Session of the Joint Scientific and Technical Committee for Global Ocean Observing System
99. Second International Meeting of Scientific and Technical Experts on Climate Change and the Oceans
100. First Meeting of the Officers of the Editorial Board for the International Bathymetric Chart of the Western Pacific
101. Fifth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
102. Second Session of the Joint Scientific and Technical Committee for Global Ocean Observing System
103. Fifteenth Session of the Joint IOC-IHO Committee for the General Bathymetric Chart of the Oceans
104. Fifth Session of the IOC Consultative Group on Ocean Mapping
105. Fifth Session of the IODE Group of Experts on Marine Information Management
106. IOC-NOAA *Ad hoc* Consultation on Marine Biodiversity
107. Sixth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
108. Third Session of the Health of the Oceans (HOTO) Panel of the Joint Scientific and Technical Committee for GLOSS
109. Second Session of the Strategy Subcommittee (SSC) of the IOC-WMO-UNEP Intergovernmental Committee for the Global Ocean Observing System
110. Third Session of the Joint Scientific and Technical Committee for Global Ocean Observing System
111. First Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate
112. Sixth Session of the Joint IOC-JGOFS CO₂ Advisory Panel Meeting
113. First Meeting of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional - Global Ocean Observing System (NEAR-GOOS)
114. Eighth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of "El Niño" **(Spanish only)**
115. Second Session of the IOC Editorial Board of the International Bathymetric Chart of the Central Eastern Atlantic **(Also printed in French)**
116. Tenth Session of the Officers Committee for the Joint IOC-IHO General Bathymetric Chart of the Oceans (GEBCO), USA, 1996
117. IOC Group of Experts on the Global Sea Level Observing System (GLOSS), Fifth Session, USA, 1997
118. Joint Scientific Technical Committee for Global Ocean Observing System (J-GOOS), Fourth Session, USA, 1997
119. First Session of the Joint 100-WMO IGOSS Ship-of-Opportunity Programme Implementation Panel, South Africa, 1997
120. Report of Ocean Climate Time-Series Workshop, Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate, USA, 1997

121. IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional Global Ocean Observing System (NEAR-GOOS), Second Session, Thailand, 1997
122. First Session of the IOC-IUCN-NOAA *Ad hoc* Consultative Meeting on Large Marine Ecosystems (LME), France, 1997
123. Second Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), South Africa, 1997
124. Sixth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico, Colombia, 1996 **(also printed in Spanish)**
125. Seventh Session of the IODE Group of Experts on Technical Aspects of Data Exchange, Ireland, 1997
126. IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), First Session, France, 1997
127. Second Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LME), France, 1998
128. Sixth Session of the IOC Consultative Group on Ocean Mapping (CGOM), Monaco, 1997
129. Sixth Session of the Tropical Atmosphere - Ocean Array (TAO) Implementation Panel, United Kingdom, 1997
130. First Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System (GOOS), France, 1998
131. Fourth Session of the Health of the Oceans (HOTO) Panel of the Global Ocean Observing System (GOOS), Singapore, 1997
132. Sixteenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO), United Kingdom, 1997
133. First Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS), France, 1998
134. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean (IOC/EB-IBCWIO-IW3), South Africa, 1997
135. Third Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), France, 1998
136. Seventh Session of the Joint IOC-JGOFS C02 Advisory Panel Meeting, Germany, 1997
137. Implementation of Global Ocean Observations for GOOS/GCOS, First Session, Australia, 1998
138. Implementation of Global Ocean Observations for GOOS/GCOS, Second Session, France, 1998
139. Second Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), Brazil, 1998
140. Third Session of IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional - Global Ocean Observing System (NEAR-GOOS), China, 1998
141. Ninth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño', Ecuador, 1998 **(Spanish only)**
142. Seventh Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series, Croatia, 1998
143. Seventh Session of the Tropical Atmosphere-Ocean Array (TAO) Implementation Panel, Abidjan, Côte d'Ivoire, 1998
144. Sixth Session of the IODE Group of Experts on Marine Information Management (GEMIM), USA, 1999
145. Second Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System (GOOS), China, 1999
146. Third Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), Ghana, 1999
147. Fourth Session of the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC); Fourth Session of the WCRP CLIVAR Upper Ocean Panel (UOP); Special Joint Session of OOPC and UOP, USA, 1999
148. Second Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS), France, 1999
149. Eighth Session of the Joint IOC-JGOFS CO2 Advisory Panel Meeting, Japan, 1999
150. Fourth Session of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional – Global Ocean Observing System (NEAR-GOOS), Japan, 1999
151. Seventh Session of the IOC Consultative Group on Ocean Mapping (CGOM), Monaco, 1999
152. Sixth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), France, 1999
153. Seventeenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO), Canada, 1999
154. Comité Editorial de la COI para la Carta Batimétrica Internacional del Mar Caribe y el Golfo de Mexico (IBCCA), Septima Reunión, Mexico, 1998
IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA), Seventh Session, Mexico, 1998
155. Initial Global Ocean Observing System (GOOS) Commitments Meeting, IOC-WMO-UNEP-ICSU/Impl-III/3, France, 1999
156. First Session of the *ad hoc* Advisory Group for IOCARIBE-GOOS, Venezuela, 1999 **(also printed in Spanish and French)**
157. Fourth Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), China, 1999
158. Eighth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series, Russian Federation, 1999
159. Third Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS), Chile, 1999
160. Fourth Session of the IOC-WMO-UNEP-ICSU-FAO Living Marine Resources Panel of the Global Ocean Observing System (GOOS). Hawaii, 2000
161. Eighth Session of the IODE Group of Experts on Technical Aspects of Data Exchange, USA, 2000
162. Third Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LME), France, 2000
163. Fifth Session of the IOC-WMO-UNEP-ICSU Coastal Panel of the Global Ocean Observing System (GOOS), Poland, 2000
164. Third Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System (GOOS), France, 2000
165. Second Session of the *ad hoc* Advisory Group for IOCARIBE-GOOS, Cuba, 2000 **(also printed in Spanish and French)**
166. First Session of the Coastal Ocean Observations Panel, Costa Rica, 2000
167. First GOOS Users' Forum, 2000
168. Seventh Session of the Group of Experts on the Global Sea Level Observing System, Honolulu, 2001
169. First Session of the Advisory Body of Experts on the Law of the Sea (ABE-LOS), France, 2001 **(also printed in French)**
170. Fourth Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System, Chile, 2001
171. First Session of the IOC-SCOR Ocean CO₂ Advisory Panel, France, 2000
172. Fifth Session of the GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Norway, 2000 **(electronic copy only)**
173. Third Session of the *ad hoc* Advisory Group for IOCARIBE-GOOS, USA, 2001 **(also printed in Spanish and French)**
174. Second Session of the Coastal Ocean Observations Panel and GOOS Users' Forum, Italy, 2001
175. Second Session of the Black Sea GOOS Workshop, Georgia, 2001
176. Fifth Session of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional – Global Ocean Observing System (NEAR-GOOS), Republic of Korea, 2000

177. Second Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Morocco, 2002 (**also printed in French**)
178. Sixth Session of the Joint GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC), Australia, 2001 (**electronic copy only**)
179. *Cancelled*
180. Second Session of the IOC-SCOR Ocean CO₂ Advisory Panel, Honolulu, Hawaii, U.S.A, 2002 (**electronic copy only**)
181. IOC Workshop on the Establishment of SEAGOOS in the Wider Southeast Asian Region, Seoul, Republic of Korea, 2001 (SEAGOOS preparatory workshop) (**electronic copy only**)
182. First Session of the IODE Steering Group for the Resource Kit, USA, 19–21 March 2001
183. Fourth Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), France, 2002
184. Seventh Session of the IODE Group of Experts on Marine Information Management (GEMIM), France, 2002 (**electronic copy only**)
185. Sixth Session of IOC/WESTPAC Coordinating Committee for the North-East Asian Regional - Global Ocean Observing System (NEAR-GOOS), Republic of Korea, 2001 (**electronic copy only**)
186. First Session of the Global Ocean Observing System (GOOS) Capacity Building Panel, Switzerland, 2002 (**electronic copy only**)
187. Fourth Session of the ad hoc Advisory Group for IOCARIBE-GOOS, 2002, Mexico (**also printed in French and Spanish**)
188. Fifth Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean (IBCWIO), Mauritius, 2000
189. Third session of the Editorial Board for the International Bathymetric Chart of the Western Pacific, China, 2000
190. Third Session of the Coastal Ocean Observations Panel and GOOS Users' Forum, Vietnam, 2002
191. Eighth Session of the IOC Consultative Group on Ocean Mapping, Russian Federation, 2001
192. Third Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Lisbon, 2003 (**also printed in French**)
193. Extraordinary Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño', Chile, 1999 (**Spanish only; electronic copy only**)
194. Fifth Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System, France, 2002
195. Sixth Session of the IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System, South Africa, 2003
196. Fourth Session of the Coastal Ocean Observations Panel, South Africa, 2002 (**electronic copy only**)
197. First Session of the JCOMM/IODE Expert Team On Data Management Practices, Belgium, 2003 (*also JCOMM Meeting Report No. 25*)
198. Fifth Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), Paris, 2003
199. Ninth Session of the IOC Consultative Group on Ocean Mapping, Monaco, 2003 (**Recommendations in English, French, Russian and Spanish included**)
200. Eighth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), France, 2003 (**electronic copy only**)
201. Fourth Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Greece, 2004 (**also printed in French**)
202. Sixth Session of the IOC-IUCN-NOAA Consultative Meeting on Large Marine Ecosystems (LMEs), Paris, 2004 (**electronic copy only**)
203. Fifth Session of the Advisory Body of Experts on the Law of the Sea (IOC/ABE-LOS), Argentina, 2005 (**also printed in French**)
204. Ninth Session of the IOC Group of Experts on the Global Sea level Observing System (GLOSS), France, 2005 (**electronic copy only**)
205. Eighth Session of the IOC/WESTPAC Co-ordinating Committee for the North-East Asian Regional – Global Ocean Observing System (NEAR-GOOS), China, 2003 (**electronic copy only**)