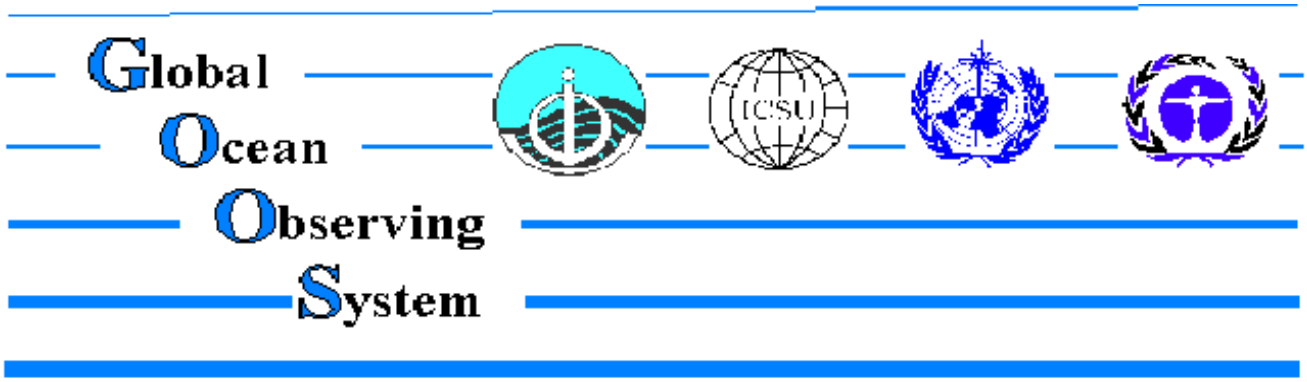

Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

IOC-WMO-UNEP-ICSU Steering Committee of the Global Ocean Observing System (GOOS)

Fifth Session
1-3 May 2002
Paris, France

GOOS Report No. 126 **UNESCO**

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Paris, December 2002
English only

ABSTRACT

The fifth session of the GOOS Steering Committee (GSC) took place on 1-3 May 2002 in Paris, France. Intersessional working groups were established to work on a communications strategy for GOOS; on the GOOS brochure; and on the status of indicator development. It was agreed that a GOOS biennial review should replace the annual GOOS status report. The Committee approved the final stages of the design plan for the coastal component of GOOS, called upon the Ocean Observations Panel for Climate to increase the effort devoted to considering ice-covered seas, and called upon both the OOPC and the Coastal Ocean Observations Panel (COOP) to ensure that close working relationships develop between COOP and the activities under the Global Ocean Data Assimilation Experiment (GODAE) and the Argo profiling float project. COOP and OOPC were also asked to work closely with the International Council for the Exploration of the Sea (ICES) to develop ideas for an Atlantic-wide multi-community approach to GOOS that would build on and complement ongoing developments. The GSC strongly endorsed the development of NASA'a proposed Aquarius Mission that will address long-term GOOS requirements for sea surface salinity. The Committee agreed that it would be premature at this time to start developing a Coastal Theme for the Partners for an Integrated Global Observing Strategy; this development should await publication of the coastal GOOS design plan at the end of the year. The Committee encouraged Regional GOOS groups to take on board the advice emerging from COOP, OOPC, GODAE and Argo in designing GOOS developments at the regional level. The Rio GOOS Office was encouraged to give high priority to the development of a proposed South Atlantic workshop to be convened early in 2003. Neville Smith was asked to organize and chair a Steering Group to develop plans for an Ocean Information Technology Pilot Project.

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ANNEXES

1. OPENING AND WELCOME

1.1 WELCOME AND INTRODUCTION

The fifth session of the Global Ocean Observing System (GOOS) Steering Committee (GSC) was called to order by its Vice Chairperson, Dr Julie Hall, acting as Chair, on Wednesday, 1 May 2002, at 0900, in Salle XIV at UNESCO headquarters, Paris, France. The Chair welcomed those present, including the new members of the Committee. Apologies were presented from Committee members W. Nowlin, R. Rayner, D. Wallace, Zhouwen Yu, G. Brundrit, and from the representative of the United Nations Environment Programme (UNEP), E. Adler. The list of participants is presented in Annex II.

1.2 COMMENTS FROM SPONSOR ORGANIZATIONS

Patricio Bernal, representing the hosting organization, the Intergovernmental Oceanographic Commission (IOC), welcomed the Committee to UNESCO. He pointed out that very considerable progress had been made since one of the early GOOS planning meetings in which he had participated – namely the so-called "Blue Ribbon" Panel for GOOS, which met at Scripps Institution of Oceanography in August 1992. We have moved a very considerable way towards implementation, and the core elements of the system were now implemented and providing services to users. GOOS had been much occupied with 'science push'; it was now time to pay more attention to 'demand-pull'. Advocacy from the user community was essential if GOOS activities were to achieve the transition from research activities to operations. It would be important in the future to get the major industrial sectors (such as oil and gas, finance, tourism, and so on) 'on-side' as an important step in establishing the benefits of GOOS. Industry trials of the value of observing system products in business forecasts were now beginning. In this context he passed around a note from the IOC biennial report for 2000-2001, which reads:

"The long term challenge for the IOC is to define a global framework in which the development of GOOS as a single, permanent, global, public-oriented service can be achieved, with the active contribution of different sectors of the society, including the private sector. This requires demonstration of the economic benefits of a common shared strategy between the public and private sector, the identification of the public and private services that can be derived and/or shared through a common observing platform and the appropriate segmentation of public and private products and users. Achieving this new vision will require the development, negotiation and adoption of international norms and agreements, especially in the area of data and information exchange and sharing."

He went on to note that JCOMM is a strong new institutional mechanism underpinning the development of GOOS, and that EuroGOOS is showing the way forward as far as the regional development of GOOS is concerned.

Dr Bernal informed the Committee that GOOS would be presented by the IOC at the World Summit on Sustainable Development (WSSD), scheduled for Johannesburg in the summer of 2002, as one of the tools essential for sustainable development.

Chris Crossland, representing ICSU, noted that ICSU has a strong interest in encouraging the development of observing systems in support of long term research activities, like those required for decadal observations of climate change. Peter Dexter, representing WMO, noted WMO's continuing strong support for the development of GOOS and its implementation through JCOMM.

1.3 WORKING ARRANGEMENTS AND ADOPTION OF THE AGENDA

Colin Summerhayes, Director of the GPO, set out the meeting agenda (document GSC-V/1) (Annex I), and timetable (document GSC-V/2), presented the list of participants (document GSC-V/3) (Annex II), and introduced the list of documents (document GSC-V/4) (Annex III). He noted that all meeting documents had been made available (and would stay) on the GOOS web site (http://ioc.unesco.org/goos/GSC-V_doclst.html). He also noted that the working language for the meeting would be English. The provisional agenda (Annex I) was adopted.

Julie Hall reminded attendees that a talk on "*The Continuous Plankton Recorder (CPR) Programme and GOOS*" would be given by Chris Reid, the Director of the CPR, at 6 pm on Thursday 2 May 2003, and invited all to attend, bearing in mind that the CPR was one of the key components of GOOS.

2. THE GOOS INFRASTRUCTURE

2.1 COMMENTS FROM GSC CHAIR

Julie Hall presented a report by the Chairman giving his view of key GOOS developments since GSC-IV, and of priority issues to be considered at GSC-V.

Table of key developments since GSC-IV

1. Establishment of the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM), with the first sessions of JCOMM and its Management Committee;
2. Agreement on a rolling review for satellite based observations as part of the Ocean Theme process of the Partners for an Integrated Global Observing Strategy (IGOS);
3. Two meetings of the Coastal Ocean Observations Panel (COOP), leading to a draft Strategic Design Plan;
4. A suite of successful meetings in Australia, led by the Perth Office, leading to refined plans for regional developments in the Pacific islands, southeast Asia and the Indian Ocean;
5. Establishment of a committee to guide development of Indian Ocean GOOS (IOGOOS), and a Secretariat in Hyderabad, in India, to support IOGOOS;
6. Establishment of an IOC GOOS Office at Rio de Janeiro, in Brazil;
7. Completion of an initial review of the Global Observing Systems Information Centre (GOSIC);
8. Establishment of a North Sea Ecosystem Pilot Project, jointly with the International Council for the Exploration of the Sea (ICES);
9. Continued progress with the pilot projects of the Ocean Observations Panel for Climate (OOPC), notably with the Global Ocean Data Assimilation Experiment (GODAE), and the Argo profiling float programme;
10. Establishment of, or progress with, COOP-related pilot projects, some of which have not (yet) been formally acknowledged by COOP and the GSC as pilot projects. These include the Global Seagrass Network (SEAGNET), the Adriatic Sea Integrated Coastal Areas and River Basin Management System (ADRICOSM), the Mediterranean Network to Assess and Upgrade Monitoring and Forecasting (MAMA), the Quickly Integrated Joint Observing Team (QUIJOTE), and Vietnamese Forecasting System, and the Rapid Assessment of Marine Pollution project (RAMP);
11. Progress with implementation of the JCOMM operations (JCOMMOPS) Centre in Toulouse, France;
12. Substantial funding from the European Commission for the MAMA Network;
13. Completion of strategic plans for IOCARIBE-GOOS and PacificGOOS;
14. Formal establishment of Black Sea GOOS (by Memorandum of Understanding);
15. Establishment of EuroGOOS's Northwest Shelf Operational Oceanographic System (NOOS);
16. Hiring of a consultant (Bert Thompson) to collect data on national contributions to GOOS;
17. Continuation of the GOOS Products and Services Bulletin (with Issue No.2);
18. Beginning of the POGO (Partnership for Observations of the Global Ocean) Fellowships for training in GOOS methodologies.

The Committee was pleased to see substantial progress in so many areas.

2.2 REPORT ON I-GOOS ACTIVITIES AND REMARKS FROM I-GOOS CHAIR

Silvana Vallerga, chairperson of the IOC-WMO-UNEP Intergovernmental Committee for GOOS (I-GOOS) gave an I-GOOS perspective on the future of GOOS (working document GSC-V/8). She reported on progress at the 5th I-GOOS meeting (28-30 June 2001; background document GSC-V/B1), and the 21st IOC Assembly meeting (2-13 July 2001), and gave an overview of recent developments and plans.

Dr Vallerga noted that GOOS was entering a new phase, closer to implementation, and that some Member States now have operational monitoring systems in place and are collaborating to implement regional observing systems. She pointed to a concern expressed by some that GOOS committees, panels and meetings had proliferated over the years as GOOS had grown and approached implementation, and that GOOS would benefit in performance and be better perceived by governments if its organization was streamlined. She noted that the 5 initial GOOS module panels had been reduced to two, by merging three panels into COOP and merging the services panel into the OOPC. A regional forum will help to bring the different regional groups together, and a first attempt at this was proposed for Athens in December 2002. She put forward the suggestion that it may prove possible to create a single GOOS management committee to take over from I-GOOS and the GSC. She suggested that in the future GOOS would need to consider separately the needs of one substantial user group interested in 'now casting' (describing the present state of the ocean and forecasting its changes in the short term), and another substantial user group interested in 'forecasting' (meaning long range forecasting of the kind required for climate predictions). She made a plea for the incorporation of more operational oceanographers and meteorologists into the 'new' committee for GOOS. Among other things she noted improvements in the mechanisms enabling I-GOOS to carry out its business inter-sessionally, especially the formation of an I-GOOS Board with some *ad hoc* working groups focused on particular topics of interest. One of these was looking at the way in which the UN Convention on the Law of the Sea (UNCLOS) might impact on the timely observations for implementation of GOOS allowed by new technologies. A consultant (Peter Ryder) had been engaged to prepare a background paper on this topic.

The Committee felt that the I-GOOS Board, with its associated working groups, would help to ensure that I-GOOS took a more active role in the promotion of GOOS in the future, in a way that complemented the scientific and technical advice provided by the GSC. Some members expressed an interest in learning about the activities of the consultant on UNCLOS. The Committee felt that it was unwise to introduce new definitions for tried and true terms like now casting and forecasting, and that the inclusion of numerical weather forecasting in the definition of 'now casting' would create confusion. Several members noted that it was not the GSC nor I-GOOS that would implement GOOS; implementation would be carried out by governments, acting on the advice of I-GOOS and the GSC. Some members of the GSC suggested that it was difficult for I-GOOS to be as effective as it ought to be, given that it met infrequently, that its membership was largely non-operational, and that its membership was far from consistent. Nevertheless, there was general agreement that there was a need for two bodies, one to provide high quality scientific and technical advice, and another to convert that into a form that was meaningful for policy and decision makers. The Committee agreed that much more attention needed to be given to the development of services and products based on the observing system. Here there is a clear role for JCOMM, based on advice from GOOS.

The Committee agreed that every effort should be made through the GOOS sponsors (IOC, WMO, UNEP and ICSU), and through those nations with a strong commitment to GOOS, to ensure that the important contribution that the observing systems could make to sustainable development was brought out in the debates at the WSSD in Johannesburg in August and September 2002.

Action 1: Members to persuade their national representatives to WSSD that observing systems are needed to support integrated coastal management and sustainable development.

Action 2: I-GOOS Chair to make available to GSC Members copies of the draft report to the GOOS-UNCLOS group by consultant Peter Ryder.

Action 3: ICSU to provide the GPO with the precise wording used by ICSU to refer to observing systems in their science and technology presentation to the WSSD.

2.3 2002 REVIEW OF GOOS

Paul Mason reported on progress in the development of a review of GOOS by a group of experts, which he chairs and which is following the plan approved by the IOC Assembly (July, 2001) (working document GSC-V/9). His group recognizes that GOOS is evolving as we move out of the design phase and into implementation, and that this evolution may require some change to the organizational structure. The group is gathering information by means of a questionnaire and will hold its first meeting in September 2002, reporting back to the Assembly in summer 2003.

Action 4: Members should cooperate with the GOOS Review Panel by providing comprehensive answers in a timely fashion to the questionnaire sent out for the Panel by the GPO.

2.4 REPORT FROM GPO DIRECTOR

2.4.1 GPO Activities

Colin Summerhayes reported briefly on the accomplishments and needs of the GPO (working document GSC-V/10). The GPO continued to be very active in support of the growing number of GOOS related activities requiring international coordination. New groups with which the GPO had now to be involved to ensure good coordination included: (i) JCOMM, along with the JCOMM Management Committee; (ii) the IGOS partners (which also meant involvement in the Ocean Theme team, the Integrated Carbon Theme team, the IGOS Secretariat, management of the IGOS web site, and attendance at plenary meetings of the Committee on Earth Observation Satellites – CEOS); (iii) ICES and the new ICES-IOC Steering Group on GOOS; PICES (the north Pacific equivalent of ICES); (iv) the Coordinating Group on Meteorological Satellites (CGMS); (v) the GODAE and Argo projects; (vi) POGO; and (vii) all the new regional GOOS groups (5 years ago there was just NEAR-GOOS and EuroGOOS). Although this growth reflected the success of GOOS, it placed a tremendous burden on the slender resources of the GPO.

The professional staff coordinating this work totaled 16, representing 9.7 man-years. This compared with 11 staff, representing 7.5 man-years in 1998 at the time of GSC-I. The staff was distributed, reflecting the growing regional requirement, with staff time available from the IOC's regional secretariats for IOCARIBE (for IOCARIBE-GOOS) and WESTPAC (for NEAR-GOOS and SEAGOOS), plus the two GOOS offices in Perth and Rio. During the year, staff support had decreased slightly from 10.1 to 9.7 man-years compared with 1999/2000. Janice Trotte had started working part time as the GOOS person in Rio in December 2001. Art Alexiou (Technical Secretary of OOPC) was now working half time instead of full time and would retire at the end of 2002. Cesar Toro had joined the IOCARIBE Secretariat in Cartagena and was working in support of IOCARIBE-GOOS. Three secretaries plus one part time secretary supported the GPO at headquarters in Paris.

During the year there had been a continued high level of output of reports and publications. The GOOS web site had been improved. GOOS News had continued, and a second issue had been made of the Products and Services Bulletin. There was still no GOOS brochure. Publication of the annual GOOS Status Report had been halted following discussions with the Chair (Prof. Nowlin) about its content and manner of presentation.

The IOC continued to provide around 36% of the funds to support GOOS programme activities, the rest of the funds being raised from national agencies. IOC's actual support of GOOS was significantly higher than these figures would suggest, since it includes the salaries.

The Committee was pleased with the progress of the GPO and with its efforts in the face of lack of resources.

2.4.2 GOOS Brochure

Tony Knap reported on progress with the GOOS brochure (background document GSC-V/B5), which had been drafted by Maria Hood of the GPO with assistance from a GSC inter-sessional working group chaired by Tony.

The Committee agreed that a brochure for non-science audiences was needed, but that the current draft brochure was too long, and recommended hiring a professional communications expert to get it into shape. The Committee considered that once the format had been agreed, it might be worthwhile modifying the brochure annually to include new advances and products.

The Committee noted the lack of progress in producing the annual GOOS Status Report. The Committee agreed that we no longer need a lengthy and detailed annual report of this kind. Instead we need something like a short, colorful biennial report, along the lines of the one produced by the Global Terrestrial Observing System (GTOS). As in the case of the brochure, professional advice would be necessary. Both the brochure and the biennial status report should deliver the message that the observing system is useful, but should not 'sell' specific products. They should tell governments how GOOS will help them be more effective and productive, and how GOOS can provide information needed to support sustainable development. Such documents are needed not only at the global level but also at the regional level. They have to be up to date. The Biennial Report should contain

performance metrics indicating how resources are being used, how well they are being used, and how GOOS is meeting its objectives.

Action 5: Form an inter-sessional group (Chaired by Swamy, and comprising the GPO Director plus Johannes Guddal, Tony Knap, Eric Lindstrom, Helen Yap, and Tom Malone), to develop a communications strategy for GOOS, and present it at GSC-VI.

Action 6: Tony Knap (Chair) and the Brochure Working Group plus GPO Director, to finalize the requirements, character, target and format for the proposed GOOS brochure, and work with the GPO on the production in consultation with a professional.

Action 7: The GPO, with advice from Neville Smith, to finalize the requirements, character, target and format for the GOOS Biennial Review to replace the annual GOOS Status Report, and oversee production in consultation with a professional.

2.4.3 GOOS Products and Services Bulletin

Johannes Guddal reported on progress with the GOOS Products and Services Bulletin (GPSB). He noted that the GPO had had great difficulty in providing the staff time necessary to keep the Bulletin up to date, and that the steering committee for the Bulletin had had great difficulty in getting material submitted from the wider community for new issues. He thanked Prof. Nowlin for offering to have Texas A & M University take over the design of new issues. Nevertheless, he expressed concern about the sustainability of the Bulletin.

In response to these concerns, members identified the following possible writers and topics for future issues (one new scenario was required per issue):

Keith Thompson: - Coastal flooding

Eric Lindstrom: - Volvo Yachts, receiving SeaWifs ocean color imagery
- Applications by tuna fisheries
- Products from altimetry and Quickscat winds
- Pollution mitigation (S. California). (This could also be coupled to the MPERSS service under JCOMM)
- "Beachcomber's Newsletter", ENSO "roofing alarm"

Mike Sinclair: - "Biodiversity information users" (Suggested name: Ken Frank)
- Search and Rescue (Canadian Coast Guard)

Hans Dahlin: - Tourism and ice services

J. Muelbert: - Flood freshwater impacts on estuaries. (Mass formation of silt banks)

G.N. Swamy: - Long term changes in the Indian Monsoon.
- Sports (surfing). Suggested name: Judith Wolfe

In addition, Julie Hall suggested providing a template for authors to follow in writing articles.

Action 8: Johannes Guddal (Chair) with Eric Lindstrom, Mike Sinclair and Director GPO, to finalize plans for development of the GOOS Products and Services Bulletin, including a template for future authors of special articles.

There followed a general discussion on the subject of outreach and communication, which was supported by the activities of a sessional working group (Guddal, Smith, Knap, Baker, Yap, Narayana), leading to the following actions, and reinforcing the requirement for Action 5 (above). The discussions considered the requirements, character, targets, formats and additional requirements of the existing/future communication mechanism of GOOS, such as (i) the Brochure, (ii) the Biennial Review, (iii) the Products and Services Bulletin, (iv) the IOC/GOOS Web Site, and (v) an update to *The GOOS 1998 Prospectus*. The common strategic elements of a communications strategy for GOOS emerged as follows:

(i) Recognize these communication activities are also part of Capacity Building, in order to penetrate, irrespective of technology levels, into target groups even in developing countries;

(ii) Adopt a multi-media approach for easy adaptation by, transition to, and transfer among, each and all of the above (i) to (v) communication channels;

(iii) Ensure that some key-members are common in the groups responsible for the development, production, execution, and maintenance of these channels;

(iv) Carry over some common "images" for "brand identity" across these channels;

(v) Effect prompt and simultaneous updating (to the extent practical), and insert dynamic alerts (in the case of web-based channels) on new developments;

(vi) Establish a strong and serious GOOS mechanism for advocacy and communication support eventually comprising: (a) GOOS/GSC members; (b) Technical Advisers/Editors; and (c) Media Consultants (Communication experts, visualisers, multi-media specialists, multi-language experts, etc.);

(vii) Consider multi-language release world-wide, with regional sensitivity;

(viii) Provide for dynamic linkages with the print-publications, web sites and other communication activities of related systems - national, regional and global;

(ix) Consider evolving this advocacy and communication mechanism into a full-fledged public-relations outfit of GOOS in the near future.

The goal should be to tilt the mind-set of conventional maritime members towards the operational benefits of GOOS. The channels should be exciting and inspiring to students, young recruits, bureaucrats and managers. The proposed mechanism may be charged with the responsibility for press releases, provided a quick (e-mail) network exists among the Support Group members, and clear-cut responsibility and accountability are assigned.

Funding would be required, possibly from: (a) Gratis from institutions; (b) Grant-in-Aid from relevant agencies; (c) Sponsorship from organizations; (d) Commercial advertisements; (e) GPO budget.

Action 9: Members to use all available opportunities to give papers on GOOS at scientific meetings, and to write short articles for appropriate scientific journals and newsletters on benefits of GOOS for science, to help spread the word about GOOS to the scientific community.

Action 10: Members to send sets of PowerPoint presentations on GOOS to the GPO to be put on the Overheads section on the GOOS homepage.

Action 11: Members to list significant highlights of GOOS (ways in which GOOS had made a significant impact on the scientific and other user communities) from the past 5 years, for the GPO to put on the GOOS web site, by end May 2002.

2.4.4 GOOS Work Programme and Budget

Dr Summerhayes presented the work programme and budget for the next biennium (working document GSC-V/11). A small sessional working group was formed to examine the work programme and budget and to report on them under item 7.1.

3. REFINING THE STRATEGIC DESIGNS FOR GLOBAL GOOS

3.1 COASTAL OCEAN OBSERVATIONS PANEL REPORT

3.1.1 COOP Activities

The panel co-chairs, Dr Tom Malone and Dr Tony Knap, reported on progress with COOP activities (working document GSC-V/12), and described the contents and objectives of the draft final design plan for COOP that was available as a working document (GSC-V/13). The draft would be sent out for external review, and then finalized at COOP-IV in Cape Town (24-27 September 2002). At that same meeting work would start on the development of the Implementation Plan.

One key new element of the design plan was the notion that the GOOS Regional Alliances (GRAs) contribute to and benefit from the Global Coastal System (GCS) by forming a Global Federation of Regional GOOS Alliances. In that model the GCS would supply: (i) a network of reference & sentinel stations; (ii) standards & protocols; (iii) coastal to basin scale interactions; (iv) economies of scale; and (v) capacity building; while the GRAs would supply: (vi) national and regional priorities; (vii) land-based sources; (viii) higher resolution; and (ix) more variables.

Among the major issues for COOP are questions concerning the processes of coordination and oversight of implementation, which could take place as part of an expanded JCOMM, or of some similar body with a purely coastal focus and including biology and chemistry. The creation of a Global Federation of GRAs could be essential to developing the necessary global approach to the coastal element of GOOS. In addition, considerable thought needs to be given to connecting COOP's plans to the activities of: (i) the Regional Seas Conventions and Action Plans of UNEP's Regional Seas programme, (ii) the Regional Fisheries Bodies; and (iii) the Large Marine Ecosystems (LMEs).

Aside from work on the COOP plan, Tom Malone had also been involved in helping to develop the coastal elements of the US GOOS plan, and in working closely with the Council of the Sir Alister Hardy Foundation for Ocean Science (SAHFOS) to ensure that development of the Continuous Plankton Recorder (CPR) programme (which is part of GOOS) continued in line with GOOS requirements. In addition, he was planning to promote implementation of the COOP design plan through presentations to the Annual ICES Science Conference (Copenhagen, October 2002), to the Indian Ocean GOOS Conference (Mauritius, November 2002), to the 1st regional GOOS Forum (Athens, December 2002) and to the 3rd EuroGOOS Conference (Athens, December 2002).

The Committee was impressed with the progress made by COOP, endorsed the draft plan and approved the plans for finalizing it in consultation with the wider community. The Committee noted that there was a need for the strategic design plan to take fully on board the recommendations made in the strategic design plan for the Living Marine Resources (LMR) Panel of GOOS. There was also a need to consider how to help to build the capacity required for developing countries to participate in coastal GOOS. The plan should make clear the priority areas for science and for other users. The message needs to be that the design plan is not a set of mandatory requirements, but a 'framework' that will in some way maximise benefit and add real value to Member States' activities.

Action 12: COOP Chairs to make available on a CD, for the benefit of regional GOOS bodies, the software developed to determine the core variables to be measured for coastal seas, by end 2002.

Action 13: Members to check the sections of the draft COOP design plan in their area of competence, and provide feedback to Tom Malone by 10 May 2002.

Action 14: Members to suggest to Tom Malone the names of outside experts who might form useful external reviewers of the draft COOP design plan by 10 May 2002.

The Committee noted that there was a need for there to be a strong link to JCOMM, and approved of the appointment of Tony Knap as JCOMM Rapporteur on coastal GOOS matters.

3.1.2 Liaison with LOICZ, GLOBEC, GTOS and Other Bodies

It is essential for the credible scientific development of COOP that it has strong links into the scientific research community. Julie Hall and Chris Crossland noted that there were strong links between COOP and the Land Ocean Interaction in the Coastal Zone (LOICZ) programme of the International Geosphere-Biosphere Programme (IGBP). Tom Malone and Tony Knap noted that strong links had been built between COOP and the Global Ocean Ecosystems Dynamics (GLOBEC) Programme and with GTOS. There are good links to the GEOHAB programme (Global Ecology and Oceanography of Harmful Algal Blooms), to the IGBP Oceans programme (through Julie Hall), to the OOPC, and to POGO. Thus far there had been little interaction between COOP and the Secretariats of the various Conventions dealing with coastal environments such as (i) the Global Plan of Action for the Protection of the Marine Environment from Land Based Sources, (ii) the Jakarta Mandate of the Biodiversity Convention, (iii) the Straddling Stocks protocol of the UN Convention on the Law of the Sea, and (iv) the Ramsar Convention on Wetlands.

The Committee expressed its satisfaction with the level of inter-linkage, while noting the need for stronger linkages to the Secretariats as the Implementation Plan is developed.

3.2 OCEAN OBSERVATIONS PANEL FOR CLIMATE REPORT

3.2.1 OOPC Report

Dr Neville Smith (chair OOPC) reported on progress with OOPC activities (working document GSC-V/14), and on progress with CLIVAR and its relation to GOOS. [*GODAE, Argo, and other pilot projects are reported on separately under Agenda Item 4*]. A key milestone was the publication of *Observing the Oceans in the 21st Century*, which was essentially the proceedings of the OceanObs99 Conference. This provides a blueprint for going forward, sets out the rationale and describes the components. The volume is already guiding the major ocean agencies in their work.

In the inter-sessional period the OOPC has been concerned with its pilot projects, including GODAE, Argo and the High Resolution Sea Surface Temperature (HiResSST) Project, and with the development of plans for a network of Time Series stations.

A global ocean time series observatory system is now being developed as an OOPC/CLIVAR/ POGO activity. The system is multidisciplinary, providing physical, meteorological, chemical, biological and geophysical time series observations. The data are publicly available as soon as received and quality-controlled by the owner/operator. An international Science Team provides guidance, coordination, outreach, and oversight for the implementation, data management and capacity building. A pilot network (2001-2006) has been defined consisting of all operating sites and those planned within 5 years, subject to evaluation in terms of the qualifying criteria by the Science Team.

The Tropical Moored Buoy Network was reviewed in September 2001. It was agreed that these buoys play a fundamental role in the Pacific and an emerging role in the Atlantic. No major change was envisaged in design for the TAO/TRITON array in the Pacific. Concerns include the effect of vandalism on fixed moorings in near coastal regions of the east Pacific and east Atlantic, where some back-up strategy may be needed. Capacity building is needed to enable more developing nations to utilise large ocean buoys for their own (GOOS) purposes. There review of the arrangements for tropical moored buoys led to creation of the Tropical Moored Buoys Implementation Panel.

Quite a lot of work has taken pace on indices, such as the North Atlantic Oscillation (NAO) Index and the Southern Oscillation Index (SOI). An expanded, broader set of indices is needed.

The CO_2 report prepared by Mr Doney and Maria Hood and approved by GSC-IV had been published as a GOOS report, and would form part of the IGOS Partners' approach to an Integrated Global Carbon Theme. OOPC-VI had developed a 'pilot' carbon observing activity involving SOOP and "reference" lines. Advice was being sought from the SCOR/IOC CO_2 Panel and from the International Ocean Colour Coordinating Group (IOCCG). Future developments would be in line with those required for the newly developing IGBP/WCRP/IDHP Global Carbon Project

Plans are being developed for meetings in the Indian Ocean and South Atlantic regions to take forward the development of observing systems there. Work continues on the surface marine data programme, the Ship Of Opportunity Programme (SOOP), especially in support of the JCOMM VOSCLIM project, Sea Surface Temperature (SST), and Pressure at Mean Sea Level. Strong links have been developed with COOP at the

"common variables" level, and in the context of modelling (with GODAE). OOPC has not made the progress that might have been desired in dealing with polar seas (the ice-covered ocean).

OOPC has spent some time providing inputs to the second Adequacy Report being produced by the Global Climate Observing System (GCOS) on behalf of all the observing systems, for the UN Framework Convention on Climate Change (UNFCCC). Declines in ocean observations for climate must be arrested; investments must be sustained. Argo is a major advance. OOPC identified needs for: (i) repeat hydrographic lines; (ii) ocean carbon observations (see above); and (iii) integration of present observing system elements.

Neville identified the significant issues for consideration of the GSC to be: the need for strong links to JCOMM; the need for strong liaison with CLIVAR panels; the need to continue having COOP chairs attend OOPC meetings, and vice versa; the need to develop indices of ocean properties and behaviour; the need to consider the role of GOOS in making carbon measurements; the need to review the GCOS Adequacy Report.

In concluding, Neville reflected, as the outgoing OOPC Chair, on the progress that had been made in recent years. He had attended 16 OOSDP/OOPC meetings, 10 meetings of the GSC or its predecessor body (J-GOOS), and 12 meetings of the GCOS Steering Committee as well as meetings of the Joint Steering Committee for the WCRP, plus 8 related meetings (for example some of those involving the preparation for publication of *The GOOS 1998*, and those involved in preparing for JCOMM and in starting it off). Key milestones during that period were: publication of the Ocean Observing System Development Panel (OOSDP) Report in 1994; initiation of GODAE and Argo in 1998; the OceanObs Conference in 1999; initiation of JCOMM in June 2001; and publication of *Observing the Oceans in the 21st Century* (in 2001).

The Committee applauded the progress made and agreed with the plans proposed.

There was substantial discussion on indicators. Many members agreed that GOOS does have to take the path of developing indicators, and that it is better to take the lead than to have poorly constituted indices/indicators. It was noted that Europe is currently wrestling with the same problem (e.g. in the EC's Environment Assessment initiative). Indices must be found that are scientifically credible and relevant. Examples of indicators of the status of the Earth system included: El Niño-Southern Oscillation (ENSO) events and other basin scale oscillations (NAO, and Pacific Decadal Oscillation – PDO); thermohaline circulation; Arctic sea ice; sea level; the susceptibility of coastal populations, habitats and living resources to extreme weather events; the condition (status/health) of marine and estuarine ecosystems, including the health of marine organisms (both as indicators of the health of marine communities and as indicators of potential risks to human health); and sustainability of living marine resources and the carrying capacity of marine ecosystems for living marine resources.

Addressing the concerns raised by Neville's presentation, the following actions were agreed:

Action 15: Worth Nowlin to continue to act as GSC Representative on the JCOMM Management Committee until Jim Baker takes over this task.

Action 16: OOPC and COOP Chairs to maintain strong links between COOP and the OOPC and vice versa.

Action 17: An inter-sessional group (comprising Mike Sinclair as Chair, with Anthony Knap, Helen Yap, Nic Flemming, Ed Harrison, Tom Malone, Neville Smith and Umit Unluata) should review the status of indicator development and operational use, develop requirements for indicators, identify user groups, and develop a plan for identifying and incorporating indicators as GOOS products, and report back to GSC-VI.

Action 18: The OOPC should increase the effort devoted to considering the ice-covered seas, recognizing the objectives of GCOS cannot be met without advice on this topic.

3.2.2 Liaison with GCOS and the UNFCCC

Dr Alan Thomas (Director GCOS) described briefly the latest developments in GCOS, with particular reference to the linkages with GOOS, through the OOPC, to the 7th Conference of the Parties (COP-7) to the Framework Convention on Climate Change (Marrakech, 29 Oct. – 4 Nov. , 2001). He noted the emphasis being given to the development of national action plans for implementing GCOS (background document GSC-V/B6);

comprehensive reports are expected from all developed countries and will form the basis for the second Adequacy Report to the UNFCCC in 2003.

Among other things he noted that it is clear that re-analysis will become increasingly important in defining the fields of data that are needed for climate studies.

GCOS is continuing with the series of regional workshops for capacity building that have been requested by the UNFCCC and that are funded through contributions from the Global Environmental Facility (GEF) of the World Bank. Workshops had been held in the Pacific islands and in Africa. Workshops are planned for the Caribbean and East Asia. Regional Action plans will be developed as a response to the inputs received at each workshop.

The Committee continues to support the efforts of GCOS on behalf of GOOS and other observing system partners to engage the Parties of the UNFCCC and its Subsidiary Body on Scientific and Technical Advice (SBSTA) on systematic observations, especially global ocean observations for climate. The GSC supports the preparation of a "Second Paper on the Adequacy of the Climate Observing Systems" as recommended by the GCOS Steering Committee and urges the participation by OOPC and GOOS scientists in writing the Report. The GSC noted the potential opportunities for participation by GOOS regional programmes in the GCOS Regional Workshops and where possible encourages participation by GOOS regional programmes in order to ensure their regional needs are made known to the UNFCCC/SBSTA. Nevertheless, the Committee was disappointed that the arrangements for including an ocean element in the regional workshops had not yet worked well.

Action 19: GCOS, OOPC and COOP to work together to increase regional ocean participation in the GCOS regional capacity building workshops.

Action 20: GPO, with the aid of GCOS, to inform regional GOOS bodies of the possibilities for participation in the GCOS regional capacity building workshops.

Action 21: OOPC to contribute to the preparation by GCOS of a "Second report on the Adequacy of the Global Climate Observing Systems" for presentation to the UNFCCC.

4. IMPLEMENTATION OF GLOBAL GOOS DESIGNS

4.1 JCOMM

Dr Peter Dexter (WMO Marine Programme) reported on progress with JCOMM, noting background document GSC-V/B7A&B, the report of JCOMM-I (Akureyri, Iceland, 19-29 June 2001), and providing a verbal report on the outcome of the first JCOMM Management Committee Meeting (Geneva, 6-9 February 2002). He drew attention to the ways in which JCOMM provides much-needed infrastructure for GOOS and GCOS, for example through actions being undertaken by JCOMM subsidiary or reporting bodies, and provided a report on the activities of the JCOMMOPS operational centre at Toulouse (excluding the Argo function, which will be described under item 4.3).

GOOS provides advice directly to the JCOMM Management Committee through membership on that body of the Chair of the GSC. Other members include the JCOMM Co-presidents, one of whom is the WMO advisor on the GSC, plus the 4 JCOMM Programme Area Coordinators (for Observations, Products and Services, Data and Information, and Capacity Building). In addition there are three independent experts and representatives of OOPC, GCOS and IODE (the IOC's International Ocean Data and Information Exchange programme).

JCOMM-I had been a success, with 113 participants from 42 countries and 11 organizations. It had agreed the new structure and the work programme, and would meet again in 2005, in Canada. Its business was now being carried out by specialist groups working under the 4 programme areas, under the supervision of the Management Committee. Future priorities included: (i) development of an integrated ocean observing system, including operational ocean satellites; (ii) development of an end-to-end ocean data management system in collaboration with IODE and the WMO's Commission for Basic Systems (CBS); (iii) development of new ocean products and services, with enhanced service delivery and user interactions; (iv) building capacity, in collaboration with the GOOS capacity building panel; and (v) developing a response to the non-physical requirements of GOOS (as expressed by COOP). To facilitate this latter development, Tony Knap (COOP Co-chair) had been appointed non-physical rapporteur to JCOMM. Recognizing that the present programme areas did not cover satellites, Hiroshi Kawamura (also a member of COOP) had been appointed satellite rapporteur to

JCOMM.

The Ship Observations Team (SOT) had met in its first session, in Goa (25 February - 2 March 2002), and had begun integrating the activities of the Voluntary Observing Ship (VOS), SOOP and Automated Shipboard Aerological Programme (ASAP) Panels. It was developing a SOT strategy and implementation plan. It had initiated interaction and collaboration with the ocean CO_2 community; that community was already making CO_2 observations from industry and research ships through an initial CO_2 network consisting of 5 programmes in the Atlantic, 9 in the Pacific, 1 operating across the Atlantic and Pacific, and 5 programmes in the Southern Ocean.

The Services Coordination Group had met in its first session, in Geneva (3-6 April 2002). Its activities include those of the expert teams on MSS, Waves and Surges, Sea Ice, the Marine Pollution Emergency Response Services System (MPERSS), and JEB. The group would meet again in Varna in September 2003.

The Observations Coordination Group had held its first session at La Jolla (24-27 April 2002) and brought together representatives of the SOT, the Data Buoy Cooperation Panel (DBCP), the Group of Experts on Global Sea level (GLOSS/GE), the AST, the Tropical Moored Buoy Implementation Panel (TIP), the OOPC, NOAA/OGP (Office of Global Programmes), POGO, non-physical measurements, and satellites measurements. They had revised the work plan, reviewed the development of JCOMMOPS, and overviewed the observing system to determine required improvements and performance metrics.

The Data Management Coordination Group would hold its first meeting in Paris, in May 2002, and the Capacity Building Coordination Group would meet in Geneva in June 2002.

Thorkild Aarup (Technical Secretary to the GLOSS Group of Experts) supplemented Peter Dexter's report with a brief report on progress and plans for one of the JCOMM elements - GLOSS (background document GSC-V/B8).

The Committee was pleased with the substantial progress made in developing the infrastructure required to facilitate further the implementation of GOOS, and with the strong links that had developed between GOOS and JCOMM. No other action was required than that defined already in Action 5 (above).

4.2 IGOS-P THEMES

GOOS had accepted responsibility for working with the Committee on Earth Observation Satellites (CEOS) to implement the Oceans Theme of the Integrated Global Observing Strategy (IGOS) Partners, and the GSC has the oversight of this responsibility.

Eric Lindstrom, of NASA, the CEOS representative to the GSC, briefed the Committee on progress with and plans for the space-based segment of the Oceans Theme, plans for which were published in January 2001. The main development is an agreement between agencies for a precision altimetry mission (Jason-2) to follow on from Jason-1 (launched in December 2001) and TOPEX/POSEIDON. It will serve as a bridging mission to operational precision altimetry. The Ocean Theme has influenced development of a Sea-Winds follow on and of salinity missions (e.g. NASA's Aquarius mission). The launch of the European Space Agency's ENVISAT provides a broad spectrum of environmental information from a single platform. WMO has now recognized that the substantial array of research satellites should now be incorporated as quasi-operational elements of the Global Observing System that underpins the World Weather Watch (WWW). GOOS should follow suite.

On the *in situ* side of the Ocean Theme, developments in the Argo profiling float programme and GODAE are discussed under agenda item 4.3 (below). The implementation of many of the open ocean *in situ* physical measuring systems that underpin the ocean Theme have already been mentioned under JCOMM (above). The development of the carbon observing system called for by the Ocean Theme has begun, as mentioned under OOPC and JCOMM (above).

The Committee accepted that the Ocean Theme of the IGOS partners had had a positive impact on community planning and had helped to increase confidence in future directions, especially within the space-based sector. It has allowed a wide variety of agencies, groups and ocean observing activities to proceed forward with a common vision. The Committee noted that requirements will be reviewed again in 2003, which will be the time for the GSC to inject new requirements for a revision to the Theme.

Following advice from Worth Nowlin, the Committee developed the following note for transmission to NASA regarding the Aquarius mission to measure sea surface salinity:

"The International GOOS Steering Committee is pleased to learn about the Aquarius mission to measure global sea surface salinity, which has been proposed to the NASA Earth System Science Pathfinder programme this year. Over the past few years GOOS has articulated the need for global sea surface salinity measurements. In 1999 the first International Conference on the Ocean Observing System for Climate, co-convened by GOOS and the World Climate Research Programme's Climate Variability (CLIVAR) project, recommended the development and demonstration of experimental satellites to measure sea surface salinity within this decade. The GOOS requirements for sea surface salinity have been recognized in the planning for the GOOS-sponsored Global Ocean Data Assimilation Experiment (GODAE). This programme, which will begin in 2003, has recommended the development of global sea surface salinity fields with a resolution of 100k at 10-day increments through a combination of experimental satellite measurements and a well-distributed in situ *network for validation. We are very pleased to hear that the Aquarius mission has been designed to begin addressing these requirements. We strongly endorse the development of this mission by NASA toward meeting the GOOS long-term requirements for surface salinity observations."*

Colin Summerhayes told the Committee that the IGOS Partners were keen to develop a Coastal Theme, which had begun with the implementation of a sub-theme on coral reefs that was being led by UNEP.

Following an extended discussion, during which it was accepted (i) that the theme team approach has been very useful; (ii) that aircraft could also play an important role in remotely sensing the ocean's surface; and (iii) that any development of a proposed Coastal Theme would have to await publication of the COOP design plan, the Committee agreed on the following actions:

Action 22: GSC Chair to pass to NASA the GSC's strong endorsement of the development of the Aquarius Mission, which has been designed by NASA to begin to address the long term GOOS requirements for sea surface salinity observations.

Action 23: GPO, before May 30, to inform the 9th IGOS Partners meeting that the GSC considers (i) that it is too early to begin development of a Coastal Theme, and that we should wait until the implementation plans for the GOOS Coastal Module and related parts of GTOS are complete before starting this process; (ii) that the rolling review process for the Ocean Theme should include remote and *in situ* observations needed for the common global variables of the Coastal Ocean Observing System of GOOS, including remote sensing from aircraft; and (iii) that in the absence of a defined Coastal Theme the urgent work required on coral reefs might be part of the Ocean Theme.

Maria Hood reported on progress with the development of the Integrated Global Carbon Observing (IGCO) Theme of the IGOS Partners. As mentioned under OOPC, above, the ocean carbon observing system report had been published as a GOOS report. The ocean carbon team was waiting for the leaders of the IGCO Theme to determine a path for integrating the ocean carbon work with that which had recently been completed on terrestrial carbon. Ocean carbon developments continue to be worked on by the new joint SCOR/IOC Panel on CO_2. She noted that the majority of the carbon observations presently being made were for research purposes ain support of process studies; very few could be considered operational. An eventual carbon observing network would include observations along ship's tracks, as well as time series observations at agreed stations.

In discussion, the Committee agreed that we do seem to have a fairly well defined set of socio-economic drivers for measuring the carbon cycle, and these are over and above those of scientific inquiry. These drivers are likely to emerge fairly strongly in the 2nd GCOS Adequacy Report. The aim of the ocean carbon programme should be to test and validate models as well as to monitor (detect) change. The Doney et al. report is an excellent start to defining the observational strategy, and reflects a consensus between the demands of science and other requirements covered by GOOS and GCOS.

The Committee recognized the importance of understanding and monitoring of the Carbon Cycle and noted the establishment of the Global Carbon Project (GCP). Further it noted the preparatory work undertaken by the CO_2 Panel, with the support of the IOCCG, in developing a plan for ocean carbon observations. The Committee noted that the required observations are a mix of sustained and process (scientific inquiry) motivated observations. There are several initiatives, including time series and VOS pCO_2 that already constitute commitments to long-term measurement networks. The degree to which the GCP would rely on initiatives led by GOOS was not clear to the Committee. The GSC, and its scientific Panels, is willing to provide scientific

oversight for the sustained network, but needs the IGOS Partnership (which includes the sponsors of GCP) to provide more specific advice to GOOS on its likely requirement.

Action 24: GPO, before 30 May 2003, to request the IGOS Partnership (which includes the sponsors of the Global Carbon Project GCP) to provide more specific advice to GOOS on its likely requirement for scientific oversight for the sustained carbon network.

Action 25: GOOS sponsors to appoint a carbon scientist to the Committee, to ensure a strong link to the ocean carbon community, by year-end 2002.

4.3 GODAE, INCLUDING ARGO

Neville Smith (OOPC Co-Chair, and Director of GODAE Bureau) reported on progress with and plans for GODAE and Argo (working document GSC-V/15), introducing the GODAE Implementation Plan (background document GSC-V/B12).

The GODAE Strategic Plan (http://www.bom.gov.au/GODAE/Strategic_Plan.pdf) had been published. The Implementation Plan was just now available, and would be published soon. There had been a meeting of the Steering Team meeting (4-7 December 2001) (http://www.bom.gov.au/GODAE/6thIGST/; http://www.bom.gov.au/GODAE/godae_product_urls.htm). There had been good progress with the GODAE High-Resolution SST project (GHRSST), and a draft GHRSST Pilot Project Plan was being sent out for review (http://www.bom.gov.au/GODAE/HiResSST/plan.zip). That project would develop high resolution SST data sets and products using all available remotely sensed and *in situ* data. GOOS use is being made of the GODAE server established by US Fleet Numerical in Monterey. There had been good progress with GODAE in the Pacific, through an IPRC-hosted workshop in Honolulu, led by Japan and US scientists. Several new GODAE projects were being developed, including: inter-comparisons, testing for the N. Atlantic, tropical Pacific and N. Pacific. The present focus was on planning for the GODAE Symposium "En Route to GODAE", scheduled for 13-15 June in Biarritz, France, where the strategy and progress towards implementation would be reviewed. GODAE was contributing to successfully building (aspects of) operational oceanography.

Argo is a Pilot Project of GODAE and CLIVAR and directed by its Science Team (led by Dean Roemmich). The Team have made excellent progress with implementation, and commitments for the next 3 years are consistent with full deployment being approached in 2005. Commitments to the full array of floats increased to near full level in 2001, with some 10% already in the water. The goal remains a global network and considerable progress has been made on commitments for the remote oceans (the current commitments can be seen on the Argo web page) (http://www.argo.ucsd.edu/). The Argo Science Team was meeting on 12-14 March, in Hobart, Australia. Final steps were being made to complete the data management system. There was excellent progress on many fronts, and Argo might indeed be regarded as a "model" Pilot Project.

The Committee thanked Neville Smith for the tremendous effort, enthusiasm and energy that he had personally put into the development of the OOPC and its related projects, notably GODAE and Argo. It was very pleasing to see the very significant progress being made through GODAE and Argo towards the realization of the vision of GOOS. The Committee called for the following action:

Action 26: Chairs of OOPC and COOP to form an inter-sessional group to ensure that a close working link develops between COOP, GODAE and Argo, perhaps through a pilot project, and to report on progress to GSC-VI.

4.4 OTHER PILOT PROJECTS

Colin Summerhayes gave a brief report on progress with and plans for PIRATA (background document GSC-V/B13), based on the results of the 8th meeting of the PIRATA programme (Paris, 29-31 August 2001). A particular concern was the low (70%) data return, which was caused mostly by vandalism (the TAO array has a data return of 80%). Extensions to PIRATA are being proposed towards the northeast, towards the southeast, and towards the west, to satisfy the needs of coastal states for ocean information. For the future, arguments are being presented for the creation of an international collaborative oceanographic and climate centre in northeastern Brazil (e.g. in Natal). Proposals are also being considered for a vessel dedicated to maintenance of the PIRATA array.

The Committee noted the developments.

Tony Knap gave a brief report on progress with and plans for the RAMP Project (Rapid Assessment of Marine Pollution), which is a Pilot Project of COOP. The aim is to provide an early warning system of environmental distress by using a variety of easily measurable indicators. The programme is intended to be cheap and easy to operate, especially for the benefit of developing countries; it is therefore a potential tool for capacity building.

The Committee considered that in due course, when RAMP has built up a portfolio of test examples, the project should be subject to a non-advocate review.

Action 27: Tony Knap to present the RAMP pilot project to (i) regional GOOS groups (through the Regional GOOS Forum in Athens) and (ii) the UNEP Regional Seas Programme (RSP) (perhaps through a presentation at the 5th meeting of the RSPs in Toyama).

4.5 GOSIC

Colin Summerhayes briefed the Committee on the outcomes of the review of the Global Observing Systems Information Centre (GOSIC), and on progress with and plans for GOSIC (background document GSC-V/B14). The review took place in April 2001. The Review team concluded that GOSIC is a unique central entry and integrating point for the three observing systems GOOS, GCOS and GTOS, and must continue its functions. A number of recommendations were made, and are now being acted upon. They include the requirement for each of the three observing systems to appoint a data coordinator, and for each of the scientific panels (e.g. COOP, OOPC) to provide points of contact for and with GOSIC. It should be noted that funding to support continuance of GOSIC beyond its trial three-year period has now been secured from NOAA OGP.

In discussion, the Committee agreed that GOSIC was potentially a good and useful tool. However, there was a need to understand who the users are, whether or not their requirements are being met, and how much the system was being used (e.g. how many hits are there per month on the GOSIC web site). There appears to be a need to raise awareness of GOSIC and its role among the potential user community. The role of the coordinators should be to ensure that the system works effectively. There should be a review once every 2-3 years to keep GOSIC on track. There was a need to consider where the long-term home for an operational GOSIC might be once it was fully developed.

Action 28: On behalf of the GSC, the GPO should request Bert Thompson to act as the GOOS Coordinator for GOSIC, and to be the coordinator between GOSIC and both COOP and the OOPC.

Action 29: Peter Pissierssens (IODE) to advertise GOSIC through the IOC's Ocean Portal.

Action 30: GPO to bring GOSIC to the attention of the regional GOOS bodies, and feature it on the GOOS web pages.

5. REGIONAL/NATIONAL ACTIVITIES DESIGN AND IMPLEMENTATION

Julie Hall introduced this topic, reminding the Committee that the GSC Discussion Document on Regional Implementation has now been published on the GOOS web site, and that I-GOOS has appointed an inter-sessional group to refine a Regional Policy statement (background document GSC-V/B15). Regional developments will be taken forward through the 1st Regional GOOS Forum, designed by I-GOOS, which will take place in Athens in December 2002.

Julie noted that as Regional Fishery Bodies (RFBs), Regional Seas Conventions (RSCs) and Regional GOOS Alliances (RGAs) will be critical to the implementation of the coastal module, it would be useful: (i) to discuss possible roles of ICES and PICES in the development of the coastal module and of ways in which the GOOS effort can be used to benefit regional "fishery" bodies such as ICES and PICES; (ii) to do the same for Regional Seas Conventions; and (iii) to discuss the relationship between GRAs and COOP in relation to the design and implementation of the coastal module. In addition, in this context, there needs to be discussion of how RFBs, RSCs and GRAs can work together to achieve common goals, especially as related to the implementation of the coastal module. Ideally the Committee should be searching for a way forward that involves a working partnership between these bodies.

5.1 REGIONAL GOOS ALLIANCES

For actions on the following regional presentations, see section 5.1.12 below.

5.1.1 ICES

Bill Turrell (Co-Chair of the ICES-IOC Steering Committee on GOOS) reported on progress and plans in the development of linkages between GOOS and ICES, noting the activities of the ICES-IOC Steering Committee for GOOS and the development of a joint ICES-EuroGOOS Pilot Project on an ecosystem-based approach to fisheries and environmental management in the North Sea (background document GSC-V/B16). Also noted was the interest of the ICES-IOC Steering Group in developing similar projects on the continental margin of northeastern North America (involving Canada and the USA), and on the French Atlantic coast (involving France and possibly Spain). He noted the interests of ICES in working with the GOOS community towards the development of a North Atlantic basin-scale approach to GOOS.

The Committee agreed that we do not wish to duplicate the activities that were already being undertaken by the institutions operating within ICES, which for the most part were not represented in the IOC, and therefore were not represented in I-GOOS. Links between the GOOS scientific bodies and ICES are therefore essential to ensure that this disconnect between agencies at the national level is not detrimental to the development of GOOS. In that context, the Committee was pleased to note that the North Sea Pilot Project was developing right along COOP lines. The Committee agreed that there was a need to consider how GOOS might develop at the basin-scale in the North Atlantic, and that this should be done in conjunction with ICES. It noted that there was already an ongoing dialogue about this between EuroGOOS and US institutions, and agreed that it is timely to consider the development of an integrated plan for GOOS in the North Atlantic. There are good opportunities to work together on data and information management and on modelling so as to deliver greater efficiency and effectiveness.

5.1.2 PICES

Colin Summerhayes introduced the subject of how relations between GOOS and PICES might be strengthened, noting that although PICES had been unable to send a representative to GSC-V to provide a PICES view of possible links, they had provided a working paper on this topic (document GSC-V/19). He reminded the Committee that PICES had co-sponsored an operational oceanographic forecasting workshop as part of the IOC's WESTPAC Scientific Conference (Seoul, August 2001), that PICES has an ongoing dialogue with NEAR-GOOS, and that PICES had expressed a strong interest in the Living Marine Resources Module of GOOS prior to the formation of COOP.

The Committee agreed that there should be closer cooperation between GOOS and PICES. The Committee did not feel in a position to recommend action on the suggestions made in the PICES paper, which required more thought and dialogue before a decision could be made.

5.1.3 EuroGOOS

Hans Dahlin (the Director of EuroGOOS) reviewed progress and plans in EuroGOOS (background document GSC-V/B17). EuroGOOS comprises 30 agencies from 16 countries and is now self-funding through member's subscriptions. Its objective is to provide a focus for the European contribution to the global GOOS. This year has seen the implementation of Northwest Shelf Operational Observing System (NOOS) (background document GSC-V/B18). The now completed Mediterranean Forecasting System Pilot Project (MFSPP) has been an outstanding success, and has been succeeded by a new EC-funded project: the Mediterranean Forecasting System: Towards Environmental Predictions (MFSTEP). A number of other EC-funded projects stimulated by EuroGOOS continue to operate in the Atlantic, including, DIADEM-TOPAZ, and GYROSCOPE. The EC is also funding a Baltic project (PAPA), which contributes to the operation of the Baltic Operational Oceanographic System (BOOS). Progress is being made in planning operational oceanographic system for the Arctic. Plans have been concluded for the 3rd EuroGOOS Conference on Operational Oceanography (Athens, 3-5 December 2002).

EuroGOOS is assisting with GOOS capacity building in that it has overlapping membership with and contributes to the development of MedGOOS. It has signed a MOU with the newly formed Black Sea GOOS. And it has offered to host the 1st Regional GOOS Forum alongside the EuroGOOS Conference in Athens.

EuroGOOS is currently working to establish precisely what the ocean observing system consists of in the European area. This activity is taking place through the EC-funded EDIOS Project (European Directory of the

Initial Ocean Observing System), which will produce a metadatabase of activities. The database will help the GOOS community see more clearly what is going on at present under national flags.

EuroGOOS intends to make a contribution to the EC's proposed project on Global Monitoring and Environmental security (GMES), which may be funded as part of the EC's 6th Framework programme starting in 2003. EuroGOOS is in dialogue with JCOMM about the best way to take this development forward. EuroGOOS is also working closely with ICES and OSPAR on the proposed North Sea Ecosystem Pilot Project mentioned under item 5.1.1 above.

Finally he noted that the EuroGOOS Office had now moved from Southampton Oceanography Centre to the Swedish Meteorological and Hydrological Institute in January 2002, following the retirement of Nic Flemming.

The Committee noted the continuing impressive progress being made by EuroGOOS, and praised the development of links to other regional GOOS bodies, especially the hosting of the 1st Regional GOOS Forum.

5.1.4 MedGOOS

Silvana Vallerga (Chairperson of MedGOOS) reported on progress with and plans for the development of MedGOOS (background document GSC-V/B19), which comprises 16 agencies from 13 countries. She focused particularly on the implementation of the EC-funded MAMA project (Mediterranean network to Assess and upgrade Monitoring and forecasting Activity in the region), which had its kick-off meeting in Paris March 11-13, 2002. MAMA focuses on trans-national pooling of resources through the sharing of experience and the transfer of expertise. Its main goal is to build a basin-wide network for ocean monitoring and forecasting, linking all the Mediterranean countries, and building on the existing network of national institutions. Its partners include all of the riparian countries of the basin. MAMA has a capacity building element that will contribute to the GOOS capacity building programme.

The Committee was pleased to see that MAMA had been funded, and wished MedGOOS success in implementing the project. The Committee noted that the MAMA proposal was being promoted as a generic example of the kind of proposal needed by other regional GOOS bodies to begin the development of GOOS at the regional level. The Committee also noted with approval that MedGOOS was linked closely to the relevant Regional Seas programme, as represented by the Barcelona Convention.

5.1.5 Black Sea GOOS

Thorkild Aarup (Technical Secretary to the Black Sea GOOS Committee) reported on progress with and plans for the development of Black Sea GOOS. Black Sea GOOS was created through the signing of a Memorandum of Understanding in Paris in June 2001, following a final planning meeting in Poti, Georgia, in May 2001. Subsequently the MOU between Black Sea GOOS and EuroGOOS was signed in September 2001. Following the successful MAMA model, the Black Sea GOOS community developed the ARENA proposal for submission to the EC for funds to provide the necessary research infrastructure for a pre-operational ocean observing and forecasting system in the Black Sea. EuroGOOS is a partner in the ARENA project, which has just been funded.

The Committee was pleased to see the progress made by the Black Sea community and congratulated them on securing the funding to take the ARENA proposal forward.

5.1.6 GOOS-AFRICA

Colin Summerhayes reported on progress with and plans for GOOS-AFRICA. A major workshop had been convened in Nairobi (November 2001), which had led to the development of a proposal for a Regional Ocean Observing and Forecasting System for Africa (ROOFS-AFRICA) for submission to the African Process meeting that was timed to coincide with the WSSD in Johannesburg. The proposal aimed to improve access to and training in the use of remotely sensed data; to improve the ocean observing system – including sea-level measurements - around Africa; and to raise involvement in and access to numerical modelling for the production of products useful to support sustainable development. The GOOS-AFRICA Committee planned to review the draft proposal at a meeting in Abidjan from 6-11 May 2002.

At the Nairobi meeting, some long standing members had rotated off the Committee and new members had been added. Links had been created between GOOS-AFRICA and IODE's Ocean Data and Information Network for Africa (ODINAFRICA). Links had also been forged with the space agencies, with the modelling community with the meteorological community, with the Western Indian Ocean Marine Applications Project (WIOMAP), and with the UNEP Regional Seas programmes for east and west Africa. The Committee was now working to cement links between GOOS-AFRICA and the African Large Marine Ecosystem (LME) Projects, which carry the prospect of being able to provide funds to implement GOOS-AFRICA requirements. A strategic plan should be developed. Finally Geoff Brundrit announced that he would stand down as Chair at the end of 2002. The Committee was formally requested to recognize GOOS-AFRICA.

Additional progress to meeting the goals of GOOS-AFRICA was being made independently through a $0.5 million UNESCO cross cutting project on remote sensing in relation to water resources and ecosystems in Africa, led by a three man team including the Director of the GPO. The project was managed by the Technical Secretary of the GOOS-AFRICA Committee.

The Committee was pleased to see the progress being made. It felt that formal recognition of the regional bodies was a matter for I-GOOS, not for the GSC.

5.1.7 Indian Ocean GOOS (IOGOOS)

Narayana Swamy reported on progress with and plans for Indian Ocean GOOS (background document GSC-V/B20). Agreement on the formation of Indian Ocean GOOS had been reached at a meeting in New Delhi in November 2001. A strategy had been drafted, a steering committee formed, and a secretariat created (in Hyderabad, thanks to the generosity of the Indian government). The next step was for a Memorandum of Understanding to be drafted to be signed at the proposed Indian Ocean GOOS Conference (Mauritius, November 2002).

Bill Erb (GOOS Regional Programme Perth Office) outlined plans for the proposed Indian Ocean GOOS Conference. It would focus on climate, with the aid of advice from the OOPC, but there would be a significant component on coastal GOOS, which would be organized by Tom Malone of COOP. The meeting would be held in conjunction with the final meeting for planning the Western Indian Ocean Marine Applications Project (WIOMAP), which was being planned by the WMO and IOC secretariats. Invitees to the IOGOOS Conference would include a representative of GOOS-AFRICA and of the UNEP Regional Seas Programme for South Asia.

The Committee noted and approved the considerable progress made.

5.1.8 PacificGOOS

Bill Erb reported on progress with and plans for the development of PacificGOOS (background document GSC-V/B21). He noted that the South Pacific Applied Geosciences Commission (SOPAC) supplies a part time secretariat for PacificGOOS. PacificGOOS has developed a strategic plan, which is due to be agreed by the next Steering Committee meeting in October. A capacity building workshop on remote sensing was held in Noumea (25-27 September 2000). There are plans for a second such workshop and for a Pacific Argo workshop, both in September 2002. PacificGOOS has offered to host the next I-GOOS meeting (2003) in Fiji.

Bill also reported on progress with SEREAD (Scientific Educational Resources and Experience Associated with the Deployment of Argo floats), an initiative to raise awareness about Argo by involving schoolchildren throughout the region in monitoring the progress of the Argo project. This project was launched in March 2001 with funds from a number of partners. Meetings of the steering committee, which Bill chairs, were held in January and August 2001. The project is managed and developed at the University of the South Pacific, and the teaching resource material is already in draft form. SEREAD will begin some time early in 2002.

The Committee noted the steady progress, and looked forward to seeing the strategic plan, publication of which might be expected to help to bring in more resources.

5.1.9 NEAR-GOOS

In the absence of Professor Yu Zhouwen, Mr Hasegawa reported on the results of the 6th meeting of NEAR-GOOS (August 2001, Seoul) (background document GSC-V/B22). Progress continues to be made in data exchange, which is the main *raison d'être* for NEAR-GOOS as it is presently defined. Access to the real time database by users has increased steadily since December 1999. In support of data exchange, NEAR-GOOS runs

an annual data and information management training workshop, with the help of the Japan Ocean Data Centre (JODC), for scientists from the WESTPAC region. The 5th such course was held at the end of 2001.

The Committee is actively developing a medium term strategic plan to broaden the scope of NEAR-GOOS. This will involve consultation with users, the addition of non-physical environmental parameters, data assimilation, modelling and forecasting. This development has been helped by the holding of an Ocean Forecasting Workshop, jointly with PICES, as part of the WESTPAC Annual Meeting in Seoul in August 2001.

The Committee noted progress, endorsed the framework and direction of the medium term strategy (particularly noting that the strategy would contain a feasible action oriented programme), and recommended that the strategy should reflect the directions developed in the COOP design plan, and should consider interactions with GODAE.

5.1.10 IOCARIBE-GOOS

Colin Summerhayes reported on progress with and plans for the development of IOCARIBE-GOOS. He noted that following the 4th session of the *ad hoc* Advisory Group on IOCARIBE-GOOS (Veracruz, February 2002), the IOCARIBE-GOOS strategic plan (background document GSC-V/B23) had been accepted by the 7th session of the IOCARIBE Sub-Commission, which had endorsed the recommendations of the plan and requested Member States to nominate representatives for the fully fledged Steering Committee. The wider community had been alerted to the development of IOCARIBE-GOOS through an IOCARIBE-GOOS symposium during the Oceanology International Americas meeting in Miami in April 2001. It was planned to hold another such symposium during Oceanology International Americas 2003. In the meantime plans were being developed for pilot projects. Work had begun on an inventory of existing systems and activities in the region. A call was made for IOCARIBE-GOOS to be formally recognized by the international GOOS bodies.

The Committee agreed that the production of the strategic plan was a significant initial achievement, and looked forward to seeing some of the pilot projects develop.

5.1.11 SEAGOOS

Bill Erb reported on progress with and plans for the development of South-east Asia GOOS (SEAGOOS). He noted that the regional community had been brought together at a recent meeting in Seoul (August 2001) (background paper GSC-V/B24), as part of the WESTPAC Science Meeting. Working groups had examined three main topics central to GOOS in the region: (i) climate and tropical cyclones; (ii) coastal dynamics and pollution; and (iii) ecosystems and fisheries. Several potential pilot projects were identified, and the terms of reference for an *ad hoc* working group for SEAGOOS were established. The participants strongly supported the creation of SEAGOOS, agreed to work together for its development, and called on WESTPAC to formally endorse SEAGOOS as a GOOS Regional Alliance. It was noted that the S.E. Asian Centre for Marine and Atmospheric Prediction (SEACAMP) had been endorsed by the ASEAN community, and that this would be one of the existing systems that would need to be brought together under an eventual SEAGOOS.

The Committee noted that progress was rather slow, which might be a reflection of the lack or weakness of operational agencies at the national level.

5.1.12 Actions resulting from regional presentations

In the general discussion following the regional presentations the Committee was pleased to see the growth in regional activities, which reflects in turn the engagement of many agencies of many Member States that formerly were not considered to be actively interested in GOOS. The Committee recognized that the GRAs were important mechanisms for implementing GOOS, and complementary to JCOMM. The Regional Policy document (yet to be approved by I-GOOS) would provide them with general principles and guidelines of operation. In addition the GRAs should use the newly developed COOP plans to guide regional development.

The Committee recognized that different regions are at different levels of maturity in their approaches to operational activities, which explains why they are developing at different rates. One significant weakness almost everywhere was the link between oceanographic and meteorological agencies.

The Committee recognized that it cannot review and/or endorse every action of the GRAs, nor is it possible to undertake such review through the advisory panels. The Committee therefore did not see a great need

to continue receiving a growing number of reports on regional activities; the more proper place for these was at I-GOOS meetings. I-GOOS needed to take on board the requirement to formally recognize each GRA.

The Committee felt that there was much to be said for getting the GRAs to work together as a 'Federation'. This could provide a mechanism for regional implementation, to parallel the mechanism for global implementation that was provided by JCOMM. Such a Federation could profitably focus on such issues as: (i) developing liaison and awareness of commonalities and common issues; (ii) adoption of common standards; and (iii) discussion of the common goals for contributing to the global element of GOOS while at the same time meeting regional and local objectives. It would be useful for such a Federation to have a forum where the GRAs could meet, and the Committee noted that I-GOOS had planned such a Forum for December 2002 in Athens.

Close links were needed between the regional alliances and the other regional entities in the UN system, especially the Regional Seas programmes and Action Plans, the Regional Fisheries Bodies, and the Large Marine Ecosystem Projects. As far as their formal recognition was concerned, the GSC considered this to be a matter for I-GOOS. In this context the GSC still needed to consider how to take forward possible links to CCAMLR (Commission for Conservation of Antarctic Marine Living Resources).

In the context of a discussion on the merits of the Continuous Plankton Recorder programme, the Committee debated the question of whether or not to recommend to GOOS Regional Alliances the application of any particular technologies. Recognizing that ocean information about living resources was extremely limited, the Committee decided that GRAs should be invited to consider establishing CPR lines in their areas.

Action 31: OOPC and COOP to work closely with the ICES-IOC Steering Group on GOOS to see how ICES can help take forward COOP and OOPC initiatives and vice versa, as a prelude to consideration of the development of an Atlantic-wide multi-community approach to GOOS that would build on and complement ongoing developments involving GODAE, EuroGOOS, and US and Canadian agencies, and to report back to GSC-VI.

Action 32: Jim Baker to explore with PICES the possibility of developing a joint GOOS and PICES approach to ocean observations in the North Pacific, including the possibility of establishing a regional GOOS office for the North Pacific, and to report back to GSC-VI.

Action 33: GPO to ask I-GOOS to finalize as soon as possible the GOOS Regional Policy so that GOOS Regional Alliances can be formally recognized.

Action 34: GPO to encourage I-GOOS (via the June 2001 meeting of the I-GOOS Board) to use the Regional Forum in Athens to consider the possibility of creating a GOOS Regional Federation, to meet the need for a regional implementation mechanism to parallel the global implementation affected through JCOMM.

Action 35: GPO to ask I-GOOS (via the June 2001 meeting of the I-GOOS Board) to formally endorsed both GOOS-AFRICA and IOCARIBE-GOOS as GOOS Regional Alliances.

Action 36: Jim Baker to send a message of encouragement to new GOOS Regional Alliances.

Action 37: GPO to request all regional GOOS bodies to take on board design advice from COOP, OOPC, GODAE and Argo, in designing GOOS at the regional and local level, so that national, regional and international efforts are internally consistent.

Action 38: GPO to recommend that all regional GOOS bodies make special efforts to develop strong links with the relevant Regional Seas Conventions and Action Plans of UNEP's Regional Seas Programme.

Action 39: GPO to recommend that GOOS regional groups consider how to incorporate into their action plans systematic monitoring using the Continuous Plankton Recorder (CPR) to provide descriptions in time and space of changes in plankton communities.

Action 40: GPO to recommend (before the WESTPAC science meeting in Perth in September 2002) that WESTPAC give due consideration to changing the membership of the NEAR-GOOS Coordinating Committee to reflect the imperatives of the new strategic plan.

5.2 GOOS-UNEP REGIONAL SEAS COORDINATION

Colin Summerhayes reported on recent interactions with the UN Regional Seas Programme (background paper GSC-V/B25), which is responsible for 14 Regional Seas Conventions and Action Plans. In effect these operate as a single distributed Convention covering most coastal seas. GOOS is increasingly being seen as a distributed tool for meeting the requirements of this distributed convention.

The Committee approved of the continuing close linkage between the GPO and UNEP's office for the Regional Seas programme, and noted the calls (above) for the GOOS Regional Alliances to form strong links with their local RSP's if they have not already done so.

5.3 IOC-GOOS REGIONAL OFFICES

5.3.1 Perth Office

Bill Erb reported on progress with the Perth Office (background document GSC-V/B26). A review of its activities had been carried out by the sponsors on 14-15 March 2001 (background document GSC-V/B27). Assistance of various kinds had been provided to facilitate progress in PacificGOOS, SEAGOOS, and Indian Ocean GOOS (IOGOOS). Geoff Holland had been engaged as a consultant to develop a strategy for capacity building for the Pacific Islands and Indian Ocean regions, as necessary next step in attracting resources to these regions.

The Committee was pleased to note that the reviewers of the Office had judged its performance as highly satisfactory, and conveyed to Bill Erb its own warm appreciation for his considerable and successful efforts on behalf of the three GOOS regional alliances.

5.3.2 Rio Office

Colin Summerhayes noted that the IOC was developing a Memorandum of Understanding with the Brazilian Government regarding the establishment in Rio de Janeiro of an IOC GOOS Office for the Tropical and South Atlantic, (background paper GSC-V/B28). The Office had started in December 2001 with the appointment, part-time, of Janice Trotte, formerly of the GPO secretariat in Paris.

The Committee welcomed the establishment of the Office and, in particular, the support provided by Brazil, the IOC and NOAA. The Committee believes that the activities of the Office will be critical for the establishment of capacity and functionality for observing systems in the region. The Office should give high priority to establishing dialogue among South Atlantic countries, particular those from S. America, on the availability (observations that are there now) and utility (what are the socio-economic, industrial and scientific applications) of ocean observing system data. It is important that a strategy be developed for ocean observations and that ownership of this strategy largely come from the South Atlantic countries, which might include the development of South Atlantic GOOS Regional Alliances.

PIRATA is clearly a high-priority activity for GOOS, and the Committee believed that it is appropriate for the Rio Office to support it and to ensure that it promotes and follows GOOS requirements and principles.

The Committee also believed that the proposed South Atlantic Workshop should be given high priority and that the Office should assist the organizing committee for the Workshop. The Committee noted that several WOCE activities in the South Atlantic could form a foundation for the Workshop. The Committee accepted that a Workshop this year is not possible but stresses that it should be convened early in 2003, and encouraged the Office to provide the needed assistance. The Committee noted several other activities, including the GLOSS Workshop and interaction with the regional Oil and Gas Industry. One of the strengths of the Perth Office and its Conference in 2000 was the co-location of meetings, and the Committee encouraged the Rio Office to investigate options for merging activities like GLOSS with the Workshop.

The Committee noted the likely strong links to CLIVAR at the Workshop. This was welcome, but the Committee reiterated that its interests are in sustained ocean observations, either for climate or coastal applications, and that the Office should ensure that these needs are appropriately reflected in the agenda for the Workshop.

The Committee noted that the Office would also have to work closely with projects already established in the region, such as the COOP pilot project QUIJOTE.

Action 41: The new Rio Office should (i) give high priority to establishing dialogue among South Atlantic countries, particular those from South America, on the availability (observations that are there now) and utility (what are the socio-economic, industrial and scientific applications) of ocean observing system data, as the basis for developing a strategy for ocean observations; (ii) provide support to PIRATA; (iii) give high priority to the proposed South Atlantic Workshop, which should be convened early in 2003, ensuring that the GOOS interests in sustained ocean observations for climate or coastal applications are appropriately reflected in the agenda, and assist the organizing committee for the Workshop.

5.4 NATIONAL GOOS DEVELOPMENTS

Colin Summerhayes noted that work is underway to obtain details of national commitments to GOOS. The work is being done by Bert Thompson, operating under contract at the University of Delaware (background document GSC-V/B29).

The committee noted this development.

6. DATA AND INFORMATION MANAGEMENT

6.1 OCEAN INFORMATION TECHNOLOGY PROJECT

Neville Smith provided an update on developments in the Ocean Information Technology (OIT) project, details of which can be seen at http://www.bom.gov.au/OOPC/NVODS_WS/. The rational for the project had been spelled out at GSC-IV, and if the GSC is willing to support the endeavour, then the next steps would be to set specific objectives, build a work programme around them, and develop a schedule for implementation. The vision is to create an efficient and effective data and information management system for the ocean and marine environment, based on leading-edge [ocean] information technology, and serving the oceanographic community and beyond.

To achieve this vision we need to create an Ocean data and information management Pilot Project that will meet some of the significant requirements set out in the GOOS Data and Information Management Strategy and Plan (GOOS Report 103) produced by Ron Wilson in 2001, such as: (i) the demand for effective telecommunications; (ii) the need for common standards, practices and protocols; (iii) the need for data and product service matched to the participants and users of GOOS data; (iv) the need for innovative data inquiry, access and delivery mechanisms; and (v) the need for intra-operability and interoperability.

Project components would therefore include topics like: (i) telecommunications; (ii) standards and protocols (e.g. XML; Metadata standards; and the "Unconventional" - requiring links into IODE and into the JCOMM Expert group on Data, for instance); (iii) data archaeology; (iv) data integrity; (v) data circulation; (vi) data and product servers; (vii) data assembly; (viii) user interfaces (including innovative IT solutions). These would be considered as work packages, leading to a comprehensive review and discussion of the way forward at a conference after around 3 years.

The linkages between "work packages" are critical. GOOS (OOPC, COOP, GODAE), JCOMM, and IODE would be Joint Partners in the pilot project. Ideally they should provide a Steering Team, which might then consider involving GOOS Regional Alliances, and seeking support from possible Patrons (following the GODAE model). A complete prospectus should be agreed by the GSC, the JCOMM data group and IODE. The Secretariats should be involved in the activity.

The Committee thanked Neville for his efforts to develop the project, recognizing that this is an ambitious goal but that it will become more difficult if it is not tackled now. The Committee endorsed the formation of the Pilot Project in principle, and the formation of a Steering Team. Some consideration should be given to forming links to the private sector, to the inclusion of remote sensing data, and to eventual products.

Action 42: Neville Smith to form and chair a Steering Committee to develop plans for an Ocean Information Technology Pilot Project, and work towards creation of a Patrons Group to fund the activities of the Pilot Project, and report back to GSC-VI.

7. GOOS CAPACITY BUILDING

7.1 REPORT OF THE GOOS CAPACITY BUILDING PANEL

Colin Summerhayes reported on the GOOS capacity building programme, noting that activity had been rather limited during the year due to illness of the Chairman (working document GSC-V/16). Nevertheless the Capacity Building Implementation Strategy had been published and new members had been added to the Panel, notably Ellik Adler representing UNEP, Peter Pissierssens representing IODE and ODINAFRICA, and Craig Donlon, representing UNESCO's Bilko programme for training in remote sensing. Plans had been made for an inaugural meeting of the Panel in Geneva (24-27 June 2002) in conjunction with the meeting of the Capacity Building Panel for JCOMM, to ensure synergy and lack of duplication between the two efforts.

Peter Dexter noted that JCOMM had inherited a wide range of capacity building activities, and one first task would be to try to integrate these into a comprehensive approach.

Colin Summerhayes noted that he had been asked to develop an inventory of capacity building activities within the various global observing domains of the IGOS Partners, as the basis for developing a more coherent and integrated capacity building programme in support of global observing.

Peter Pissierssens told the Committee about the way in which capacity building is being approached through ODINAFRICA, which is building a network of ocean data centres and exchange mechanisms across Africa. Experience has shown that training courses by themselves do not work effectively. ODINAFRICA combines training with the provision of equipment plus maintenance and support, to ensure sustainability of the programme over the longer term. The IODE's OceanTeacher programme maintains a web-based training curriculum. GOOS modules could be added to OceanTeacher.

The Committee was pleased to see that the Capacity Building Panel was proposing to meet, and expected some concrete plans to emerge for action, it wished to see a focus on data and information management, and on access to and training in the use of remotely sensed data. Modelling should also feature prominently. The Committee noted with approval the connections being developed between the capacity building activities of GOOS, GCOS, JCOMM and IGOS.

Action 43: GOOS CB Panel, at its June meeting, to pay special attention to the areas of data and information management, and remote sensing in the development of a GOOS Capacity Building programme.

7.2 REPORT ON POGO ACTIVITIES

Dr Tony Knap report on the way in which the Partnership for Observations of the Global Oceans (POGO) is evolving to assist GOOS development. For the most part the focus of POGO activities since GSC-IV has been on the implementation of its multi-sponsored Fellowship Programme, which provides training in ocean observation techniques (background document GSC-V/B30). The POGO laboratory directors are keen to help with GOOS developments, especially Argo and the global network of time series stations. Their next meeting will be in Hobart, Australia, in January 2003, when they will focus on the Indian Ocean.

The Committee noted developments.

8. COMMITTEE BUSINESS

8.1 APPROVAL OF BUDGETS

Jim Baker reported on the findings of the sessional working group on the work programme and budget (working document GSC-V/11). A feeling had been expressed by some that there were "too many meetings and too much paper". However, the real question was whether the output of the meetings warranted the cost and the number. The reality is that we have fewer meetings driven from the top, but many more that were driven from the bottom up (excluding the regional ones). The 'bottom-up' meetings were being generated by the scientific community to address the issues that it was concerned with (e.g. GODAE; Argo; etc.). The same applied to the GOOS Regional Alliances; there the metric for success initially was the number of GRAs - their meetings were the means to producing that success. The general conclusion of the working group was that the meetings we hold have been very productive, and have in fact underpinned the successes of the past 5 years in getting GOOS

implemented. As far as the volume of paper was concerned, the working group noted that the GPO had moved in recent years from providing paper copy to meetings, to posting documents electronically. This puts the responsibility for accessing the documents on the members of the various GOOS bodies. When they feel they need a particular document, they can of course download it.

The Committee agreed that we are having smaller and more efficient and effective meetings, and not too many of them for the range of tasks. The Committee endorsed the work programme and budget, requesting that future submissions should link activities to expected outcomes. The Committee agreed that for the time being COOP should continue to meet twice per year. For GSC-VI it was recommended that GODAE should appear under Implementation, not under Design.

Action 44: GPO to link the presentation of the work programme and budget to clearly designated outcomes for use in preparing papers for GSC-VI.

To enable the GSC to spend its time more productively in future, the Committee accepted the need to reduce the time spent on reporting. To facilitate speeding up the process of receiving and analysing reports on regional activities, the Committee accepted Jim Baker's suggestion that they should be made using a template. Similarly, to facilitate the tasks of the GPO, the Committee agreed that reports of all GOOS meetings should be kept to around 10 pages where feasible.

Action 45: Jim Baker and GPO to develop templates to form the basis for regional reports to future GSC sessions for use in preparing regional papers for GSC-VI.

Action 46: GPO to limit the length of the report of the 5th session of the GSC to no more than 10 pages.

8.2 REVIEW OF AND AGREEMENT ON ACTION ITEMS

Colin Summerhayes reviewed progress against the 53 action items from GSC-IV (working document GSC-V/6). The majority of the actions had been completed; the few remaining ones were ongoing items or 'in-hand'.

The Committee reviewed and finalized the list of actions for GSC-V (see agenda item 10, below).

8.3 MEMBERSHIP OF GSC AND PANELS

On behalf of Prof. Nowlin, Colin Summerhayes reported on the actions taken to establish a rotation procedure for membership. The 12-person core membership of the GSC should reflect (i) a balance between user groups, operational experts, and scientific researchers; as well as (ii) a geographic balance and (iii) appropriate gender distribution.

Jim Baker reported on the findings of a sessional working group on membership.

In discussion the Committee agreed that there were 4 vacancies caused by the rotation off the Committee of: Naoyuki Hasegawa (operational meteorology); Julie Hall (coastal ecosystems); Douglas Wallace (carbon); and Geoff Brundrit (marine physics). It was agreed that replacements should be sought in the areas of: (i) operational meteorology; (ii) operational coastal ocean physics; (iii) biology and ecosystems, or coastal pollution; and (iv) carbon. Given the retirement of Julie Hall and Naoyuki Hasegawa, both members of the GSC Executive Committee (with Julie as Vice Chair), it would be necessary to find and appoint a new Vice-Chair and a new Executive Committee.

Action 47: GPO, Jim Baker, and GOOS sponsors to work to find replacements for 4 outgoing GSC Members, bearing in mind specific requirements, by year-end, and to appoint a new Vice Chair and Executive Committee.

8.4 CALENDAR ITEMS: DATE AND PLACE OF NEXT MEETINGS

Following the plan that the GSC should alternate its meetings between the regions and UNESCO HQ, GSC-VI will be held in Cape Town in March 2003, and GSC-VII at UNESCO HQ in spring 2004.

Action 48: GPO to explore the possibility of changing the date of the 6th session of the GSC (initially proposed for 12-14 March 2003) to late in February or earlier in March.

The Committee was asked to suggest suitable venues for GSC-VIII (spring 2005), bearing in mind that GOOS planning meetings outside UNESCO HQ will have been held in:

Europe: [Nantes (France): J-GOOS-I; and Geneva (Switzerland): I-GOOS-SSC-I; I-GOOS-SSC-III]
North America: [Miami (USA): J-GOOS-IV; and Washington (USA): I-GOOS-PS-II]
South America: [Vina del Mar (Brazil): GSC-IV]
Africa: [Cape Town (S.Africa): GSC-VI]
Asia: [Beijing (China): GSC-II]
Australasian: [Melbourne (Australia): I-GOOS-PS-I]

Narayana Swamy offered to host GSC-VIII in Goa, India.

The Committee briefly considered what scientific presentations might be made (like that on the CPR at the present meeting) in Cape Town.

Action 49: Jim Baker to ask Fred Grassle to arrange for a presentation on the Census of Marine Life at GSC-VI.

9. CLOSURE

The meeting ended at 5.00 pm on Friday, 3 May 2002.

10. LIST OF ACTIONS

Action 1	Members to persuade their national representatives to WSSD that observing systems are needed to support integrated coastal management and sustainable development
Action 2	I-GOOS Chair to make available to GSC Members copies of the draft report to the GOOS-UNCLOS group by consultant Peter Ryder.
Action 3	ICSU to provide the GPO with the precise wording used by ICSU to refer to observing systems in their science and technology presentation to the WSSD.
Action 4	Members should cooperate with the GOOS Review Panel by providing comprehensive answers in a timely fashion to the questionnaire sent out for the Panel by the GPO.
Action 5	Form an inter-sessional group (Chaired by Narayana Swamy, and comprising the GPO Director plus Johannes Guddal, Tony Knap, Eric Lindstrom, Helen Yap, and Tom Malone), to develop a communications strategy for GOOS, and present it at GSC-VI.
Action 6	Tony Knap (Chair) and the Brochure Working Group plus GPO Director, to finalize the requirements, character, target and format for the proposed GOOS brochure, and work with the GPO on the production in consultation with a professional.
Action 7	The GPO, with advice from Neville Smith, to finalize the requirements, character, target and format for the GOOS Biennial Review to replace the annual GOOS Status Report, and oversee production in consultation with a professional.
Action 8	Johannes Guddal (Chair) with Eric Lindstrom, Mike Sinclair and Director GPO, to finalize plans for development of the GOOS Products and Services Bulletin, including a template for future authors of special articles.
Action 9	Members to use all available opportunities to give papers on GOOS at scientific meetings, and to write short articles for appropriate scientific journals and newsletters on benefits of GOOS for science, to help spread the word about GOOS to the scientific community.
Action 10	Members to send sets of PowerPoint presentations on GOOS to the GPO to be put on the Overheads section on the GOOS homepage.
Action 11	Members to list significant highlights of GOOS (ways in which GOOS had made a significant impact on the scientific and other user communities) from the past 5 years, for the GPO to put on the GOOS web site, by end May 2002.
Action 12	COOP Chairs to make available on a CD, for the benefit of regional GOOS bodies, the software developed to determine the core variables to be measured for coastal seas, by end 2002.
Action 13	Members to check the sections of the draft COOP design plan in their area of competence, and

	provide feedback to Tom Malone by 10 May 2002.
Action 14	Members to suggest to Tom Malone the names of outside experts who might form useful external reviewers of the draft COOP design plan, by May 10, 2002.
Action 15	Worth Nowlin to continue to act as GSC Representative on the JCOMM Management Committee until Jim Baker takes over this task.
Action 16	OOPC and COOP Chairs to maintain strong links between COOP and the OOPC and vice versa.
Action 17	An inter-sessional group (comprising Mike Sinclair as Chair, with Knap, Yap, Flemming, Harrison, Malone, Smith and Unluata) should review the status of indicator development and operational use, develop requirements for indicators, identify user groups, and develop a plan for identifying and incorporating indicators as GOOS products, and report back to GSC-VI.
Action 18	The OOPC should increase the effort devoted to considering the ice-covered seas, recognizing the objectives of GCOS cannot be met without advice on this topic.
Action 19	GCOS, OOPC and COOP to work together to increase regional ocean participation in the GCOS regional capacity building workshops.
Action 20	GPO, with the aid of GCOS, to inform regional GOOS bodies of the possibilities for participation in the GCOS regional capacity building workshops.
Action 21	OOPC to contribute to the preparation by GCOS of a "Second report on the Adequacy of the Global Climate Observing Systems" for presentation to the UNFCCC.
Action 22	GSC Chair to pass to NASA the GSC's strong endorsement of the development of the Aquarius Mission, which has been designed by NASA to begin to address the long term GOOS requirements for sea surface salinity observations.
Action 23	GPO, before May 30, to inform the 9th IGOS Partners meeting that the GSC considers (i) that it is too early to begin development of a Coastal Theme, and that we should wait until the implementation plans for the GOOS Coastal Module and related parts of GTOS are complete before starting this process; (ii) that the rolling review process for the Ocean Theme should include remote and *in situ* observations needed for the common global variables of the Coastal Ocean Observing System of GOOS, including remote sensing from aircraft; and (iii) that in the absence of a defined Coastal Theme the urgent work required on coral reefs might be part of the Ocean Theme.
Action 24	GPO, before May 30, to request the IGOS Partnership (which includes the sponsors of the Global Carbon Project GCP) to provide more specific advice to GOOS on its likely requirement for scientific oversight for the sustained carbon network.
Action 25	GOOS sponsors to appoint a carbon scientist to the Committee, to ensure a strong link to the ocean carbon community, by year-end 2002.
Action 26	Chairs of OOPC and COOP to form an inter-sessional group to ensure that a close working link develops between COOP, GODAE and Argo, perhaps through a pilot project, and to report on progress to GSC-VI.
Action 27	Tony Knap to present the RAMP pilot project to (i) regional GOOS groups (through the Regional GOOS Forum in Athens) and (ii) the UNEP Regional Seas Programme (RSP) (perhaps through a presentation at the 5th meeting of the RSPs in Toyama).
Action 28	On behalf of the GSC, the GPO should request Bert Thompson to act as the GOOS Coordinator for GOSIC, and to be the coordinator between GOSIC and both COOP and the OOPC.
Action 29	Peter Pissierssens (IODE) to advertise GOSIC through the IOC's Ocean Portal.
Action 30	GPO to bring GOSIC to the attention of the regional GOOS bodies, and feature it on the GOOS web pages.

Action 31	OOPC and COOP to work closely with the ICES-IOC Steering Group on GOOS to see how ICES can help take forward COOP and OOPC initiatives and vice versa, as a prelude to consideration of the development of an Atlantic-wide multi-community approach to GOOS that would build on and complement ongoing developments involving GODAE, EuroGOOS, and US and Canadian agencies, and to report back to GSC-VI.
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Action 34	GPO to encourage I-GOOS (via the June 2001 meeting of the I-GOOS Board) to use the Regional Forum in Athens to consider the possibility of creating a GOOS Regional Federation, to meet the need for a regional implementation mechanism to parallel the global implementation affected through JCOMM.
Action 35	GPO to ask I-GOOS (via the June 2001 meeting of the I-GOOS Board) to formally endorsed both GOOS-AFRICA and IOCARIBE-GOOS as GOOS Regional Alliances.
Action 36	Jim Baker to send a message of encouragement to new GOOS Regional Alliances.
Action 37	GPO to request all regional GOOS bodies to take on board design advice from COOP, OOPC, GODAE and Argo, in designing GOOS at the regional and local level, so that national, regional and international efforts are internally consistent.
Action 38	GPO to recommend that all regional GOOS bodies make special efforts to develop strong links with the relevant Regional Seas Conventions and Action Plans of UNEP's Regional Seas Programme.
Action 39	GPO to recommend that GOOS regional groups consider how to incorporate into their action plans systematic monitoring using the Continuous Plankton Recorder (CPR) to provide descriptions in time and space of changes in plankton communities.
Action 40	GPO to recommend (before the WESTPAC science meeting in Perth in September 2002) that WESTPAC give due consideration to changing the membership of the NEAR-GOOS Coordinating Committee to reflect the imperatives of the new strategic plan.
Action 41	The new Rio Office should (i) give high priority to establishing dialogue among South Atlantic countries, particular those from South America, on the availability (observations that are there now) and utility (what are the socio-economic, industrial and scientific applications) of ocean observing system data, as the basis for developing a strategy for ocean observations; (ii) provide support to PIRATA; (iii) give high priority to the proposed South Atlantic Workshop, which should be convened early in 2003, ensuring that the GOOS interests in sustained ocean observations for climate or coastal applications are appropriately reflected in the agenda, and assist the organizing committee for the Workshop.
Action 42	Neville Smith to form and chair a Steering Committee to develop plans for an Ocean Information Technology Pilot Project, and work towards creation of a Patrons Group to fund the activities of the Pilot Project, and report back to GSC-VI.
Action 43	GOOS CB Panel, at its June meeting, to pay special attention to the areas of data and information management, and remote sensing in the development of a GOOS Capacity Building programme.
Action 44	GPO to link the presentation of the work programme and budget to clearly designated outcomes for use in preparing papers for GSC-VI.
Action 45	Jim Baker and GPO to develop templates to form the basis for regional reports to future GSC sessions for use in preparing regional papers for GSC-VI.
Action 46	GPO to limit the length of the report of the 5th session of the GSC to no more than 10 pages.
Action 47	GPO, Jim Baker, and GOOS sponsors to work to find replacements for 4 outgoing GSC Members, bearing in mind specific requirements, by year-end, and to appoint a new Vice Chair and Executive Committee.
Action 48	GPO to explore the possibility of changing the date of the 6th session of the GSC (initially proposed for 12-14 March 2003) to late in February or earlier in March.
Action 49	Jim Baker to ask Fred Grassle to arrange for a presentation on the Census of Marine Life at GSC-VI.

ANNEX I

AGENDA

1. OPENING AND WELCOME

1.1 WELCOME AND INTRODUCTIONS
1.2 COMMENTS FROM SPONSOR ORGANIZATIONS
1.3 LOGITICS

2. THE GOOS INFRASTRUCTURE

2.1 COMMENTS FROM GSC CHAIR
2.2 REPORT ON I-GOOS ACTIVITIES AND REMARKS FROM I-GOOS CHAIR
2.3 2002 REVIEW OF GOOS
2.4 REPORT FROM GPO DIRECTOR (including presentation of proposed budgets and updates/plans for the GOOS Products and Services Bulletin, the GOOS web site, and the GOOS Bulletin)

2.4.1 GPO Activities
2.4.2 GOOS Brochure
2.4.3 GOOS Products and Services Bulletin
2.4.4 GOOS Work Programme and Budget

3. REFINING THE STRATEGIC DESIGNS FOR GLOBAL GOOS

3.1 COASTAL OCEAN OBSERVATIONS PANEL REPORT (including liaison with LOICZ, GTOS, AND GLOBEC)

3.1.1 COOP Activities
3.1.2 Liaison with LOICZ, GLOBEC, GTOS and Other Bodies

3.2 OCEAN OBSERVATIONS PANEL FOR CLIMATE REPORT, (including liaison with GCOS and the UNFCCC)

3.2.1 OOPC Report
3.2.2 Liaison with GCOS and the UNFCCC

4. IMPLEMENTATION OF GLOBAL GOOS DESIGNS

4.1 JCOMM
4.2 IGOS-P THEMES
4.3 GODAE, INCLUDING ARGO
4.4 OTHER PILOT PROJECTS
4.5 GOSIC

5. REGIONAL/NATIONAL ACTIVITIES DESIGN AND IMPLEMENTATION

5.1 REGIONAL GOOS ALLIANCES

5.1.1 ICES
- Report from the ICES-IOC Committee
- Request release of ICES hydrographic data
- Ask for suggestions as to proper connections with GOOS/OOPC

5.1.2 PICES
- Consideration of ways to strengthen PICES-GOOS connection
- Discuss possibility of IOC-GOOS Office for North Pacific

5.1.3 EuroGOOS
- Progress report
- Ask them to consider how they might aid GOOS Capacity Building
- Consider plans for the EuroGOOS Conference in Athens (December)

5.1.4 MedGOOS
- Progress Report

5.1.5 Black Sea GOOS
- Progress Report

5.1.6 GOOS-Africa
- Progress Report
- Consider any recommendation to I-GOOS

5.1.7 Indian Ocean GOOS (IOGOOS)
- Status report
- Recognition of IOGOOS development by GSC and recommendation to I-GOOS

5.1.8 PacificGOOS
- Progress report
- Note they have offered to host the next I-GOOS meeting

5.1.9 NEAR-GOOS
- Suggest they engage the scientific community in a broad ranging review of the possibilities for full GOOS development, perhaps committing to producing a strategic plan based on that assessment
- Future membership might be more inclusive

5.1.10 IOCARIBE-GOOS
- Progress report
- Consideration of their strategic plan plans for a pilot project

5.1.11 SEAGOOS
- Progress report

5.2 GOOS-UNEP REGIONAL SEAS COORDINATION
5.3 IOC-GOOS REGIONAL OFFICES

5.3.1 Perth Office
- Report by W. Erb; background and action documents prepared in advance.
- Consider sponsors' review of the office performance, presented as background document

5.3.2 Rio Office
- Background paper
- Brief review of status

5.4 NATIONAL GOOS DEVELOPMENTS

6. GOOS CAPACITY BUILDING

6.1 REPORT OF THE GOOS CAPACITY BUILDING PANEL
6.2 REPORT ON POGO ACTIVITIES

7. COMMITTEE BUSINESS

7.1 APPROVAL OF BUDGETS
7.2 REVIEW OF AND AGREEMENT ON ACTION ITEMS
7.3 MEMBERSHIP OF GSC AND PANELS
7.4 CALENDAR ITEMS

8. CLOSURE

ANNEX II

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ANNEX III

LIST OF DOCUMENTS*

Document Code	Title	Agenda Items	Lang.
	WORKING DOCUMENTS		
GSC-V/1	Provisional Agenda	1.3	E only
GSC-V/1B	Annotated Provisional Agenda	1.3	E only
GSC-V/2	Provisional Timetable	1.3	E only
GSC-V/3	List of Participants	1.3	E only
GSC-V/4	Provisional list of Documents (this document)	1.3	E only
GSC-V/5	Report of GSC-IV	2.1	E only
GSC-V/6	Progress against the actions of GSC-IV	2.1 & 7.2	E only
GSC-V/7	Report of the Session (to be prepared during the meeting)	All	E only
GSC-V/8	An I-GOOS Perspective on the Future of GOOS	2.2	E only
GSC-V/9	Plans for the 2002 review of GOOS	2.3	E only
GSC-V/10	GPO Director's Report	2.4.1	E only
GSC-V/11	GOOS Project Office Work Programme and Budget	2.4.4 & 7.1	E only
GSC-V/12	Report of COOP activities and plans	3.1.1	E only
GSC-V/13	COOP Design Plan	3.1.1	E only
GSC-V/14	Report of OOPC activities and plans	3.2.1	E only
GSC-V/15	Report of GODAE and Argo	4.3	E only
GSC-V/16	Report on Progress with Capacity Building	6.1	E only
GSC-V/17	List of actions of GSC-V (to be prepared during the meeting)	All	E only
	BACKGROUND DOCUMENTS		
GSC-V/B1	Report of I-GOOS-V (June 2001)	2.2	E only
GSC-V/B2	GOOS News No. 11	2.4.1	E only
GSC-V/B3	GOOS News No. 12	2.4.1	E only
GSC-V/B4	Report of G3OS Sponsors Meeting (June, 2001)	2.4.1	E only
GSC-V/B5	Draft GOOS Brochure	2.4.2	E only
GSC-V/B6	Highlights of GCOS-X Meeting (April 2000)	3.2.2	E only
GSC-V/B7	Report of the JCOMM–1 (Iceland) and JCOMM-MC-1 (Geneva)	4.1	E only
GSC-V/B8	Report of the 7th GLOSS Meeting (Honolulu, April 2001)	4.1	E only
GSC-V/B9	Report of the 7th IGOS Partners Meeting (June 2001)	4.2	E only
GSC-V/B10	Report of the 8th IGOS Partners Meeting (Nov 2001)	4.2	E only
GSC-V/B11	The IGOS Brochure	4.2	E only
GSC-V/B12	GODAE Implementation Plan	4.3	E only
GSC-V/B13	Report of PIRATA-VII Meeting (August 2001)	4.4	E only
GSC-V/B14	Report and Review of GOSIC	4.5	E only
GSC-V/B15	Regional Policy Document (I-GOOS draft)	5.0	E only
GSC-V/B16	ICES-IOC GOOS Plans for North Sea Pilot Project	5.1.1	E only
GSC-V/B17	EuroGOOS Status Report (2002)	5.1.3	E only
GSC-V/B18	EuroGOOS NOOS Plan	5.1.3	E only
GSC-V/B19	Report on MedGOOS	5.1.4	E only
GSC-V/B20	Indian Ocean GOOS document	5.1.7	E only
GSC-V/B21	PacificGOOS Strategic Plan	5.1.8	E only
GSC-V/B22	Report of 6th meeting of NEAR-GOOS (Seoul, August 2001)	5.1.9	E only
GSC-V/B23	IOCARIBE-GOOS Strategic Plan	5.1.10	E only
GSC-V/B24	Report of SEAGOOS Meeting (August 2001)	5.1.11	E only
GSC-V/B25	GOOS and UNEP Regional Seas Programme	5.2	E only
GSC-V/B26	Report on Status of Perth Office and programmes	5.3.1	E only
GSC-V/B27	Review of Perth Office and programmes	5.3.1	E only
GSC-V/B28	Report on Status of Rio Office and programmes	5.3.2	E only
GSC-V/B29	Report on Status of National GOOS Commitments	5.4	E only
GSC-V/B30	Report on POGO Fellowship Programme	6.2	E only

* This list is for reference only. No stocks of these documents are maintained.

ANNEX IV

LIST OF ACRONYMS

ACSYS	Arctic Climate System Study
AOPC	Atmospheric Observing Panel for Climate
ASEAN	Association of South-East Asian Nations
AST	Argo Science Team
BATS	Bermuda Atlantic Time Series Station
CCCO	Committee on Climate Change of the Ocean
CEOS	Committee on Earth Observation Satellites
CLIVAR	Climate Variability and Predictability
CMM	Commission for Marine Meteorology
COP	Conference of the Parties (of the UNFCCC)
CPR	Continuous Plankton Recorder
CSIRO	Commonwealth Scientific and Industrial Research Organization
DBCP	Data Buoy Co-operation Panel
EC	European Commission
EEZ	Exclusive Economic Zone
ENSO	El Niño-Southern Oscillation
ENVISAT	Environmental Satellite
EPB	Electronic Products Bulletin
ESODAE	European Shelf Seas Data Assimilation and Forecast Experiment
EU	European Union
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
EuroGOOS	European GOOS
FAO	Food and Agriculture Organization of the United Nations
FCCC	Framework Convention on Climate Change
FOAM	Forecast Ocean Atmosphere Model
GCOS	Global Climate Observing System
GCRMN	Global Coral Reef Monitoring Network
GEF	Global Environment Facility
GEOHAB	Global Ecology of Harmful Algal Blooms
GIPCO	GOOS Integrated Panel for the Coastal Ocean
GIPME	Global Investigation of Pollution in the Marine Environment
GLOSS	Global Sea-Level Observing System
GLOBEC	Global Ocean Ecosystems Dynamics
GODAE	Global Ocean Data Assimilation Experiment
GOOS	Global Ocean Observing System
GOOS-IOS	GOOS Initial Observing System
GOSIC	G3OS Information Centre
GOSSP	Global Observing Systems Space Panel
GPO	GOOS Project Office
GSC	GOOS Steering Committee
GTOS	Global Terrestrial Observing System
GTS	Global Telecommunications System (of WMO)
GTSPP	Global Temperature-Salinity Profile Programme
HAB	Harmful Algal Blooms
HOTO	Health of the Oceans
HOTS	Hawaii Ocean Time Series Station
IAEA	International Atomic Energy Agency
IBTS	ICES International Bottom Trawl Survey
ICES	International Council for the Exploration of the Sea
ICSU	International Council of Science
IEPB	IGOSS Electronic Products Bulletin

IFREMER	Institut français de recherche pour l'exploitation de la mer
IGBP	International Geosphere-Biosphere Programme
IGOSS	Integrated Global Ocean Services System
IGOS	Integrated Global Observing Strategy
I-GOOS	Intergovernmental Committee for GOOS
IIAG	Interim Implementation Advisory Group
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOC-EC	Intergovernmental Oceanographic Commission Executive Council
IOCARIBE	IOC Sub-Commission for the Caribbean and Adjacent Regions
IOCCG	International Ocean Colour Co-ordination Group
IODE	International Oceanographic Data and Information Exchange
IOS	Initial Observing System
IPCC	Intergovernmental Panel on Climate Change
IUG	International Union of Geographers
JAFOOS	Joint Australian Facility for Ocean Observing Systems
JAMSTEC	Japan Marine Science and Technology Centre
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
J-DIMP	Joint Data and Information Management Panel
JEB	JCOMM Electronic Products Bulletin
JGOFS	Joint Global Ocean Flux Study
LME	Large Marine Ecosystem
LMR	Living Marine Resources
LOC	Local Organizing Committee
LOICZ	Land-Ocean Interactions in the Coastal Zone
LUCC	Land Use and Cover Change Programme
MedGOOS	Mediterranean GOOS
MONBUSHO	Japanese Ministry of Education and Science
MSS	(Expert Team) on Maritime Safety Services
NAML	North American Marine Laboratories Network
NAO	North Atlantic Oscillation
NASA	National Aeronautics and Space Administration (USA)
NEAR-GOOS	N. E. Asian Region GOOS
NGCCs	National GOOS Co-ordinating Committees
NGOs	Non-Governmental Organizations
NIO	National Institute of Oceanography (India)
NOAA	National Oceanic and Atmospheric Administration (USA)
NODC	National Oceanographic Data Centre
NSF	National Science Foundation (USA)
ODINAFRICA	Ocean Data and Information for Africa
OECD	Organization for Economic Co-operation and Development
OGP	Office of Global Programmes (of NOAA)
OOPC	Ocean Observations Panel for Climate
OOS	Ocean Observing System
OOSDP	Ocean Observing System Development Panel
PACSICOM	Pan African Conference on Sustainable Integrated Coastal Management
PICES	North Pacific Marine Science Organization
PIRATA	Pilot Research Array in the Tropical Atlantic
POGO	Partnership for Observation of the Global Ocean
RAMP	Rapid Assessment of Marine Pollution
SAHFOS	Sir Alister Hardy Foundation for Ocean Sciences (UK)
SAR	Synthetic Aperture Radar
SBSTA	Subsidiary Body for Scientific and Technological Advice
SEA-GOOS	Southeast Asian GOOS
SEAWIFS	Sea-Viewing, Wide-Field-of-View Sensor
SECAMP	S. E. Asia Centre for Atmospheric and Marine Prediction
SIO	Scripps Institute of Oceanography (University of California, USA)

SOA	State Oceanic Administration (China)
SOC	Southampton Oceanography Centre
SOOP	Ship-of-Opportunity Programme
SST	Sea Surface Temperature
TAO-IP	Tropical Atmosphere Ocean Array Implementation Panel
TEMA	Training, Education and Mutual Assistance programme (IOC)
TOGA	Tropical Ocean Global Atmosphere Research Programme
TOPEX	Typhoon Operational Experiment
TORs	Terms of Reference
UNCED	United Nations Conference on Environment and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme
UNISPACE	United National Conference on Outer Space
VOS	Voluntary Observing Ship
WCRP	World Climate Research Programme
WESTPAC	IOC Sub-Commission for the Western Pacific
WGNE	Working Group on Numerical Experimentation
WHOI	Woods Hole Oceanographic Institution (USA)
WIOMAP	Western Indian Ocean Marine Applications Project
WMO	World Meteorological Organization
WOCE	World Ocean Circulation Experiment
XBT	Expendable Bathythermograph