Restricted distribution

IOC/EC-Ext.1/Inf. 1
Paris, 28 September 2001
Original: English

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

Extraordinary Session of the Executive Council
Paris, 10-11 December 2001

Sustainable Development and the Intergovernmental Oceanographic Commission of UNESCO
Draft

A document for the World Summit on Sustainable Development
Johannesburg, November, 2002

Draft

Sustainable Development and the Intergovernmental Oceanographic Commission of UNESCO

A document for the World Summit on Sustainable Development

Johannesburg

November, 2002

Foreword

The Intergovernmental Oceanographic Commission of UNESCO and Sustainable Development

History may recognise the year 1992 as an important milestone in the evolution of the human race on the planet. It was the year that governments assembled at Rio de Janeiro, for the United Nations Conference on Environment and Development (UNCED), to begin the discussion on how to reconcile the demands of the present with the hopes for the future. It was an early round in a continuing debate in which there will be many more points of view to be heard and many more demands to be addressed. The Conference produced an important document, Agenda 21, which has since served as a standard against which progress can be measured. Ten years later, in Johannesburg, 2002, governments are again meeting at the World Summit on Sustainable Development (WSSD), to look at achievements and failures, and to take action on future policies and programmes.

Chapter 17, of Agenda 21, deals specifically with the ocean. The ocean deserves a special place when speaking of sustaining the environment in which we live and of the resources needed to develop the well being of all peoples. The ocean is unique in occupying the greatest portion of the planet's surface. The ocean is necessary for the air we breathe, the water we drink, the food we eat and the climate in which we live. The ocean is both a global commons and a global responsibility.

No country has the necessary resources to study and monitor the whole ocean and many countries lack the capacity to address even their own near shore areas. In addition, in 1994, the UN Convention on the Law of the Sea came into force, recognising the concept of the global commons, but also bestowing on coastal states jurisdiction of the sea out to 200 nautical miles, and for seabed resources, potentially even further. The promise of future offshore wealth is tempered by the onerous undertaking to manage and protect these waters. This is particularly difficult for the developing world.

Relatively, little is known of the ocean environment. It is complex and inaccessible. It is difficult and expensive to study. It is complicated by national and international jurisdictions, regional and global agreements and conflicting priorities. It is also an essential part of the planetary environment, on which we all depend, and collectively governments must do more to address their responsibilities in ocean stewardship.

This document gives examples, and describes in simple language, what one small United Nations organization, namely the Intergovernmental Oceanographic Commission of UNESCO, has accomplished since UNCED and what it will be attempting in the next decade.

Contents

1. Introduction to the IOC

1.1 The context

> *"The oceans are a global commons and as such require an integrated approach by governments"*
> *Extract from an IOC message to the Commission on Sustainable Development (CSD 7)*

The World Ocean represents a unique global commons and a vital life support system for humanity in the twenty-first century. It is arguably the most bountiful and yet the most threatened natural resource of the planet.

The interaction of the ocean with the atmosphere, on time scales from days to millennia, is a major determinant of the world's weather, climate, air quality and freshwater supply. The ocean provides the primary mode of transportation of natural resources and manufactured goods between nations and is crucial to economy and trade. The full extent of its living and non-living resources is as yet undetermined.

Three quarters of the earth's surface consists of ocean, a large portion outside national jurisdiction and thus part of a global commons. The very size of the ocean belies its vulnerability. On the other hand, the value of its benefit to the global community belies the extent to which it has yet to be properly observed and understood.

Since 1992 there have been significant changes in the political and legal regime relating to the oceans. In 1994, the long awaited UN Convention on the Law of the Sea came into force. Most of the attention has been focused on the extension of national jurisdiction that the law bestows on coastal states. Much less has been paid to other articles, such as those dealing with responsibilities for the marine environment, capacity building and intergovernmental Co-operation.

In 1996, governments agreed on a global plan of action, backed up by national plans, to address the protection of the marine environment from the wastes generated on land. The Washington Agreement recognises the pollution problems caused by the agricultural and industrial wastes that flow into the sea in rivers and those that are discharged directly into coastal waters.

The United Nations declared 1998 as The International Year of the Oceans, which promoted many activities from local to global levels, from school programmes to national action and to important international and intergovernmental initiatives. Part of this impetus fuelled action at the UN General Assembly, which accepted a recommendation from the Commission on Sustainable Development to adopt an informal consultative process that would give more visibility to ocean issues at the highest level of that organization. This process has been in place since 1999. Concurrently, the Secretary General has called for greater Co-operation amongst the UN organizations dealing with the ocean.

Any task dealing with the ocean demands intergovernmental co-ordination. The Intergovernmental Oceanographic Commission of UNESCO is uniquely placed to play a pivotal role in many of the needed areas of action.

1.2 The organization

The Intergovernmental Oceanographic Commission was established under the auspices of UNESCO in 1960 to provide the Member States of the United Nations with an essential mechanism for global Co-operation in the study of the ocean. Its mandate contained the added responsibility of serving as a mechanism for co-ordination of ocean science amongst all the UN agencies and programmes with responsibility for marine affairs.

The IOC has its own Statutes, Member States (currently 128), Executive Council and elections. In 1987, the Twenty-fourth Session of the General Conference provided the IOC with functional autonomy within UNESCO. The latest revision of the Statutes occurred in November 1999, to recognise the evolution of IOC responsibilities to address ocean and coastal sciences, information services and management.

In simple terms, the IOC assists governments to address their individual and collective ocean and coastal problems, through the sharing of knowledge, information and technology and through the co-ordination of national programmes. An essential part of all IOC activities is the facilitation and support of the efforts of developing countries to participate effectively, and on an equal basis, in marine issues. The IOC provides a focus for other UN specialised organizations working together on ocean related science based responsibilities.

> *"The purpose of the Commission is to promote international cooperation and to coordinate programmes in research, services and capacity building, in order to learn more about the nature and resources of the ocean and coastal areas and to apply that knowledge for the improvement of management, sustainable development, the protection of the marine environment, and the decision making processes of its Member States."*
> *Article 2 , IOC Statutes*

1.3 The future

The governments of the world have advanced sustainable development principles over the last ten years, but much remains to be accomplished. The increasing population and demand for resources will not diminish in the near to medium future and therefore pressure on marine and coastal environments will not abate. Governmental action will continue to be the driving force behind needed changes, including intergovernmental efforts to address regional and global issues.

The knowledge required for the wise management of marine resources and the information necessary to apply that management will arise mainly from the collective wisdom of governments working together. Accurate and co-ordinated reports of the state of the ocean and coastal waters can only be achieved through governmental action. The governments in their turn need the support of the electorates, which implies awareness of the issues by the public and an acceptance and ownership of responsibility by industry.

The IOC has been faced with increasing demands in the past and there is no sign that this trend will diminish in the next ten years. The ability of the IOC to respond to issues is improving. Many of its programmes in data exchange, ocean observations, science, coastal management and marine environmental quality have reached a stage where the results are directly benefiting society. Finding the resources to take full advantage of opportunities and to increase the capacity and capability of all countries to participate in these advances, will be a major challenge. This challenge applies equally to the funding of national activities and

actions as the programmes of the IOC are built on the collective contributions of its Member States.

2. Integrated coastal area management

2.1 Managing coastal environments

In 1997 the IOC established a programme specifically directed at the management of coastal environment and coastal activities. The action was a direct reflection of the high priority given by governments to coastal issues and further amplified by the new management responsibilities within extended offshore jurisdictions.

The range of issues within the vulnerable coastal areas of the world is enormous. Co-operative efforts must also recognise the sensitivity of national jurisdictions and the many other regional and international organizations carrying out specific responsibilities. The IOC programme has therefore focused on building the capacity to tackle the problems of monitoring changes in the coastal environment, of sharing and accessing information, of bringing together the different sciences involved and using these to develop ways of managing coastal activities in a sustainable way.

The shallow coastal waters are an important part of the marine ecology, providing food and habitat to a large part of the commercial fish stocks and a home for the growing mariculture industry. Threats to the ocean environment will also be first evident on its margins and therefore monitoring these waters should be a priority. The ocean observing system being managed by the IOC has recognised the value of coastal observations, both for their value in monitoring change and for the resulting information upon which day to day coastal management can rely.

> *"The coastal area contains diverse and productive habitats important for human settlements, development and local subsistence. More than half the world's population lives within 60 km of the shoreline, and this could rise to three-quarters by the year 2020. Many of the world's poor are crowded in coastal areas. Coastal resources are vital for many local communities and indigenous people. The exclusive economic zone (EEZ) is also an important marine area where the States manage the development and conservation of natural resources for the benefit of their people. For small island States or countries, these are the areas most available for development activities"*
> *Agenda 21: 17.3*

Although states have jurisdiction within their coastal areas and adjacent seas, they share many of the same problems, have the same regional priorities and a need to understand the common global processes that affect their shores and environments. The intergovernmental Washington Agreement relates to the control of marine pollution from land-based activities. Other needed areas to address are coastal habitat loss, the protection of coral reefs, the monitoring of coastal health, the availability of information and effective coastal management mechanisms.

2.2 Coastal protection

The ocean interaction with the coastline is not always beneficial. In some areas coastal erosion is a severe problem, in others the converse problem of keeping ports and navigational channels free from sedimentation is more prevalent. Safety of life and property from storm waves and surges and from the more rare but devastating tsunamis is also of high priority in many coastal communities. The United Nations has sponsored a decade of study into

mitigating the impact of natural disasters. The IOC has been involved in the forecasting and monitoring of natural catastrophes arising from ocean forces, especially because of the continued development of vulnerable coastal areas.

The IOC has a long-standing and successful programme in the Pacific Basin, which facilitates an intergovernmental programme to warn of, and mitigate the impact of, tsunamis. Although the programme has been centred on the Pacific for many years, there is of course no special regional significance to this, beyond the proneness of the region to earthquakes and hence to potential tsunami generation. Much of the research into the movement of these waves is also applicable to storm surge propagation. Recently other regions have been requesting the IOC to pay more attention to the forecasting of tsunami and storm surges in their respective areas.

3. Marine environmental protection

3.1 The health of the oceans

The fight against marine pollution has been an issue confronting the IOC from the very first years. Together with other UN organizations dealing with ocean issues, the IOC formed a group of experts to look at the science needed to combat marine pollution. The members of this group are chosen on their individual merit and come from all over the globe. The group has published a large number of learned documents covering specific and general studies of all aspects of marine pollution. Perhaps the best known of these reports has been the series on the "State of the Ocean". The latest, entitled "Sea of Troubles", was recently released.

> *"Degradation of the marine environment can result from a wide range of sources. Land-based sources contribute 70 per cent of marine pollution, while maritime transport and dumping-at-sea activities contribute 10 per cent each. The contaminants that pose the greatest threat to the marine environment are, in variable order of importance and depending on differing national or regional situations, sewage, nutrients, synthetic organic compounds, sediments, litter and plastics, metals, radionuclides, oil/hydrocarbons and polycyclic aromatic hydrocarbons (PAHs). Many of the polluting substances originating from land-based sources are of particular concern to the marine environment since they exhibit at the same time toxicity, persistence and bioaccumulation in the food chain."*
> *Agenda 21: 17.18*

The IOC has also addressed the problems of setting standards against which to measure contaminant levels. It has co-ordinated research on marine contaminants, held workshops and training sessions and facilitated the transfer of knowledge and technology dealing with marine pollution.

The global ocean observing programme of the IOC also has a component looking at the health of the oceans. In order for such an element of the programme to be effective, plans have to be developed and methodologies and techniques agreed upon for the measurement of specified chemicals. This has been accomplished and the implementation of the programme has begun.

By far the largest proportion of marine pollution is contributed by land-based activities, a fact that has been recognised by governments in the signing of the Washington Declaration in 1995. The IOC contributed to the effort leading to the Declaration and is now assisting with the assembly of information under the agreement, particularly in the areas of nutrients and sediments. A number of regional marine environmental assessments are also being prepared for the purposes of the associated global programme of action.

4. Sustainable use and conservation of marine living resources

4.1 A broader approach to fisheries management

Fisheries managers are generally being faced with depleted stocks of commercial fish. As traditional species diminish the fishing industry looks to new species to harvest. Management practices now look to an ecosystem approach that recognises the interdependence of species and the need to understand the total environment. The IOC programme addressing living resources is consistent with this approach.

The IOC, in partnership with its advisory partners is concerned with how the environment influences the productivity of commercially important fish stocks and how we can detect relevant changes. The anticipated outcome will be a framework to understand the role of the environment in fish stock fluctuations, and how measurements can be incorporated into management procedures, both regionally and globally.

Considering the importance of small pelagic fishes to the economies of many coastal developing states, the IOC has offered to host a synthesis/training office to consider the impact of climate change on these fish stocks.

Through a series of symposia, conferences and workshops, a total of 58 coastal countries in Africa, Asia, Latin America and Eastern Europe reached national and international agreements to proceed with the planning and implementation of projects aimed at the monitoring and assessment of large ecosystems. The Global Environment Facility has provided over $45m for these projects, with an additional $75m pending. It is recommended that the IOC Secretariat help foster collaboration between the GEF projects and fundamental large-scale marine research underway or planned in the same regions.

> *"Over the last decade, fisheries on the high seas have considerably expanded and currently represent approximately 5 per cent of total world landings. The provisions of the United Nations Convention on the Law of the Sea on the marine living resources of the high seas sets forth rights and obligations of States with respect to conservation and utilization of those resources" Agenda 21: 17.44*

4.2 Stemming the red tide

The IOC has programmes that assist in the resolution of coastal problems important to inshore fisheries. There has been a noticeable increase in the occurrence of red tides, so called because the presence of large quantities of minute but toxic marine plants that often cause the sea to appear red. These harmful blooms can lead to fish kills and render seafood dangerous to eat. The increase has been attributed to a variety of factors, such as rising water temperatures, increased pollution of coastal waters and the transfer of new species. The cause may be any or all of these. To combat the effects, the IOC has set up centres to assist governments to detect and predict these occurrences, thus avoiding loss of life and protecting investments. The initiative has received accolades from many sources for its work on the identification and monitoring of toxic species. In addition, due to the global extent of the problem, the IOC has joined with international and intergovernmental partners to study the relation of these blooms to the ocean environment and marine life.

4.3 Monitoring coral reefs

Coral reefs form one of the most beautiful and fragile habitats in the world. Concern over the health of these natural wonders has been growing in recent years and a programme to monitor changes is in place. The most significant threat continues to be from elevated sea surface temperature, which causes coral to whiten and die, the so-called "bleaching" effect. A status report in 1998 documented massive bleaching, particularly in the Indian Ocean and Southeast and East Asia, with major shifts noted in the marine life composition on many reefs. Two years later the situation was still declining, with an estimated loss of 11% of the world's reefs, and a further 16% not fully functional. There is evidence that some recovery has occurred in parts of the Indian Ocean and East Asia, but it may be years before it will be known if the reefs will fully recover.

The monitoring of corals is important as the degradation of coral reefs affects local economies as well as marine life. Many coastal communities depend on the healthy corals for their livelihood, through such activities as coral harvesting, fishing and tourism. Understanding human communities and their social and economic conditions and motivations, associated with reef use, is becoming a major focus within the coral reef monitoring community. In 2000 the monitoring network assisted with the publication of a "Socio-economic Manual for Coral Reef Management". The manual is intended to help reef managers understand and conduct baseline socio-economic assessments of coral reef stakeholders, which will complement the marine information already being collected. Training courses, using this manual have been conducted in South Asia and East Africa, and are being planned for Southeast Asia and the Caribbean. Support from national funding agencies has allowed training to be conducted in socio-economic monitoring techniques, and enabled several demonstration sites to be established. Regional Co-operation is being encouraged to address common issues.

5. Acquiring knowledge and information to predict and manage changes in the marine environment

5.1 The ocean and global warming

The ocean plays a major role in the shaping of the Earth's climate. One of the important ways it does so is by storing carbon, an element essential to life and an important player in global warming. Human activities, such as the burning of oil and gas or the conversion of forests into farmland, release about 6-7 metric tons of carbon into the atmosphere every year in the form of carbon dioxide. The increase of carbon dioxide, and smaller quantities of other gases in the atmosphere, is contributing to the "greenhouse" effect that prevents heat escaping into space. Only about half of the carbon released remains in the atmosphere. The rest ends up in the

> *"The marine environment is vulnerable and sensitive to climate and atmospheric changes. Rational use and development of coastal areas, all seas and marine resources, as well as conservation of the marine environment, requires the ability to determine the present state of these systems and to predict future conditions. The high degree of uncertainty in present information inhibits effective management and limits the ability to make predictions and assess environmental change. Systematic collection of data on marine environmental parameters will be needed to apply integrated management approaches and to predict effects of global climate change and of atmospheric phenomena, such as ozone depletion, on living marine resources and the marine environment. In order to determine the role of the oceans and all seas in driving global systems and to predict natural and human-induced changes in marine and coastal environments, the mechanisms to collect, synthesize and disseminate information from research and systematic observation activities need to be restructured and reinforced considerably"*
> *Agenda 21: 17.96*

ocean or in plants and soil on land. However, the ocean contains about 50 times more carbon dioxide than either the air or the land. It is important to know what happens to the carbon in the ocean. Will the ability of the ocean to absorb excesses of carbon dioxide in the atmosphere continue, or is there a limit to this capacity?

In order to tackle the question of what happens to the carbon in the ocean a major effort, involving many countries, was mounted over a ten years period. The IOC was one of the organizations assisting with the massive observational and research effort required. Most of the carbon in the ocean is stored in the deep waters and in sediments on the sea floor. How, and how quickly, it is removed from the surface is important to what happens in the atmosphere. One route is through a process scientists call "the biological pump". The small plants that live at the ocean surface use the carbon dioxide to grow, then the organisms that feed on them produce particles as they die or excrete material. During the time it takes for the material to sink to the ocean, it may be eaten or decomposed by bacteria in the deep waters.

Thanks to these efforts we now have a much clearer idea of how the ocean contributes to the processes affecting global warming. We know that the disciplines of geology, chemistry, biology and physics all have to be combined to understand the global processes involved. Scientists from different countries co-operated with cruises, moorings, satellite sensors and research facilities to tackle the questions posed. We have learned that less than 1 % of the carbon, taken in by plants at the sea surface, is finally trapped in the sediments on the sea floor. We also know the reasons for the dramatic changes in the productivity of the ocean surface waters and the role of the nutrients and trace elements that fuel this growth.

One of the goals of the ten-year research effort was to use the knowledge gained from field studies to generate computer models to predict changes well into the future. Models expand the application of information into much greater time and spatial scales than can be covered by actual measurements. The next challenge will be for governments to use the knowledge gained in support of sound policies for protecting the environment and sustaining human resources.

5.2 The ocean and climate change

For the past many years the study of the role of the oceans in climate change has been a priority for the IOC. The Commission has joined with the World Meteorological Organization and others to sponsor a world climate research programme and of course paid particular attention to the ocean studies related to climate. Even without a research fleet of its own, the Commission can facilitate the efforts of its member states in co-ordinated global programmes directed at common objectives. One of these co-operative programmes was the largest oceanographic research venture ever conducted. The data collection phase lasted from 1987 to 1997. The aim was to understand the circulation of the world ocean. It took the combined efforts of research ships, moored and drifting buoys, satellites and many research and analytical laboratories from nearly 30 countries, to collect all the information required. Throughout the time of the experiment, the ocean was criss-crossed by research ships following predetermined courses designed to yield the maximum information about ocean currents. The programme was directed out of an international project office in the United Kingdom, which co-ordinated the research and data flow. Scientists are now tackling the next phase, which consists of analysing the data and developing computer models to explain the results.

Following this massive experiment, the IOC and its partners are looking at a continuation of more detailed research to look at the relationship between the ocean and weather variation. This new study is aimed at developing far more accurate long-term predictions of weather that will be of great economic value to agriculture, forestry, living and non-living resource industries and governments. The IOC needs also to be involved in longer-term more strategic research in ocean climate related to human-induced climate change.

5.3 The ocean and weather variations

As knowledge is acquired on weather and climate prediction, it should automatically be folded into the forecasting and prediction networks and models. The IOC clearly has an important role to play in this process in collaboration with the meteorological community.

In the last decade the term El Nino has become widely known and associated with dramatic swings in regional weather patterns, affecting the economy as well as the life and health of a great many people around the world. The occurrences of El Nino are a direct result of the interaction of the atmosphere and ocean over the tropical Pacific Ocean. Over the past many years, governments have been co-operating in programmes to understand and predict these occurrences. A network of monitoring stations, that operate year round, has now replaced the original research observational system. The present system is part of the global observation programme established by the IOC. Through the observations and the analysis of the data, governments will now receive warnings of impending El Nino episodes months in advance of weather changes. Governments can use this information to take action to mitigate the impact of potential droughts, floods and other extremes on agriculture, water usage, fisheries management and many other weather and climate dependent activities.

An array of moored buoys is maintained in the tropical Pacific to complement observations from satellites, research ships and other sensors. The operation of this warning system is expensive and is shared by several countries. The intergovernmental programme allows the results from the contribution of individual governments to be shared by all. Despite the global benefit from this programme, vandalism and theft of equipment from the buoys still represent significant problems faced by the governmental operations.

Despite the publicity and visibility of El Nino, scientists know that other major interactions between ocean and atmosphere exist and also impact on global weather patterns. It is the ocean that provides the greatest reservoir of heat for the atmosphere and without the inclusion of the ocean into the predictive models, long-term forecasting of weather is impossible. The IOC, in partnership with the World Meteorological Organization, supports science and observational programmes that address the role of the ocean and atmosphere. Once these processes have been studied and understood, seasonal predictions of temperature, floods and drought could become common place.

5.4 Ocean observations

There have been few programmes that have attracted the attention that has been given to the development of a global ocean observing system. It has achieved high priority within the IOC, because of the breadth of its uses, in climate, living resources, ocean health and coastal management. It has been successful within the IOC, because the programme is dependent upon intergovernmental Co-operation and also because of the obvious need for such a system

to underpin all aspects of ocean science and services. The importance of the system was recognised in Rio in 1992 and has made great progress over the last ten years.

It is accepted that the development of a truly global system will take many years to achieve. The system development has been planned to build on existing capabilities and networks and to develop in regional areas where specific priorities can be identified and resolved. Countries in many of the marginal sea areas around the world have already adopted regional observing systems to respond to regional needs and priorities. The global programme will cooperate with these regional initiatives and with other governments to investigate technologies and methodologies, to improve the effectiveness and efficiency of ocean measurement and monitoring systems and to build capacity and capabilities in developing countries in order for them to contribute and benefit. The greatest advances and the largest benefits are still to come.

The global environment is a continuum and needs to be addressed as such. A global monitoring programme for the oceans cannot operate successfully in isolation or independently of similar programmes observing other parts of the environment. The ocean observing system is co-ordinated with other observing systems in other agencies and organizations. It is recognised as being the ocean component of the climate observing system hosted by the World Meteorological Organization and as such receives visibility in intergovernmental negotiations on climate change and greenhouse gas emissions. The IOC sponsors joint expert panels, with the other global monitoring systems for the land and atmosphere, on the management of data and the use of satellite information. The growing contribution from earth observation satellites to ocean monitoring is recognised through an IOC partnership arrangement with a committee of agencies and organizations operating space borne vehicles. The oceans has been one of he themes studied by the committee, which is co-ordinating and planning the use of satellites for earth observation, to ensure the usefulness and continuity of future missions.

It is often difficult to separate the mandate of the IOC to deal with the ocean surface from that of the marine weather related requirements of the meteorological community. The IOC and the World Meteorological Organization have co-ordinated their activities in this field for many years, but have recently undertaken a major strengthening of this co-operation through the establishment of a joint Technical Commission. This commission will combine the long-standing expertise of the weather services in providing up to the minute forecasts with the knowledge and information from ocean sources that will improve the accuracy and breadth of predictions.

Ocean observations themselves are evolving from the traditional and laborious measurements from research vessels to continuous data from automated instruments. Up until now, there has been insufficient data from the sea surface and below, to be able to generate computer models capable of giving an accurate and continuous picture of what is happening. A bold new project is taking place that will entail the contribution of 3000 floats that will continuously cycle throughout the ocean depths, periodically surfacing to send their collected data through satellites to a data centre. This project will demonstrate the feasibility of forecasting ocean processes. The future will see the provision of up to the minute ocean information services, using data from all types of observations whether these originate from research vessels, from automated moored or drifting buoys, from satellites or from any other source.

5.5 Ocean data and information

One of the earliest activities of the IOC was the programme established forty years ago to facilitate the exchange of oceanographic data and to meet data management needs. The resulting data system forms a global network of national ocean data centres, some of which act as regional or global centres for specific tasks. Representatives attending data planning meetings are usually Directors or experts from these national centres giving the deliberations substance and guaranteeing the implementation of decisions made. The number of such centres is approaching seventy, which is a high proportion of the active Member States of the IOC. The system provides worldwide access to millions of ocean measurements and observations, for which the IOC has been a strong proponent for the international formats and standards necessary to facilitate their exchange and use. Technical assistance for marine data management and information services is in high demand as most ocean management and policy issues are based on the availability of adequate data. Full and open sharing of a wide range of data sets for ocean programmes, for the benefit of all countries, is a basic objective for the IOC. An intergovernmental working group is in the process of developing a new set of principles and a policy for oceanographic data exchange that can be adopted by all Member States.

Understanding climatic and long time changes in the ocean is essential to the prediction of what will happen in the future. To do this scientists need access to data collected in years gone by, but many of these old and valuable data sets are stored on paper records and lying forgotten on office shelves. The IOC data system has launched a programme termed "an archaeological search and rescue mission" resulting in an impressive increase in the number of data profiles available. Fifty countries have taken part in this continuing, high priority activity.

The IOC data programme was originally established to handle archived ocean data. In the early days of oceanography, all data was hand collected and taken to the laboratory to be calibrated and quality checked before becoming available for exchange. This meant that the data handled by the system could be many years old. Some years later, the IOC established a new programme to handle the growing requirement for data being transmitted immediately or within a relatively short time of being taken. Over the years, as more observations became automated and new technologies contributed increasing amounts of immediately available data, the distinction between the real time and archived data has diminished. End-to-end management of data from observation, through quality control to final archive and use, will be eventually the norm for all types of data. At present it has become a reality for ocean temperature and salinity measurements, which are now continually improved and up-dated through the addition of both new data from observations and archives. These continuously revised data sets are available through the IOC system to scientists and institutions around the world.

The programme has recognised the emergence of the information age and responded with actions, using advanced technologies, to ensure users can have access to ocean data and information. Many ocean data centres now use the Internet to provide direct access to their data and information holdings. In addition to these electronic libraries, the IOC has developed or supported several information tools. There is a website and an electronic global directory providing information on thousands of marine and freshwater professionals. There is a system to guide users to where data can be found, a comprehensive inventory of thousands of ocean related websites and much more. The aim is to maintain the IOC data

system as the world authority for ocean data standards and to move forward with the information age. It is expected that new developments in computer technology and methods will allow the exchange of data between centres to be made easier and that this increased access will generate closer and more useful co-operation between and amongst governments

The data exchange programme has always paid close attention to capacity building activities. Perhaps some of the greatest achievements have taken place in Africa where partnership with donor agencies has allowed the programme to develop networks of ocean data and information exchange in Africa. Already 20 African countries are being assisted to develop and operate national ocean data and information centres. These centres can then promote themselves at the national level to provide valuable data and information services to their governments, industry and the general public.

5.6 Sea level rise

One serious consequence of global warming is the threat of sea levels increasing due to the thermal expansion of the water and contributions from melting glaciers. Although the amount of this rise over the next 100 years is still a matter of debate, even a one-meter increase in sea level could threaten the existence of some small island countries or the inhabitants of low lying coastal lands. Measuring sea level, both that of the tidal variation and the long-term trend, is an activity, vitally important to the shipping industry and to coastal engineers. The IOC co-ordinates a system of international networks for reporting regional and global sea levels. In addition to the observational and archival data activities, the programme offers training courses, develops methodology and shares technological advances to improve the universal availability of this important information.

6. Strengthening international and regional, cooperation and coordination

6.1 Regional bodies of the IOC

The role of the regional bodies is twofold, to facilitate participation of regional Member States in the IOC global programmes, and to address the identified regional programme priorities of the Member States. The IOC has six major regional bodies with regional programme responsibilities in the geographic areas of the Western Pacific, the Caribbean, the Indian Ocean and the Western Indian Ocean, the Eastern Atlantic and the Black Sea.

> *"It is recognized that the role of international cooperation is to support and supplement national efforts. Implementation of strategies and activities under the programme areas relative to marine and coastal areas and seas requires effective institutional arrangements at national, subregional, regional and global levels, as appropriate".*
> *Agenda 21: 17.115*

In addition, the IOC has specific programmes in other regions – the Southeast Pacific, Southwest Atlantic, the Mediterranean Sea, the Red Sea/Gulf of Aden and the Caspian Sea. The strain on IOC resources to maintain these regional programmes has been substantial.

The implementation of IOC programmes through the collective efforts of its Member States has always been a central theme for the IOC. A complementary belief has been that more effective and efficient use of funds can be obtained through a regional approach. These twin approaches will continue, although there are associated difficulties and the history of

delivering regional activities has shown mixed results. Out-posting of regional staff has to be balanced by a reduction at the centre, because the total complement of the IOC Secretariat is fixed. The benefits arising from having a regional office are often offset by the concurrent strain placed on the central secretariat. On the other hand, providing secretariat support from headquarters negates much of the benefit of achieving a regional focus. Generating resources from regional countries to supply secretariat support is difficult without first demonstrating to governments the benefits of regional co-operation. Regional Member States have supplied office and administrative support, but obtaining professional expertise is more difficult. The IOC will continue to address ways of obtaining additional support to generate and improve the regional programmes and benefits.

A substantial part of the capacity building activities is implemented in the regions. The IOC is considering ways of providing a better structure for articulating the collective needs of regional Member States, so that the priorities reflect the real regional needs. There is now sufficient indigenous capacity in several regions to identify priorities, programmes and projects. It is to be expected that, with this direction and with the partnership of the regional countries themselves, a greater flow of resources for marine sciences will be precipitated from the donor community. Mutual assistance will be an important priority in addition to external support and funding.

Many regional ocean agreements exist that have not been implemented to their full potential. The benefits from increased capacity, reduced costs and effectiveness of joint monitoring programmes and co-operation in regional environmental and resource management, seemingly obvious, have been neglected. For most activities, the basic requirement is for shared knowledge and information that is reliable and upon which decisions can be made. The IOC should be able to contribute to the future success of agreements such as the conventions, protocols and partner programmes of the UN Environment Programme's Regional Seas Action Plan.

6.2 Partnership with other organizations

The IOC has been designated the focal point for several co-operative arrangements related to the oceans. It provides the secretariat of an intersecretariat committee on scientific programmes related to oceanography. This is a long-standing co-operative arrangement that has languished in recent years, but has the potential to increase the interaction between the different elements of the United Nations that deal with ocean activities. A second and currently more powerful inter-secretariat committee is a sub-committee on oceans and coastal areas, for which the IOC provides both the secretariat and chair. This mechanism has been charged with the function of task manager for the ocean actions under Agenda 21. As such, it has to report to the UN Commission on Sustainable Development on the follow-up activities. Although this is a visible and responsible role for the IOC, it also carries a heavy workload, especially with regard to the reporting role to the UN General Assembly via the new informal consultation on oceans and the 2002 World Summit on Sustainable Development. The IOC has a real role to play in the stated aim of the General Assembly to achieve co-ordination amongst the UN organizations concerned with ocean issues, especially with regard to ocean science and observations.

Partnerships are absolutely essential to the work of the IOC. They are an effective way to avoid overlap and to increase the capacity of the organization. The administration of agreements places demands on the workload to be carried by the Secretariat, but such

partnerships cannot be ignored or poorly serviced if they are to be successful. The many United Nations specialised agencies dealing with the oceans are obvious partners in joint programmes, but other national, regional and international organizations are also involved in co-operative arrangements. The types of arrangements vary enormously, including advisory bodies, bilateral and multilateral co-ordinating bodies, memoranda of understanding, inter-secretariat bodies, interagency arrangements, co-sponsorship and co-operative programmes.

The IOC has signed Memoranda of Understanding with many non-governmental organizations dealing with the oceans. These can cover co-operative activities for individual projects, for short or extended programmes or for continuing co-operation on matters of advice and mutual collaboration. Arrangements are also made, where necessary with research institutes, laboratories or even with government departments and agencies, where these are mutually beneficial to the IOC programme and the partner concerned. Of course each co-operative arrangement demands a certain level of support from the Secretariat and one difficulty is to maintain the impetus for such arrangements when the initial programmes have terminated or the original rationale has changed.

One of the closer relationships for the IOC is with the other science activities of UNESCO, which include programmes in geology, hydrology, ecology and the social sciences. These UNESCO programmes and the IOC have co-operated in discussions of joint multidisciplinary and issue-oriented initiatives. The Chair of the IOC and the Chairs of the other science programmes now meet biannually, to develop a joint statement that is delivered to the General Conference of UNESCO. The statement provides an opportunity for the programmes to make a collective review of science within UNESCO and to suggest actions for consideration of UNESCO Member States.

6.3 The Law of the Sea and other intergovernmental conventions and agreements

Intergovernmental negotiations can only successfully proceed when the basic understanding of the subject under discussion is shared and accepted. Once implemented, there will be an ongoing need for knowledge and information as agreements and conventions typically include provisions for auditing subsequent actions and procedures for settlement of disputes when there is an actual or perceived transgression. The requirement for understanding and monitoring exists therefore from the opening governmental discussions of these arrangements, through to their implementation and continued operation. For a global commons such as the oceans, the need for intergovernmental agreements and conventions is fundamental and the concurrent requirement for basic knowledge and information essential.

In 1994, the UN Convention on the Law of the Sea came into force. The IOC is recognised in the Law of the sea Articles as a "competent international organization". Although the negotiated text has been in existence for many years, the responsibilities given and implied for the IOC are still new and are subject to continued debate within its governing bodies. The Law of the Sea articles cover fishing, shipping, seabed mining and other activities and responsibilities for ratifying countries in a very general way. The articles will provide the framework within which more detailed conventions and protocols will evolve as necessary, for example the recent negotiated UN Fisheries Agreement. The IOC will be particularly concerned with the articles on marine pollution, capacity building and on the conduct of marine research in the extended economic zones of coastal states.

In addition to the Law of the Sea, the IOC has to address its responsibilities for marine knowledge and information to many other conventions. The ocean makes a huge contribution to the world climate and no accurate predictions of global or regional climate change can be made without taking this into account. The IOC therefore has a part in the description of climate change under the Framework Convention on Climate Change and also in the negotiations on carbon tax credits if the oceans are considered for carbon dioxide disposal in the future.

The Convention on Biological Diversity is an important agreement to sustain the genetic pool of the planet. It has been postulated that marine species make up the largest proportion of the world total. The truth is that not enough is known, especially from the deep ocean, to justify that statement. Certainly, the deep ocean is yielding species of life not even contemplated a few decades ago. The IOC is co-operating on a census of marine life project.

The number of global, regional, international and intergovernmental conventions and agreements on the ocean are too numerous to list. Examples are the Washington Declaration on Protection of the Marine Environment from Land-Based Activities, the London Convention (1972), the MARPOL Convention, Regional Sea Agreements, and many Fishery agreements and arrangements. All require some degree of marine science, data and information and therefore are a concern to the IOC.

6.4 1998 - The International Year of the Ocean

> *"The United nations has declared 1998 the International Year of the Ocean as a celebration of this source of life and civilization. But this international year is also a reminder of the need to protect this most precious of resources, an affirmation of our commitment to the rights of future generations, for whom we hold our planet – and its life-sustaining oceans – in trust"*
> *Federico Mayor, Director-General of UNESCO (1987-1999)*

The international year gave the world an opportunity to consider, and to celebrate, the ocean and what it means to our existence, our daily lives, our politics, our economies and our culture. All of these aspects were addressed during the year and the IOC played a leading role in many national, international and intergovernmental activities. Government representatives from over eighty countries signed an Ocean Charter, endorsed by the IOC that recognised the importance of the ocean and the need for co-operative action to address ocean issues. These principles were further supported by a resolution of the Francophonie countries in New York the following year. A personal version of the charter was produced in over 20 languages and signed by millions of citizens around the world.

The international year also generated important statements on the oceans from both intergovernmental bodies and high-level international gatherings. These statements helped to promote the action taken at the United Nations General Assembly for additional consultations and debate on ocean issues.

After the publications, youth and community events, conferences, Ocean Expo and all the many activities that took place in 1998, it is important to realise that the international year was only a catalyst for attention. The IOC recognises that the momentum and interest gained during the year needs to be sustained and developed in schools, in communities and in the halls of government, in order for the ocean objectives to be satisfied.

7. Ocean economic forces

7.1 Maritime Shipping

Ninety percent of world trade is transported by sea. The world merchant fleet exceeds 85,000 ships and the value of seaborne trade and shipping is over $155 billion annually. Trade by sea is increasing, with a demand for faster and more efficient cargo transport. In the coastal zone, there is a demand for more and faster short-sea transport for both vehicles and passengers and the concurrent port and harbour demands. Given the pressure on road and rail systems the growth in trade may be thrust onto marine transport. The increasing use of the ocean for transport, the development of larger and faster ships, greater competitiveness and zero tolerance for negative environmental impacts, places enormous pressure on the marine transportation system to improve efficiency while maintaining or improving safety margins. Transportation is not environmentally neutral. Maritime ports are located at the interface between the land and the sea and are in contact with important habitats, which are strategic components of the natural environment - the seabed, estuarine waters, mud flats and wetlands.

Trade is by nature intergovernmental. The issues of emissions, discharges of bilge water and tank washings, exotic species in ballast water and other environmental problems have to be agreed amongst governments and supported by science and monitoring activities. The activities of the IOC contribute both directly and indirectly to the resolution of these problems.

7.2 Offshore energy

Oil and gas production now takes place in water depths approaching 2000 meters, in locations exposed to extreme weather and ocean conditions in the tropics and in the polar oceans. The activities necessary to provide reliable meteorological and oceanographic environmental information in support of these activities must be planned and undertaken well in advance of drilling operations. Although concern is growing in governments over global warming, it is unlikely that the use of hydrocarbon fuels will diminish appreciably in the foreseeable future.

A sizeable proportion of fossil fuels now come from offshore and the needs of the industry themselves provide an impetus for the development of sophisticated tools and instruments to service existing and new challenges. Governments are interested in the ownership of resources, in the environmental assessments and regulations, in the development of supporting marine industries and in the application of the knowledge gained. Intergovernmental programmes assist in building the capacity of all countries to manage resources wisely, in the transfer of technology and in the adoption of uniform standards and methods for environmental protection. It has been argued that the use of non-renewable resources is by definition non-sustainable. However, wise extraction and use of resources meet the objectives of sustainability by preserving the environment and ecology. The more fundamental changes to renewable and truly sustainable energy in the future are then not jeopardised.

The oceans figure prominently in energy policies, in addition to the use of offshore hydrocarbons. Many commercial interests are looking at the capability of marine disposal of excess carbon dioxide, or the related possibility of increasing the ability of the ocean to

absorb the gas by promoting increased plankton growth in the surface layers. Much research needs to be accomplished before the world community either accepts or rejects these endeavours. The IOC is keeping the research developments in this area under continuing review.

In terms of renewable energy, harnessing energy from other ocean sources will continue to grow slowly. Tidal and wave energy have been subjects of study for many years, but the high capital investment costs for the former, and the difficulty in obtaining anything but local levels of power from the latter, have restricted wide spread use. Making use of the thermal gradient between the deep ocean and the surface can be done, but again the scale may be a problem. The geothermal power of undersea hot vents is another potential source. The use of renewable energy from the ocean is probably following the same path as the wind and solar terrestrial industries but several years behind.

7.3 Ocean mapping

Ocean mapping is a programme that has been very successful at minimal cost to the IOC. It is carried out in partnership with the International Hydrographic Organization, which has an extensive network of charting agencies throughout the world. Producing maps and charts of the seabed is very expensive, but the demand for charts, in early years almost solely in support of marine transportation, led to a successful intergovernmental programme. The expertise founded in navigation charts was extended into deeper waters as interest in the deep ocean developed. The mapping of the sea floor assumed wider importance as interests developed in the laying of communication cables, the siting of platforms and pipelines, in the study of ocean currents and in marine geology. Today, the requirement for countries to submit jurisdiction claims over seabed resources under the Law of the Sea, has added a new dimension and impetus to mapping requirements.

Technological advances have also added to the usefulness and priority for ocean maps. Multi-beam acoustic systems, specially equipped vessels and even satellite readings of the sea surface have transformed the availability of data. Data management handling techniques have allowed the new data to be analysed and displayed in ways that have generated more users and demands.

Accurate mapping and positioning is a prerequisite for scientific and observational activities. Recent advances into electronic mapping and satellite positioning, initially adopted for navigation, are being rapidly assumed into the ocean science community. Global and regional models need higher accuracy of boundary information as their resolution increases and the exchange of ocean data in all disciplines requires precise spatial co-ordinates. The timeliness of data is also important. Operations in deep water may be affected not only by ocean currents and weather, but also by the instability of continental margins causing slumps and slides and affecting large areas of the deep sea floor through turbidity currents.

Many of the technological advances are beyond the capacity of numerous coastal states and the need for intergovernmental assistance and the sharing of technology will continue to influence the area of ocean mapping for many decades.

7.4 Recreation and tourism

> *"The need to address the growing imbalance between the have and have-not countries is fundamental to a sustainable future for the world community on two major fronts. Firstly, there can be no hope of achieving and preserving a peaceful future unless there is a better balance of quality and dignity of life than we have at present. Secondly, there is no way that the present critical global environmental issues can be addressed unless all governments are able to cooperate in joint solutions…"*
> *Extract from the IOC Global Ocean Observing System document on Capacity Building Principles*

The economic growth of the recreation and tourist industry has been a welcome surprise to many countries. In some, this industry has surpassed many of the traditional industries in importance. As always, the increased benefits of economic development bring their own share of impacts and issues that must be addressed. A sustainable tourist industry is dependent upon the health of the environment upon which it is built. Activities such as whale watching, scuba diving, eco-tourism and bathing require the attention of both the industry itself and the governmental regime under which they operate. This is a new and important role that is still evolving. Governments and industry will need to adapt and evolve their methods to ensure the quality of the environment is protected and the ecology is not threatened.

The cruise ship fleet is one of the fastest growing maritime shipping sectors and is exposing remote and previously untouched marine environments to the potential hazards of intrusive activities.

The IOC has programmes in coastal management, in the protection of the marine environment from pollution, in monitoring and in the sharing of knowledge and information that can address these issues in the coming years.

7.5 New industries

Fifty years ago the mining of nodules from the sea floor, rich in manganese and other desired metals, seemed to be the greatest source of new wealth the oceans had to offer. That promise has not yet developed as the cost and availability of the terrestrial sources of these minerals have lessened the economic opportunity. There are many other potential ocean benefits that are being exploited or are under research. Desalinisation plants are now supplying some countries with the greater part of their freshwater needs. Genetic materials from marine species are the subject of intense research by the pharmaceutical and biochemical engineering industries. Ocean space is becoming a commodity for aquaculture, for engineering structures such as airports and for wind farms. Presently these uses of the ocean surface are close to shore, but the technology exists for engineering structures that can survive offshore conditions if economic returns are justified.

Governmental and industrial spending on marine research and observations, which will be needed to keep abreast of new developments and their associated activities, is presently insufficient. The IOC can assist governments to keep a watching brief on new technologies and can facilitate the development of environmental standards and regulations when required.

8. Addressing the needs of developing countries

From its early days, the IOC has retained its priority for training, education and mutual assistance in its programmes. The regular budget and resources of the IOC are not adequate to carry the burden of large-scale capacity building activities. On the other hand, seed money has always been found to assist in providing training courses and published materials to enable the greater participation of developing countries in the IOC programmes.

Occasionally, a Member State will provide funds to assist in an IOC managed programme in a developing country or region that will enable a greater degree of assistance to be given than would otherwise be possible. All the programmes of the IOC have a capacity building component and a new management structure, which will assist in the co-ordination of expertise and the sharing of experiences amongst the various activities. Plans are being made to find ways of increasing the access of marine programmes to international and national funding sources so that capacity building in the area can be extended and strengthened. As yet the ocean area has not attracted the direct support of international funds in the same way, for example, as the climate activities.

Several successful capacity building activities have been carried out in regions all over the world. The regular budget of the IOC is supplemented by roughly the same amount of funding from voluntary contributions from its Member States. Occasionally a national funding agency will work with the IOC to make possible an extended programme of capacity building in support of ocean science, information services or management. For example, in Africa, the IOC with the assistance of additional funds from a Member State has launched an ocean data and information project, working towards establishing a lasting network of marine and aquatic institutes in Africa. The headquarters is located in Kenya and, through its information services to the scientific community; the project aims at promoting the scientific capabilities of the continent. This is a true partnership project with twenty African countries involved in the planning process. The countries themselves agree that the objectives of the initiative are to provide marine scientists in Africa with marine science publications, to facilitate communication between marine scientists, to promote scientific activities and to provide marine scientific information with the necessary equipment and training. The close involvement of the countries in the region is an indication of their support and a demonstration of the sustainability of the activity in years to come.

Without substantial funding support for projects such as in Africa, the IOC relies on the smaller but essential training workshops, preparation of manuals and guidance materials and the support of participants from developing countries at IOC technical meetings and conferences. They make impressive numbers, for example during the international year of the ocean; the IOC supported 59 training courses, 12 workshops and 13 educational events with a total number of 1600 participants from over 100 countries. Unfortunately, the effort is still far too small to be significant. To be sustainable, there must be regular activities, with an audit of what happens to the participants. Countries wishing to participate must commit to utilise the expertise gained in their own ocean activities. Regional countries must combine their resources to help each other and to be efficient and effective. The programmes are not gifts from a country or organization, but a programme between partners with the same goals of ocean management and stewardship.

9. Concluding Thoughts

The objective of this document is to emphasise the importance of the ocean to a sustainable world order. The ocean, as it now exists, sustains the planetary environment in which we thrive and we need to understand how robust or fragile that relationship is. It has sustained marine living resources and their habitats for millennia and now we must exercise care and stewardship to ensure we don't destroy that sustainability through our ignorance of the marine environment and its ecology. The ocean sustains the economies and trade that are essential to our growth and development and we must learn how to enjoy this benefit without compromising its other values. There are other undeveloped or unknown resources in the ocean, both living and non-living, and the management of these new riches must also be careful and precautionary. We will inevitably encroach on the very space of the ocean. Our populations are already developing the desirable coastal lands for residences and industry. A sustainable marine ecology needs its vulnerable marginal habitats protected. We have also to continue to monitor and manage the wastes of our society, agriculture and commerce, that flow from our activities into the rivers and into the sea.

Governments have the largest role to play. Governments act on behalf of their people as a whole. The ocean is a huge responsibility and will need a collective intergovernmental wisdom and commitment to sustain its benefits into the future. Many countries are ill equipped to manage the marine waters and resources under their own jurisdiction, let alone contribute and adequately participate in global action.

Therefore, let the final point be to emphasise the need for sustainable capacity building programmes: true partnerships between recipient and donor countries that are built upon the priorities and commitment of the one and the knowledge, technology and resources of the other.

This brief document has deliberately stayed away from the useful, but often bewildering, acronyms and specialised language that is standard in many intergovernmental documents. For those readers who wish to identify IOC activities, a list of most of the major programmes, partners and joint ventures is given in the Appendix.

APPENDIX

ACRONYMS OF SOME OF THE MAJOR IOC AND RELATED PROGRAMMES THAT RELATE TO THE ABOVE TEXT

ABE-LOS	Advisory Body of Experts on the Law of the Sea (IOC)
ACC	Administrative Committee on Co-ordination (Partner)
ACC-SOCA ACC	Sub-Committee on Oceans and Coastal Areas (IOC et al.)
ACOPS	Advisory Committee on Protection of the Seas (Partner)
AOSB	Arctic Ocean Science Board (Partner)
Argo	Array for Real-time Geostrophic Oceanography (IOC/WMO)
ASFA	Aquatic Sciences and Fisheries Abstracts (IOC et al.)
BSRC	Black Sea Regional Committee (IOC)
CBD	Convention on Biological Diversity (UN, 1992)
CEOS	Committee on Earth Observation Satellites (Partner)
CGOM	Consultative Group on Ocean Mapping (IOC)
C-GOOS	Coastal Module Panel of GOOS (IOC)
CLIVAR	Climate Variability and Predictability (WCRP)
COP	Convention on Climate Change (Partner)
CPPS	Permanent Commission for the South Pacific (Partner)
CSI	Unit of Coastal Regions and Small Islands (UNESCO)
DBCP	Data Buoy Co-operation Panel (IOC/WMO)
DOALOS	Division for Ocean Affairs and the Law of the Sea (UN)
DOSS-2	Ad hoc Study Group on IOC Developments, Operations, Structure and Statutes (IOC)
FAO	Food and Agriculture Organization (UN)
FCCC	Framework Convention on the Climate Change (Kyoto, 1997) (Partner)
GCOS	Global Climate Observing System (WMO/IOC/FAO)
GCRMN	Global Coral Reef Monitoring Network (Partner)
GEBCO	General Bathymetric Chart of the Oceans (IOC-IHO)
GEF	The Global Environmental Facility (World Bank-UNEP-UNDP) (Partner)
GEOHAB	Global Ecology and Oceanography of Harmful Algal Blooms (IOC/SCOR)
GESAG GIPME	Expert Scientific Advisory Group (IOC)
GIPME	Global Investigation of Pollution in the Marine Environment (IOC-UNEP)
GLOBEC	Global Ocean Ecosystem Dynamics (IOC et al.)
GLOSS	Global Sea-Level Observing System (IOC)
GODAE	Global Ocean Data Assimilation Experiment (IOC/WMO)
GOOS	Global Ocean Observing System (IOC)
GOS	Global Observing System (Partner)
GOSSP	Global Observing Systems Space Panel (Partner)
GPO GOOS	Project Office (IOC)
GSC GOOS	Steering Committee (IOC)
GTOS	Global Terrestrial Observing System (Partner)

GTS	Global Communication System (Partner)	
GTSPP	Global Temperature and Salinity Profile Programme (IOC)	
HOTO	Health of the Ocean (IOC)	
IABP	International Arctic Buoy Programme (IOC/WMO)	
IASC	International Arctic Sciences Committee (Partner)	
ICAM	Integrated Coastal Area Management Programme (IOC)	
ICES	International Council for the Exploration of the Sea (Partner)	
ICG-ITSU	International Co-ordination Group for the Tsunami Warning System in the Pacific (IOC)	
ICSEM	International Commission for the Scientific Exploration of the Mediterranean Sea (Partner)	
ICSU	International Council for Science [previously: International Council of Scientific Unions] Partner)	
IDNDR	International Decade for Natural Disaster Reduction	(Partner)
IGBP	International Geosphere-Biosphere Programme (ICSU)	(Partner)
I-GOOS	Intergovernmental Committee for (IOC)	
IGOS	Integrated Global Ocean Services Strategy (Partner)	
IGOSS	Integrated Global Ocean Services System (IOC/WMO)	
IHO	International Hydrographic Organization (Partner)	
IHP	International Hydrological Programme (UNESCO) Partner)	
IMO	International Maritime Organization (Partner)	
IOCARIBE IOC	Sub-Commission for the Caribbean and Adjacent Regions	(IOC)
IOCARIBE-GOOS	IOCARIBE Regional GOOS (IOC)	
IOCCG	International Ocean Colour Co-ordinating Group (Partner)	
IOCEA	Regional Committee for the Central Eastern Atlantic (IOC)	
IOCINCWIO	Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean (IOC)	
IOCINDIO	Regional Committee for the Central Indian Ocean (IOC)	
IODE	Committee for International Oceanographic Data and Information Exchange (IOC)	
IOI	International Ocean Institute (Partner)	
IPHAB	Intergovernmental Panel on Harmful Algal Blooms (IOC)	
ITSU	International Co-ordination Group for the Tsunami Warning System in the Pacific (IOC)	
IUGG	International Union of Geodesy and Geophysics (Partner)	
IYO	International Year of the Ocean (IOC)	
JCOMM	Joint IOC-WMO Technical Commission for Oceanography and Marine Meteorology (IOC/WMO)	
J-DIMP	Joint Data and Information Management Panel (IOC et al.)	
JGOFS	Joint Global Ocean Flux Study (Partner)	
LOICZ	Land-Ocean Interaction in the Coastal Zone (Partner)	
MAB	Man and the Biosphere Programme (UNESCO) (Partner)	
MEDI	Marine Environmental Data Information Referral Service	(IOC)
MEL	Marine Environmental Laboratory (Partner)	
MIM	Marine Information Management (IOC)	
MOST	Management of Social Transformation (UNESCO) (Partner)	
NEAR-GOOS	North-East Asian Regional GOOS (IOC)	
ODINAFRICA	Ocean Data and Information Network for Africa (IOC)	
ODINEA	Ocean Data and Information Network for Eastern Africa	(IOC)
OOPC	Ocean Observation Panel for Climate (IOC)	

OSLR	Ocean Science in Relation to Living Resources (IOC)	
OSNLR	Ocean Science in Relation to Non-Living Resources (IOC)	
PICES	North Pacific Marine Science Organization (Partner)	
PIRATA	Pacific, and the Pilot Research Array in the Tropical Atlantic (Partner)	
POEM	Physical Oceanography of the Eastern Mediterranean (Partner)	
POGO	Partnership for Observing the Global Oceans (Partner)	
RECOSCIX	Regional Co-operation in Scientific Information Exchange	(IOC)
SAHFOS	Sir Alister Hardy Foundation for Ocean Science (Partner)	
SCOPE	Scientific Committee on Problems of the Environment	(Partner)
SCOR	Scientific Committee on Oceanic Research (Partner))	
SEA-GOOS	South-East Asian GOOS (IOC)	
SOLAS	International Convention for the Safety of Life at Sea	(Partner)
SOOP	Ship-of-Opportunity Programme (IOC)	
START	Global Change System for Analysis, Research and Training (Partner)	
TEMA	Training, Education and Mutual Assistance (IOC)	
TOGA	Tropical Ocean and Global Atmosphere (IOC et al.)	
UN CSD	Commission on Sustainable Development (Partner)	
UNCLOS UN	Convention on the Law of the Sea (Partner)	
UNDP	United Nations Development Programme (Partner)	
UNEP	United Nations Environment Programme (Partner)	
UNESCO	United Nations Educational, Scientific and Cultural Organization (Partner)	
UNIDO	United Nations Industrial Development Organization	(Partner)
WCRP	World Climate Research Programme (Partner)	
WDC	World Data Centre (Partner)	
WESTPAC	Regional Sub-Commission for the Western Pacific (IOC)	
WHO	World Health Organization (Partner))	
WMO	World Meteorological Organization (Partner))	
WOCE	World Ocean Circulation Experiment (Partner)	
WWW	World Weather Watch (Partner)	