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**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION**
(of UNESCO)

# REPORT OF THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM) TO THE 21ST SESSION OF THE IOC ASSEMBLY, PARIS, 3 TO 13 JULY 2001

This biennial report is submitted to the IOC Assembly in accordance with Clause 1 of the Terms of Reference of the IOC Consultative Group on Ocean Mapping (IOC/CGOM).

It covers the period from April 1999 to April 2001, since the last Report of the IOC/CGOM to the IOC Assembly (doc. IOC/INF-1122 dated 3 May 1999).

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## A. CONSULTATIVE ACTIVITIES

### 1. THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM)

1.1 MEETINGS

The 8th Session was held in the Head Department of Navigation and Oceanography in St. Petersburg, Russian Federation, from 10 to 15 May 2001, under the Chairmanship of Dr. Günter Giermann, Chairperson CGOM.

1.2 STATEMENTS MADE BY THE CHAIRPERSON CGOM AT MEETINGS OF IOC GOVERNING AND REGIONAL BODIES

The statements delivered at XX Session of IOC Assembly and at II Session of IOCINDIO are contained in Annex IV.

## B. OCEAN MAPPING PROJECTS

### 2. THE GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)

2.1 MEETINGS OF THE JOINT IOC-IHO GUIDING COMMITTEE, OF OFFICERS AND OF SUB-COMMITTEES

Numerous meetings of GEBCO and its subcommittees have taken place since the Seventh Meeting of CGOM in April 1999.

13th Session of the Sub-Committee on Undersea Feature Names (SCUFN), 22-25 June 1999;
16th Session of the Sub-Committee on Digital Bathymetry (SCDB), 23-25 June 1999;
17th Session of the Joint IOC-IHO Guiding Committee, 28-30 June 1999;
all in Halifax, Nova Scotia, Canada.

1st Session of GEBCO Centenary Organizing Committee (COC), 4 August 199, Salisbury, U.K.

17th Session of the Sub-Committee on Digital Bathymetry, 3-5 May 2000;
12th Session of Officers of the Joint IOC-IHO Guiding Committee, 8 May, 2000
all in Copenhagen, Denmark.

14th Session of the Sub-Committee on Undersea Feature Names, 17-21 April 2001,
18th Session of the Sub-Committee on Digital Bathymetry, 18-21 April 2001;
both in Tokyo, Japan.

18th Session of the Joint IOC-IHO Guiding Committee, 23-24 April 2001;
3rd Session of GEBCO Centenary Organizing Committee, 24 April 2001;
1st Session of GEBCO Strategic Planning Committee, 25 April 2001;
all in Kobe, Japan.

IOC has published the report of the 17th Guiding Committee and the 16th SCDB of 1999. GEBCO has circulated reports of the meetings in Copenhagen in 2000 and of the 1st and 2nd meetings of COC. Reports of SCUFN meetings are held at IHB, Monaco. Reports are not yet available for the meetings in Japan in 2001.

2.2 REPORT OF GEBCO

*(based on a report presented by Sir Anthony Laughton, Chairman of GEBCO Guiding Committee, to CGOM VIII, May 2001).*

This report addresses the issues raised in the meetings in Japan which have included most of those which were progressed in the previous meetings.

**18th Session of the Joint IOC-IHO Guiding Committee (GC), 23-24 April 2001**

It has become the custom that the meetings of the SCDB are attended by as many members of the GC as possible and that the SCDB members and advisers stay and contribute to the GC meeting. SCUFN met separately but members joined the GC for its meetings.

The SCDB has been the powerhouse behind GEBCO. Since the decision to exploit it within GEBCO and the production of the GEBCO Digital Atlas (1st issue in 1994 and 2nd in 1997). Experts from around the world have contributed to the updating and improvement of the GDA, contributing both time, effort and travel costs often borne by their parent institutions. A typical meeting now comprises some 25 to 30 participants.

In the reports of the meetings, the discussions of the SCDB and the GC (or the Officers) have been merged into one report SCUFN has reported separately.

**New Issue of the GDA**

After several years of plans to issue a revision of the 1997 GDA, in Japan emphasis was put on ensuring that it would be issued in 2001. This issue will be a considerable advance on previous issues.

- Revision of bathymetric contours including:
  the entire Indian Ocean together with the neighbouring parts of the SE Atlantic and the SW Pacific; the entire Atlantic; the waters around New Zealand; parts of the northern Atlantic and some other small revisions.

- Inclusion of a gridded database of the whole world at 1 minute grid interval derived in part from the 5th edition contours, in part from the new contouring, in part from data obtained from the continental margins. A gridding Working Group under Mike Carron of the US Naval Oceanographic Office has been progressing this. It is anticipated that it will replace the older and rather opaque DBDB5 (5-minute grid) prepared by the US Navy. The gridding interval is comparable to that used by Smith and Sandwell (1997) in their predicted bathymetry based on satellite altimetry data combined with soundings.

- Inclusion of a Gazetteer of undersea feature names

- The new GDA will be operated under Windows.

Computer contouring of the gridded database will be compatible, as far as possible, with the vector contours of the GDA. However, there may well be differences in areas where the dqta is scarce. The gridded database will enable modellers to input the best available bathymetry and to manipulate the data more efficiently.

As part of its mandate the SCDB reviewed advances in contoured or gridded surveys from around the world and debated whether they could be available to GEBCO.

Contributions from the IOC IBC series were considered for inclusion. The Guiding Committee expressed concern that these were not always easily available for GEBCO, in spite of earlier agreements.

Many countries have undertaken extensive and intensive surveys of their own continental margins in relation to possible claims for an extended legal continental shelf under UNCLOS, and to assess resources in their EEZ. In some countries these data are not available pending legal decisions

under UNCLOS and for security reasons. Potential commercial exploitation of the data has also restricted their availability.

When data have been made available, there have often been copyright constraints laid on GEBCO when they are incorporated, whereas in some countries (e.g., the USA) freedom of information, legislation insists that data are freely available. Some members of the GEBCO community would like to have GEBCO products freely available on the internet, whereas others recognise the constraints imposed by agreements where copyright is involved. Free access might prevent the acquisition of new data. this debate continues.

**Undersea Feature Names**

Under the leadership and scholarship of Dr. Fisher, in Tokyo, SCUFN-XIV reviewed some 500 names opposed to names in SCUFN-XIII. The workload for SCUFN has increased considerably as new and more detailed surveys under the IOC mapping projects and along continental margins have defined more and more features. The Guiding committee accepted Dr. Fisher's view that SCUFN should meet annually rather than biannually and that alternate meetings should be held at the IHB in Monaco where Michel Huet maintains the database of names.

The GC urged that the IBCs of IOC should contribute to the costs of these additional meetings since many of the names have arisen from their activities. Dr. Fisher was also concerned that the work fell on the relatively few members of SCUFN and looked for suitable new members to devote time and effort to the task of nomenclature. He indicated that he would continue as chairman until at least 2003.

A draft of the Second Edition, running to 307 pages of the IOC-IHO Gazetteer of Geographical Names of Undersea Features (BP8) was circulated for comment by the IGHB in March 2001. It is also available as an Excel file.

**SCOR Working Group 107**

This Working Group was set-up to advise IOC on the requirements for improved global bathymetry from the oceanographic, government, defense and commercial communities. It first met in 1996 in Southampton, UK and again in 1997 in Baltimore, USA. Regrettably the final report has not yet been completed in spite of the increasing demands for accurate and usable bathymetry from modellers. When completed it should give IOC the necessary justification for increased effort in ocean mapping.

**GEBCO Centenary Celebrations**

To celebrate the centenary of the initiation of the GEBCO programme by Prince Albert 1$^{st}$ of Monaco in 1903, a conference on ocean mapping is being planned for 14$^{th}$ to 16$^{th}$ April 2003 in Monaco. The International Hydrographic Bureau will host this conference with the support of the Monegasque Government and of the Palace.

There have been three meetings of the Centenary Organizing Committee. The conference will be held in the Salle de Variété near the IHB and Dr. Loughbridge of NGDC, Boulder, USA is organizing the programme, with the assistance of a small committee. It will be a celebration and a history of the past hundred years, an analysis of the present state of ocean mapping and a visionary look to the future.

In association with the conference there will be a display of GEBCO products past and present, publication of a history of GEBCO, a commercial and technical exhibition of related hardware, visits from survey ships, social events and commemorative items.

The celebrations will be partly funded by IOC (cf. IOC Executive Council Resolution EC-XXXIII.7), partly by the generosity of IHB and the Monegasque Government, partly by sponsorship and partly by registration fees.

**Sixth Edition of GEBCO Paper Charts**

In spite of the digital format of GEBCO products as CD-ROMs, there is still a demand for paper products for display, for teaching and for publicity. However, it is not realistic nor are funds available to repeat the conventional chart production method of the 5th edition. Technology now enables charts to be prepared on demand from digital files to the customers needs.

It is planned to display some samples of "print-on-demand" products in the centenary exhibition. In Japan there were lengthy discussions on what products were actually required, what formats and styles should be used and what digital base was needed to produce them. During the next year trials will be made of different products ranging from charts similar to the 5th edition to the more eye-catching products of GMT technology.

**Echo-sounding Around the Antarctic**

Considerable concern was expressed about a move in Germany to prevent the use of multi-beam echo-sounders in the region of the Antarctic Treaty south of 60 S, owing to the perceived damage to marine mammals from high energy acoustic sources. GEBCO was asked to support the case for continued use of echo-sounders to improve our knowledge of, and safety of navigation in, the Antarctic environment.

**GEBCO Strategic Planning Committee**

Discussions on the future of GEBCO in the Guiding committee in Japan led to the formation of a GEBCO Strategic Planning Committee under the Chairmanship of David Monahan (Canadian Hydrographic Service), Vice-Chairman of GEBCO. A preliminary meeting was held in Kobe following the Guiding Committee and another is planned for November 2001 in Southampton.

The committee will examine the fundamentals of the GEBCO programme, including what the users of today and tomorrow need, what participants can bring to the programme, what role it will play in the decades ahead, the organization of GEBCO within or outside IOC/IHO, funding issues, products to be prepared, etc.

The current structure of GEBCO and its relation to IOC and IHO is detailed in Part I of the "Guidelines for the general Bathymetric Chart of the Oceans", B-7, published by IHB in September 1991 and updated in 1993. the Strategic Planning Committee will examine this to see whether it is still relevant today and for the future.

Other parts of the Guidelines are:

Part 2 Bathymetric Data Management – Analogue and Digital
Part 3 Digital Bathymetric Data (Single Beam Echo-sounders)
Part 4 Digital Bathymetric (Multibeam Echo-sounders) (in draft but nearly complete)
Part 5 Underway Geophysics Data

The aim is to bring before our sponsoring bodies of IOC and IHO a strategic plan to take GEBCO into the next few decades.

## 3. THE INTERNATIONAL BATHYMETRIC CHART OF THE MEDITERRANEAN AND ITS GEOLOGICAL/GEOPHYSICAL SERIES (IBCM)

### 3.1 MEETINGS OF THE EDITORIAL BOARD

The 8th Session of the Editorial Board of IBCM was held on board RV *Vityaz* World Ocean Museum, Kaliningrad, 1-3 September 1999, under the Chairmanship of Professor Carlo Morelli, Chairman of IBCM. Ing.Gen. Patrick Souquière, SHOM, was elected (second) Vice-Chairman.

### 3.2 REPORT OF IBCM

*(Based on a written report sent by Prof. Carlo Morelli, Chairman EB-IBCM, to CGOM-VIII, in May 2001. As Professor Morelli was not able to attend, Captain Vadim Soboley, Chief Editor, presented the report).*

The cartographic production of IBCM-I at the scale of 1:1M has been concluded. The brochures illustrating each map have been published in the Bollettino di Geofisica teorica ed applicata and can be obtained with the maps from Dr. Desmond Scott, Cumber, Mill Lane, Sidlesham, Chichester, PO20 7LX, UK, except for the Recent Sediments which is in print. At the same address can be requested the pertinent data, when available also in digital form (or the information for obtaining them).

IBCM started in the sixties on the initiative of a group of scientists who were trying to discover the characteristics of the Mediterranean Sea at that time mostly unknown. Oceanographic ships were few, but positioning could benefit of Loran-C, precision echo sounders and graphic-recorders became available, with a new type of surface-ship gravity-meter and proton-magnetometer. In agreement with CIESM and FAO, the IOC guided in the following years the activity, increased the quality with the advancement of technology and in potentiality with the availability of new ships.

The IBCM results, published from the eighties to the nineties are nevertheless based on the '60 to '70 data: with their accuracy and their spacing. They permit regional studies (physiographic, geologic and geophysical) of the Mediterranean areas, except for local areas (basins) where (courtesy) detailed surveys have been made available.

In the meantime, new technologies were introduced (satellite navigation, multi-beam, etc.), and the generalized adoption of the computer opened the way to the so-called **digital bathymetry** where the product or the requested information will be available on tape; i.e., the product will be based entirely upon digital database. The nature of the database will be raster (a Digital Terrain Model or DTM), consisting of gridded seamless data for land and sea on an appropriate grid (0.1' to 0.5').

CGOM examined (Monaco meeting, 12-14 April 1999) the above proposal for the IBCM-II prototype and its guidelines and recognized an innovative step, which may hold promise for the future. The XIth Mediterranean Black Sea Hydrographic Commission (Split Meeting, 7-11 June 1999) accepted these guidelines, and issued its Decision 10 inviting the VHOs concerned to provide releasable data for the compilation. The operational lines have been discussed and approved in the 8th Session of the EB-IBCM (Kalingrad, September 1999). The status report of the available data will be presented at the next IBCM meeting, forecasted in Monaco, September 2001 during the 36th CIESM Congress.

Within the IOC and other interested parties, IBCM-II will, like the IBCM-I, be at the disposal of the various programmes now in development in different parts of the world.

## 4. THE INTERNATIONAL BATHYMETRIC CHART OF THE CARIBBEAN SEA AND THE GULF OF MEXICO (IBCCA)

### 4.1 MEETINGS OF THE EDITORIAL BOARD

No meeting took place in the period under consideration. The main reason for this was financial restrictions at the IOC. It is now suggested to hold an Officers Meeting before the end of the year. IBCCA-VIII will then take place in 2002.

### 4.2 REPORT OF IBCCA

*(based on a report presented by G. J. L. Frias Salazar, Vice-Chairman of IBCCA, to CGOM-VIII, May 2001).*

**Progress in Compilation and Editing of IBCCA Sheets**

- Sheets 1.01, 1.l02, 1.103, 1.104, 1.105, 1.106, 1.109 and 1.111 are available in digital format and have been incorporated into the digital database. Editing of them is in progress at INEGI.

- Sheets 1.107, 1.108 have incorporated new bathymetry for Cayman Trough and have been sent to Cuba for reviewing and acceptance.

- Sheets 1.12, previous compilation has been done by Costa Rica (about 50%), but after reviewing, the bathymetric contours have been sent to Instituto Geográfico de Costa Rica for corrections. Copies of the compilation were sent to NGDC, Boulder, Colarado, for reviewing.

- Sheets 1.13, 1.14, 1.15 and 1.17 are complete, they were considered jointly by the INEGI and the CIOH of Colombia and the DAHN of Venezuela, but digital files are not completely satisfactory for the Chief Editor. In this respect, Mr. Frias asked the IOC Executive Secretary to support a visit of a specialist from the INEGI for two or three days to Colombia and Venezuela to get directly the digital files to allow the Chief Editor to incorporate them into the digital database.

- Sheets 1.10 and 1.16 are the responsibility of the representative of the Service Hydrographique et Océanographique de la Marine (SHOM), and no progress has been reported to the Chief Editor yet.

**Printing of the IBCCA Sheets**

- Copies of Sheet 1.04 and 1.09 are available at INEGI (01 800 490 42 00, www.inegi.gob.mx, Fax +52 (4) 9 18 07 39, E-mail: atencion.usuarios@inegi.gob.mx), or from Ocean Mapping (IOC), Cumbers, Mill Lane, Sidlesham, Chichester PO20 71X, United Kingdom (Fax: +44 1243 641 222).

- For Sheets 1.01, 1.02, 1.93, 1.05, 1.06 and 1.11 the Chief Editor will produce a colour proof via plotter at the INEGI during the present year 2001.

Mr. Frias Salazar said that there is a problem to print the full sized sheet at INEGI, but it is possible to print each map in two parts using a smaller press. the printing programme will take place not later than the year 2002.

**Producing of CD-ROMs for the IBCCA**

Considering that much information is now in digital form, the Editorial Board expressed its interest in producing a CD-ROM for IBCCA.

The Chief Editor is now in the position to produce in the present year a CD-ROM for sheets1-01, 1-02, 1-03, 1-04, 1-05, 1-06, 1-09 and l-11. In addition to that, accordingly with the Editorial

Board agreement, CD-ROM assembled with Vector files for the Gulf of Mexico areas: 1.01, 1.02, 1.05 and 1.06, including the Digital Terrain Model, is going to be released in September 2001.

In this respect, the Editorial Board agreed at its meeting that international financial support is required to continue with the printed sheets and the production of the CD-ROMS for IBCCA.

**IBCCA Geophysical/Geological Series**

During its last meeting the Editorial Board agreed that, as a first step, the following three series of geophysical maps at scale 1:1 000 000 should be produced: magnetic anomalies, gravity anomalies and seismicity, but no progress has been reported in this respect.

Noting that general geophysical maps for the IBCCA area had already been published, it was further agreed that the initial work consists of digitizing those maps, with the permission of the authors/publishers and sending them to the members of the Editorial Board according to the area of responsibility.

**General Matters**

The US National Geophysical Data Centre (NGDC) prepared, jointly with the INEGI, a Web Site for IBCCA to promote the regional project via Internet. It is available since April 1998 at the following address: http:www.ngdc.noaa.gob/mgg/ibcca/ib_start.htm.

The Chief Editor has continued with the digitization, integration and structuration of the sheets that they have received from compilers and have been incorporated into the digital database.

## 5. THE INTERNATIONAL BATHYMETRIC CHART OF CENTRAL EASTERN ATLANTIC (IBCCA)

### 5.1 MEETINGS OF THE EDITORIAL BOARD

No meetings were held in the period under consideration. It is deemed unnecessary to hold a third meeting before the completion and publication of the bathymetric charts.

### 5.2 REPORT OF IBCCA

*(Based on a report presented by Ing. Gen. Andre Robertou, Chairman IBCCA to GCOM-VIII, May 2001).*

The present compilation and production status of IBCCA is as follows:

FRANCE (sheets 6 and 8 to 12)

Sheet 8 has been published in June 1999.
Sheets 6 and 9 have been published in April 2001.
Sheet 10 should have been published together with Sheets 6 and 9, but were delayed due to material problems of printing. It is about to be published.
Sheets 11 and 12 are presently being circulated for review by the members of the Editorial Board. their geographical names have been submitted to SCUFN. Depending on results , publication should take place sooner or later during the second semester of 2001.

PORTUGAL (Sheets 1 to 3 and 7)

Sheets 1 and 2 appear to be ready for publication and are expected to be printed in the immediate future, but no precise schedule is available.

Sheet 3 is presently being compiled, but no recent information is available about the progress of this work.
Sheet 7 is still to be compiled.

U.K. – FRANCE

Sheets 4 and 5, formerly Spain, are now attributed to Peter Hunter from SOC, U.K. for compilation and to France for printing.

No recent information is available on the state of development concerning the compilation work. We have good reason to guess that it is practically completed. The printing and publishing by France is still subject to the effective availability of the expected financial support. Both maps should be published during 2002 if no difficulty arises.

Remarks:

Due to difference printing techniques used by the two printing offices, some differences in the aspect of printed sheets are to be expected between the French and Portuguese products (quadrichromy for France – final choice unknown for Portugal).

It may be regretted that Portugal did not comply with provision 501-C of the Specifications for IBCEA and that the undersea features names are shown on their charts with generic terms in the Portuguese language. It is all the more to be regretted that a Portuguese version of the B6 document of the IHO-IOC "Standardization of Undersea Feature Names" is not yet available.

It is to be noted that for workload reasons no work can be initiated by SHOM on sheets 10 and 16 of IBCCA and sheets 15, 11 and 14 of IBCWIO until completion of IBCEA. The necessary financial support is not expected until 2002 and possibly later. A proposal of stages for the personnel of Madagascar has been issued, without answer to date.

The data presented in the published charts will be introduced into GDA as it has been done by France. The same is expected when the Portuguese charts will be published.

## 6. THE INTERNATIONAL BATHYMETRIC CHART OF THE WESTERN INDIAN OCEAN (IBWIO)

### 6.1 MEETINGS OF THE EDITORIAL BOARD

The 5th Session of the Editorial Board was held at Quatre Bornes, Mauritius, 24-28 July 1999, under the Chairmanship of Prof. Dr. Ing. Werner Bettac, Chairman and Chief Editor of IBCWIO.

### 6.2 REPORT OF IBCWIO

*(based on a report presented by Prof. Dr. Ing. Werner Bettac, Chairman and Chief Editor of IBCWIO to GCOM-VIII, May 2001)*

The IBCWIO Chairman reported on the 5th Session of the Editorial Board of the International Bathymetric Chart of the West Indian Ocean (IBCWIO), which was held at Quatre Bornes, Mauritius, 24-28 July 2000.

The proofs of two IBCWIO charts have been printed by Russia (HDNO). Charts 1.04 and 1.07 have been printed by Germany (BSH).

The charts have been critically examined by the Editorial Board and discussed with the producer. it was agreed that the proofs of Chart 1.03 and 1.06 of HDNO should be sent to Ms. Taylor (National Geophysical Data Centre, Boulder, USA) and Mr. Parvillers (Direction du Service Hydrographique et Oceanographique de la Marine, Paris, France). Both accepted to study the proofs,

to draw up comments, and to carry out careful reviews. The results should be returned before 15 October 2000.

Captain Fridman of HDNO announced that a further colour print, Chart 1.09, would be printed in September 2000.

Mr. Osbourne, HO South Africa, Cape Town, announced in an e-mail of 23 November 1999, that after they receive new hardware and software equipment, they will print the contours of Chart 1.20 and that the contours of Chart 1.19 will follow soon after.

The Chairman of IBCWIO asked, by letter, Dr. Robert L. Fisher, to do the scientific review of proofs 1.04 and 1.07, but he refused. Therefore, Professor Fleming of Senckenberg Institute, Wilhelmshaven, Germany, has carried out this work.

Chart 1.07 includes a large number of undersea feature names taken from the chart MARGE. NORD-MOZAMBIQUE ET CHAIN DAVIE, drawn by Vanney and Mougenot, but not contained in the GEBCO Gazeteer. The IHB (Mr. Huet) was asked by the Chairman of IBCWIO to check the names and to decide if they should be included in Chart 1.07 or not. Up to now there was no definite decision taken by IHB.

In responding to the concerns expressed by the EB-IBCWIO relating to the use of bathymetry predicted from observations of satellite altimetry, it was agreed that advice and guidelines would be sought from Walter Smith of NOAA, a specialist in the derivation of such predictions, on how best to use this information in the construction of IBC contours.

## 7. THE INTERNATIONAL BATHYMETRIC CHART OF THE WESTERN PACIFIC (IBCWP)

### 7.1 MEETINGS OF THE EDITORIAL BOARD

The third meeting of the Editorial Board of IBCWP was held in Tianjin, China, from 25-30 September 2000, under the Chairmanship of Dr. Haiqing Li, from SOA (proposed by Dr. Hou Wenfeng, Chief Editor IBCWP..

### 7.2 REPORT OF IBCWP)

*(based on a report presented by Ms. Lin Shaohua on behalf of Dr. Hou Wenfeng, Chief Editor, to CGOM-VIII, May 2001).*

Since the first session of the EB-IBCWP in 1993 a series of activities related to the project have been carried out.

Some sheets have been completed. In sub-region 1, Russia has completed 12 sheets at a scale of 1:500,000, including standard bathymetric data, track maps and depth contours. In sub-region 2, Japan has completed 4 sheets at a scale of 1:1000,000, China has completed 3 sheets 2-4, 2-8 and 2-11. In sub-region 3, China has completed 3 sheets 3-6, 3-7, 3-11, 3-12 and 3-16, Vietnam has completed sheet 3-11. In sub-region 4, Australia has completed sheets 4-12 and 4-14. the bathymetric data in sub-regions 2 and 3 is being collected and processed. China Bathymetric Database is being designed and established. The soundings were conducted in the inshore and offshore waters of China. Korea is actively collecting the new bathymetric data for its coastal area, also Malaysia is currently working on data acquisition for its sheets.

China has set up the compilation and publication of bathymetric charts by using computer cartography system. The computer-aided compilation system for bathymetric charts was established on the basis of some commercial software such as Arc/info, Arc/view, Map/info, Map/object, CorelDraw, etc. Its functions include: image and graphic scanning input, graphic vectorization, data

processing, graphic design and compilation, multi-media making, colour printing and internet transmission, etc. It provides advanced standard, prices and fast technological support for making the charts.

Some suggestions, recommendations and implementation plans have been received from the Editorial Board meeting in Tianjin, September 2000.

Collecting bathymetric data is most important for the development of the IBCWP Project because Member States have not enough data. The Editorial Board of IBCWP agreed that it is very important to exchange data between Member States in sensitive areas.

The Board agreed that proof copies of all sheets for evaluation by the EB-IBCWP should be sent to members well in advance of the next meeting in order to carry out a thorough and detailed review. The Board recommended that NGDC and NMDIS of China co-operate to develop the Database, Meta-Database and Web-site for the IBCWP Project.

The Board agreed that only names of undersea features in international waters that were previously approved by SCUFN, or those presented and subsequently approved would be included in the IBCWP sheets. The areas of undisputed national jurisdiction, both local and English names would be included in the charts.

It is the right time to schedule a IBCWP training workshop. The training workshop will involve quality control of bathymetric data, combining the use of soundings and multi-beam data quality control and standardization. The IOC Secretariat and NGDC will explore the possibility for funding and organizing a training workshop, to be hosted by NGCD, as soon as possible.

It was agreed that the next session of the IBCWP Editorial Board should be held in conjunction with the proposed training workshop. It is tentatively scheduled for the fall of 2001 at NGCD.

Five sheets were identified where some topics are potentially problematic, so as an interim measure, it was advised that all data sets relating to these sheets be deposited with the IHO-IOC DCDB in anticipation of their eventual use in building individual grids. For each sheet, participants would be consulted concerning a possible solution and the situation would be reviewed at the next meeting of the Editorial Board.

In light of the large number of sheets involved in the present IBCWP, it was suggested, subject to consultation with participants, that this project be divided into two components: the northern one would comprise sub-regions 1, 2 and 3, while the southern would comprise sub-regions , 5 and 6.

## 8. THE INTERNATIONAL BATHYMETRIC CHART OF THE ARCTIC OCEAN (IBCAO)

### 8.1 MEETINGS OF THE JOINT IOC-IASC-IHO EDITORIAL BOARD

The second meeting of the Joint Editorial Board took place at the International Hydrographic Bureau in Monaco, 2-4 November 1999, under the Chairmanship of Mr. Ron Macnab, Chairman IBCAO.

### 8.2 REPORT OF IBCAO

*(based on a report presented by Mr. Ron MacNab, Chairman IBCAO, to CGOM-VIII, May 2001).*

By the beginning of last year, the project had assembled all available data sets north of 64N and incorporated them into a coherent database. This information was used to construct a 2.5 x 2.5 km "Beta" grid which, in turn, was used to construct a provisional map of shaded relief. New information

received during the last twelve months will be used to produce an improved grid that will be submitted to the GEBCO Digital Atlas.

The third meeting of the Editorial Board is scheduled for the end of May 2001 at the Centre for Coastal and Ocean Mapping, University of New Brunswick. this gathering will address a number of short to long-term issues, e.g., IOC and IHO priorities for the production of printed maps, the designation of CCOM as a base of operations for the project for the foreseeable future, and possible structural and procedural revisions to reflect the IASC view that the IBCAO should no longer qualify as a formal IASC project because it has achieved a significant level of completion.

Concerning the question whether and to what extent manual methods might have been employed in the derivation of depth contours, Mr. MacNab explained that the project was an amalgam of manual and digital techniques, where an experienced bathymetrist developed contours while taking geomorphologic and other factors into account. The contours were then converted into digital form in regions of scarce data.

There followed a short discussion concerning the choice of an orthogonal (X,Y) co-ordinate system for defining IBCAO grid points, as opposed to a geocentric (latitude, longitude) system. It was explained that the orthogonal system was computationally more convenient and that it yielded far more satisfactory results in the visualization of the grid.

In responding to a query concerning the disposition of IBCAO products and their constituent data sets, Mr. MacNab explained that several hundred copies of a provisional map had been distributed either separately, or as an insert in Martin Jakobsson's PhD thesis at Stockholm University. A beta version of the grid is available for downloading from the project's Website. Martin Jakobsson holds copies of all constituent data sets in a working archive at the University of New Hampshire, but not all are reflected in the holdings of the IHO/DCDB. Circumstances permitting, it was agreed that steps would be given to harmonizing the UNH and DCDB archives.

Recalling that the Editorial Board had agreed to print definite IBCAO maps according to GEBCO and IOC specifications, Mr. MacNab asked for guidance on the design and format of the GEBCO version and on procedural matters related to the production of the IOC version(s). The Chairman of the GEBCO Guiding Committee replied that GEBCO was still considering future options for printed products, and would advise when the choices were clear. Central to the production of the IOC maps was the source of the contour information, i.e., copied from the latest HDNO Arctic map, or derived from the IBCAO grid. This question was deferred for discussion at the forthcoming meeting of the Editorial Board.

Finally, it was suggested that the project could serve as a prototype for future IBC projects, including second and subsequent editions of existing map sheets.

## 9. INTERNATIONAL GEOLOGICAL/GEOPHYSICAL ATLASES OF THE ATLANTIC AND PACIFIC OCEANS (GAPA)

### 9.1 MEETINGS OF THE CENTRAL EDITORIAL BOARD

No meetings took place in the period under consideration.

### 9.2 REPORT OF GAPA

*(based on a report presented by Dr. Gleb Udintsev, Chief Editor GAPA, to CGOM-VIII, May 2001).*

The status of work is as follows:

The work is financed as the expense of charitable assistance from Rice University, USA, the Japan Government and the Russian Academy of Sciences.

123 pages of the general amount of 180 pages are at the stage of colour proof printing. 35 sheets are at the stage of hachure proofs. By 1st October 2001 colour proofs of about 50-55 pages should be prepared. Print of the run copies in the amount of 600 copies is planned for the fourth quarter of 2001.

A significant addition to the contents of the Atlas are the following 4 sheets for the South Pacific: Bathymetry of Peter First Sea and one of the Marie Byrd Seamounts (1 page), Sections of multi-beam seismic profiling along and across the continental slope of the West Antarctic (2 pages) and Bathymetry and sections of sedimentary layer on seismic profiling and sediments column for the "Eltanin Impact Area" in the northern part of Bellingshauzen Sea (1 page).

## 10. SELECTED LARGE-SCALE MAPS IN EEZS OF DEVELOPING COUNTRIES

### 10.1 REPORT FROM PAKISTAN

A letter has been received from the Director of the National Institute of Oceanography , Karachi, requesting advice and assistance from IOC in constructing selected local charts in the country's EEZ. It was agreed that Dmitry Travin from IOC Secretariat would draft a letter of reply for the signature of the IOC Executive Secretary.

## 11. DECISIONS TAKEN BY THE IOC ASSEMBLY, EXECUTIVE COUNCIL AND REGIONAL COMMITTEES/SUB-COMMISSIONS

Ocean Mapping is referred to in IOC Resolution XX.5 (1999), in item 4.9 of the Executive Summary of IOCINDIO-III, Tehran, February 2000, and in Resolution EC-XXXIII.7 (2000). The full text is available in Annex IV.

## 12. TEMA AND CAPACITY BUILDING IN OCEAN MAPPING

Recent discussions in Mauritius identified opportunities for partnerships between developing and developed countries, featuring exchange visits and attendance at courses for which support from IOC might be available. In this context, it was noted that the Italian Hydrographic Service has offered basic hydrographic training at its centre in Trieste. At last year's meeting of the IBCWP Editorial Board in Tianjin, the feasibility of organizing a workshop in Boulder, USA, was discussed informally, but this proposition requires further consideration before it can be acted upon.

During the 1999 CGOM meeting, prospects for organizing courses as part of IOC's Floating University Programme were discussed. HDNO representatives pointed out that the *Siberikov* was engaged in training cruises, which could provide good TEMA opportunities if the seagoing curriculum could be expanded to include Ocean Mapping and Marine Cartography.

## 13. OCEAN MAPPING PRODUCTS/PUBLICITY

NGDC and IOC operate GEBCO and IBC Homepages on Websites. Over a thousand visitors were attracted to these Websites last year. Desmond Scott continues to sell IBC maps. GDA sales continue at a modest pace, with over 1200 copies now distributed worldwide.

## 14. ACKNOWLEDGEMENTS

The Consultative Group on Ocean Mapping wishes to express its gratitude and great appreciation for the close co-operation and support that is provided by the co-sponsors of the IOC, namely UNESCO, the IHO and the International Arctic Sciences Board (IASC).

## 15. APPROVAL OF THE REPORT

At CGOM-VIII, the Chairman and the Secretary of Ocean Mapping were instructed to finalize the document with the most recent information, to approve it and to submit the final version to the Assembly, for its acceptance.

ANNEX I

# MEMBERSHIP OF ALL GROUPS RESPONSIBLE FOR SUPERVISING OCEAN MAPPING PROJECTS SPONSORED (OR CO-SPONSORED) BY THE COMMISSION

## A. JOINT IOC-HI0 GUIDING COMMITTEE FOR THE GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)

| | | |
|---|---|---|
| Sir Anthony Laughton (UK) | **Chairman** | representing SCOR |
| Mr. David Monahan (Canada) | **Vice-Chairman** | IHO appointment |
| Ing. gen. Patrick Souquiere (France) | | Director EPSON France |
| Dr. Michael S. Loughridge (USA) | | Director, National Geophysical Data Center, Boulder Co. USA |
| Dr. Robin K.H. Falconer (New Zealand) | | representing CMG |
| Lic. José Luís Frías Salazar (Mexico) | | IOC appointment |
| Dr. Ing. Hans-Werner Schenke (Germany) | | IOC appointment |
| Mr. Alexis E. Hadjiantoniou (Greece) | | IOC appointment |
| Dr. Gleb B. Udintsev (Russian Federation) | | IOC appointment |
| Dr. Kunio Yashima (Japan) | | IHO appointment |

### GEBCO SCIENTIFIC ADVISERS

| | |
|---|---|
| Mr. Norman Z. Cherkis | U.S. Five Consultants |
| Dr. Meirion T. Jones | Director, British Oceanographic Data Centre, Southampton, UK |
| Dr. Larry A. Mayer | University of New Brunswick, Canada |
| Dr. Gary Robinson | Environmental Systems Science Centre, University of Reading, United Kingdom |
| Dr. Walter H.F. Smith | Geosciences Laboratory, NOAA/NOS USA |
| Dr. Andrew Goodwillie | Scripps Institution of Oceanography, USA |
| Cdr. Carlos Miguel Passoi Hansen | Diretor de Hidrografia e Navagação, Brazil |
| Mr. Ron Macnab | Geological Survey of Canada, Darmouth Nova Scotia, Canada |

### GEBCO Officers

:

| | |
|---|---|
| Mr. Bob Whitmarss | Permanent Secretary GEBCO |
| Mr. Peter Hunter | GEBCO Bathymetric Editor |
| Ms. Pauline Weatherall | GEBCO Digital Atlas Manager |

### Representative of organizations

| | |
|---|---|
| Rear Admiral Giuseppe Angrisano | President of the Directing Committee, IHB |
| Mr. Dmitri Travin | IOC Secretariat, UNESCO, Paris |

### GEBCO SUB-COMMITTEE ON DIGITAL BATHYMETRY (SCDB)

| | |
|---|---|
| Dr. Meirion T.Jones | Chairman<br>Director, British Oceanographic Data Centre |
| Mr. Norman Z. Cherkis | U.S Five Consultants |
| Dr. Michael S. Loughridge | Director, National Geophysical Data Center, USA |
| Mr. William Rankin | U.S. Naval Oceanographic Office |
| Capt. Andrey Popov | Head, Department of Navigation & Oceanography, Russian Federation |
| Dr. Ing. Hans-Werner Schenke | Alfred-Wegener-Institut, Germany |
| Mr. Shin Tani | Japan Oceanographic Data Center, Tokyo |
| Mr. Alexis Hadjiantoniou | Hellenic Navy Hydrographic Service, Athens |
| Dr. Michael Carron | U.S. Naval Oceanographic Office |
| Dr. John H. Hall | Geological Survey of Israel |
| Dr. Andrew Goodwillie | Scripps Institution of Oceanography, USA |

| | |
|---|---|
| Mr. Peter Hunter | BODK, UK |
| Mr. Ron Macral | Geological Survey of Canada |
| Mr. Tohy Pharaon | IHB, Monaco |

**GEBCO SUB-COMMITTEE ON UNDERSEA FEATURE NAMES (SCUFN)**

| | |
|---|---|
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| Ing. en Chef Michel Huet | International Hydrographic Bureau, Monaco |
| Dr. Galina V. Agapova | Geological Institute of the Russian Academy of Sciences, Moscow |
| Mr. M. A. Carvalho Oliveira | Diretoria de Hidrografia e Navegação, RJ, Brazil |
| Dr. Robin K.H. Falconer | Institute of Geological and Nuclear Sciences Ltd., New Zealand |
| Dr. Kunio Yashima | Hydrographic Laboratory, Maritime Safety Agency, Hiroshima, Japan |
| Mr. Desmond P.D. Scott | UK |
| Mr. Marcus Alsop | US Board on Geographic Names, NIMA |
| Rear Admiral Neil R. Guy (ex officio) | Director IHB, Monaco |

## B. CENTRAL EDITORIAL BOARD FOR THE INTERNATIONAL GEOLOGICAL GEOPHYSICAL ATLASES OF THE ATLANTIC AND PA.CIFIC OCEANS (GAPA)

| | |
|---|---|
| **Dr. Gleb B. Udintsev** | **Chief Editor**<br>**Vernadsky Institute of GeochemistryRussian Federation** |
| **Mr. Desmond P.D. Scott** | **Deputy Editor, UK** |
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| Dr. Manik Talwani | Houston Advanced Research Center, USA |
| Dr. Seiya Uyeda | Tokai University, Japan |
| Dr. Dina Zhiv | Mapping Production Association "Kartografia", Russian Federation |

## C. EDITORIAL BOARD FOR THE INTERNATIONAL BATHYMETRIC CHART OF THE MEDITERRANEAN AND ITS GEOLOGICAL/GEOPHYSICAL SERIES (IBCM)

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| **Dr. John K. Hall** | **Vice-Chairman**<br>**Geological Survey of Israel, Jerusalem, Israel** |
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| Captain Andrey Popov | Head Department of Navigation & Oceanography, St Petersburg, Russian Federation |
| Prof. Maurice Gennesseaux | Université Pierre et Marie Curie, France |
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## D. EDITORIAL BOARD FOR THE INTERNATIONAL BATHYMETRIC CHART OF THE CARIBBEAN SEA AND GULF OF MEXICO (IBCCA)

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| | |
|---|---|
| **Geog. José Luis Frías Salazar** | **Vice-Chairman**<br>**Instituto National de Estadística, Geografía e Informática, México** |
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| Major Rolando Feitö Sarduy | Instituto Cubano de Hidrografía, Cuba |
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| Ing. Olivier Parvillers | Service Hydrographique et Océanographique de la Marine, France |
| Capitan de Fragata L. A. Mendoza Mazzeo | Centro de Investigaciones Oceanograficas e Hidrograficas, Colombia |
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## E. EDITORIAL BOARD FOR THE INTERNATIONAL BATHYMETRIC CHART OF THE CENTRAL EASTERN ATLANTIC (IBCEA)

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| **Dr. Isabelle Niang-Diop** | **Vice-Chairman**<br>**Université C.A.DIOP, Dakar-Fann, Senegal** |
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## F. EDITORIAL BOARD FOR THE INTERNATIONAL BATHYMETRIC CHART OF THE WESTERN INDIAN OCEAN (IBCWIO)

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| Mr. Martin Chodota | Survey of Kenya |
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## G. EDITORIAL BOARD FOR THE INTERNATIONAL BATHYMETRIC CHART OF THE WESTERN PACIFIC (IBCWP)

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## H. IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM)

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| Rear Admiral Neil Guy | representing IHB | |

**Representative of the IOC Secretariat for Ocean Mapping**

| | |
|---|---|
| Mr. Dmitri Travin | Intergovernmental Oceanographic Commission,<br>UNESCO, 1 rue Miollis<br>PARIS 75732 CEDEX 15, France<br>Fax: +33 (1) 45 68 58 12<br>Tel.: +33 (1) 45 68 40 44<br>Email:d.travin@unesco.orc:<br>Time Zone: + 1 (Summer + 2) |

## I. EDITORIAL BOARD FOR THE INTERNATIONAL BATHYMETRIC CHART OF THE ARCTIC OCEAN (IBCAO)

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| Mr. Garrik Grikurov | VNIIOkeangeologia, St, Petersburg, Russian Federation |
| Mr. Hilmar Helgason | Icelandic Hydrographic Service, Reykjavik, Iceland |
| Mr. Martin Jakobsson | Stockholm University, Department of Geology and Geochemistry, Stockholm, Sweden |
| Dr. Garik Grikura | |

| | |
|---|---|
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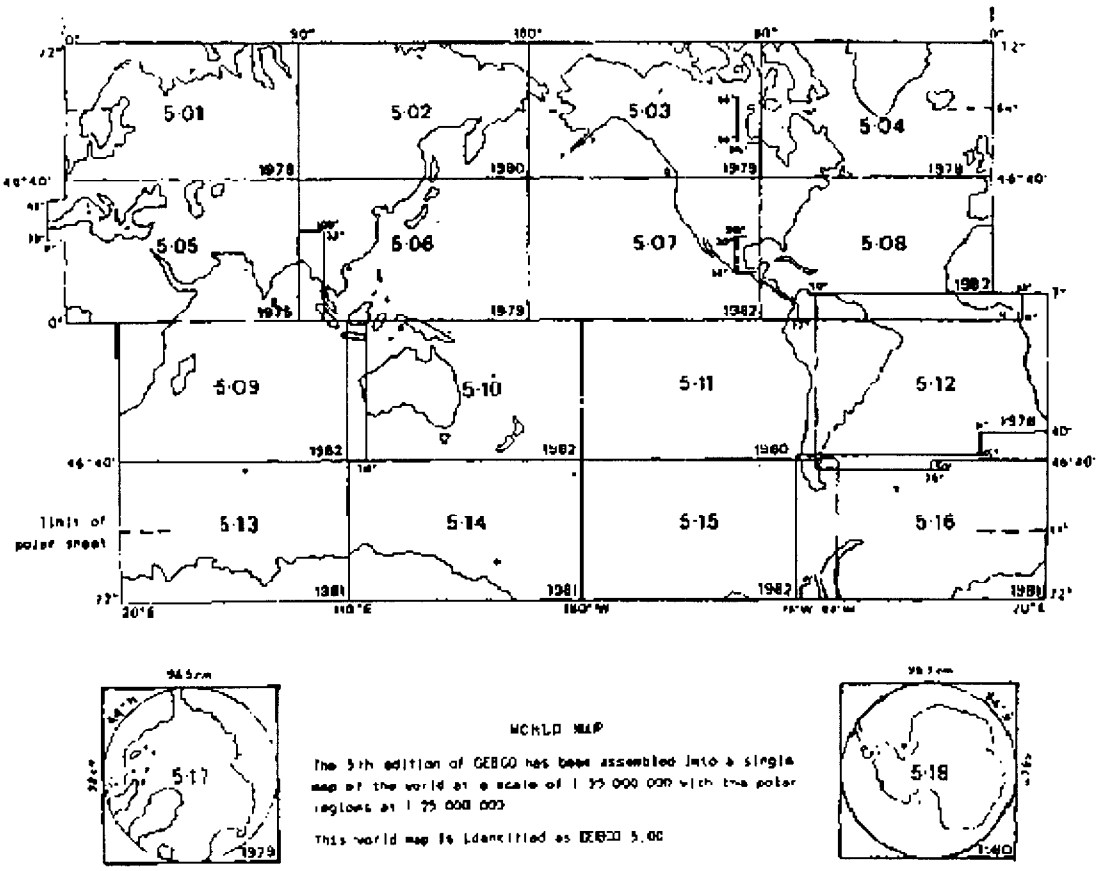
| Mr. John Woodward | Royal Danish Administration of Navigation and Hydrography, Copenhagen, Denmark |
| Rear Admiral Neil R. Guy (ex officio) | Director IHB, Monaco |

ANNEX II

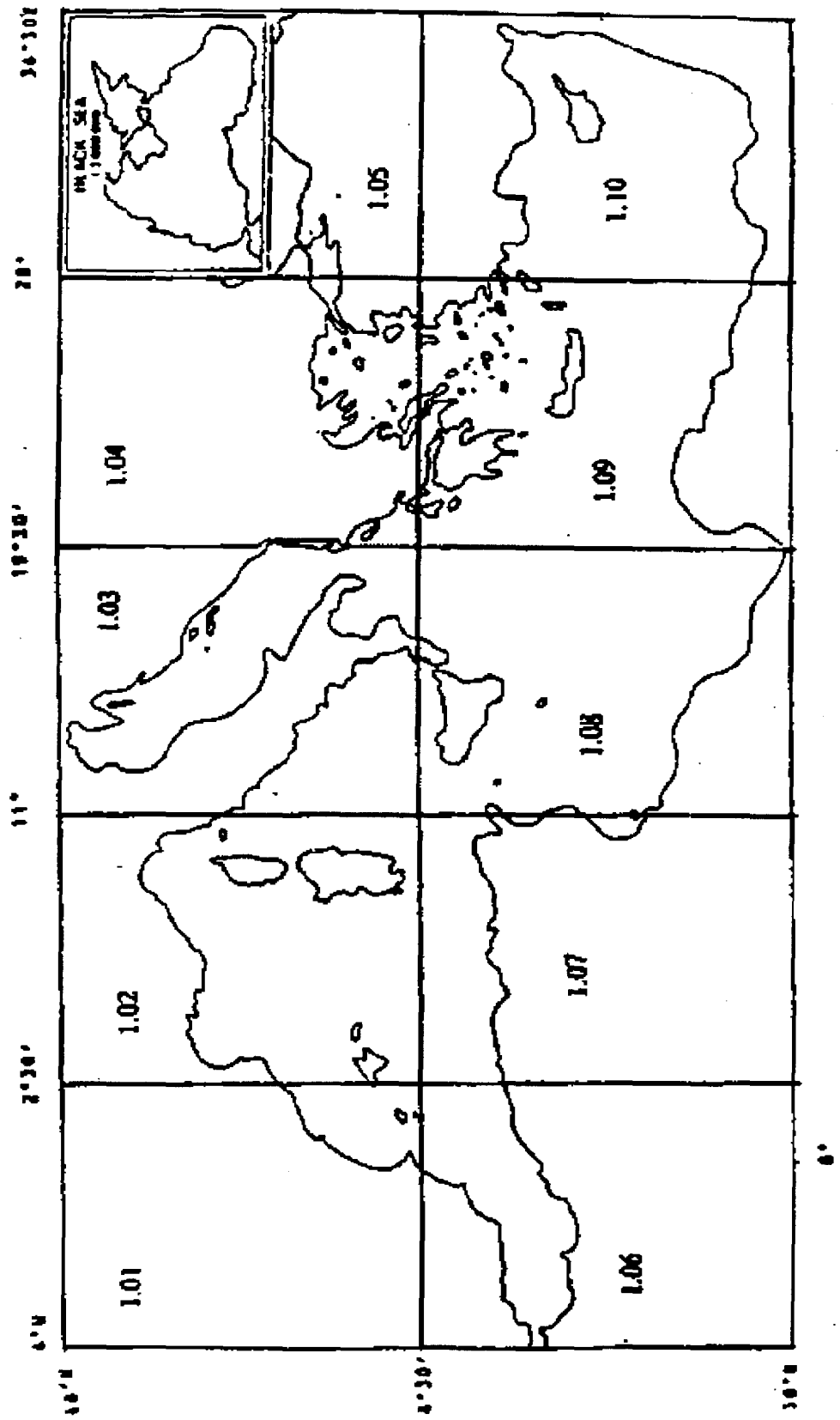
# ASSEMBLY DIAGRAM OF THE GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)

Scale l/l million at the Equator

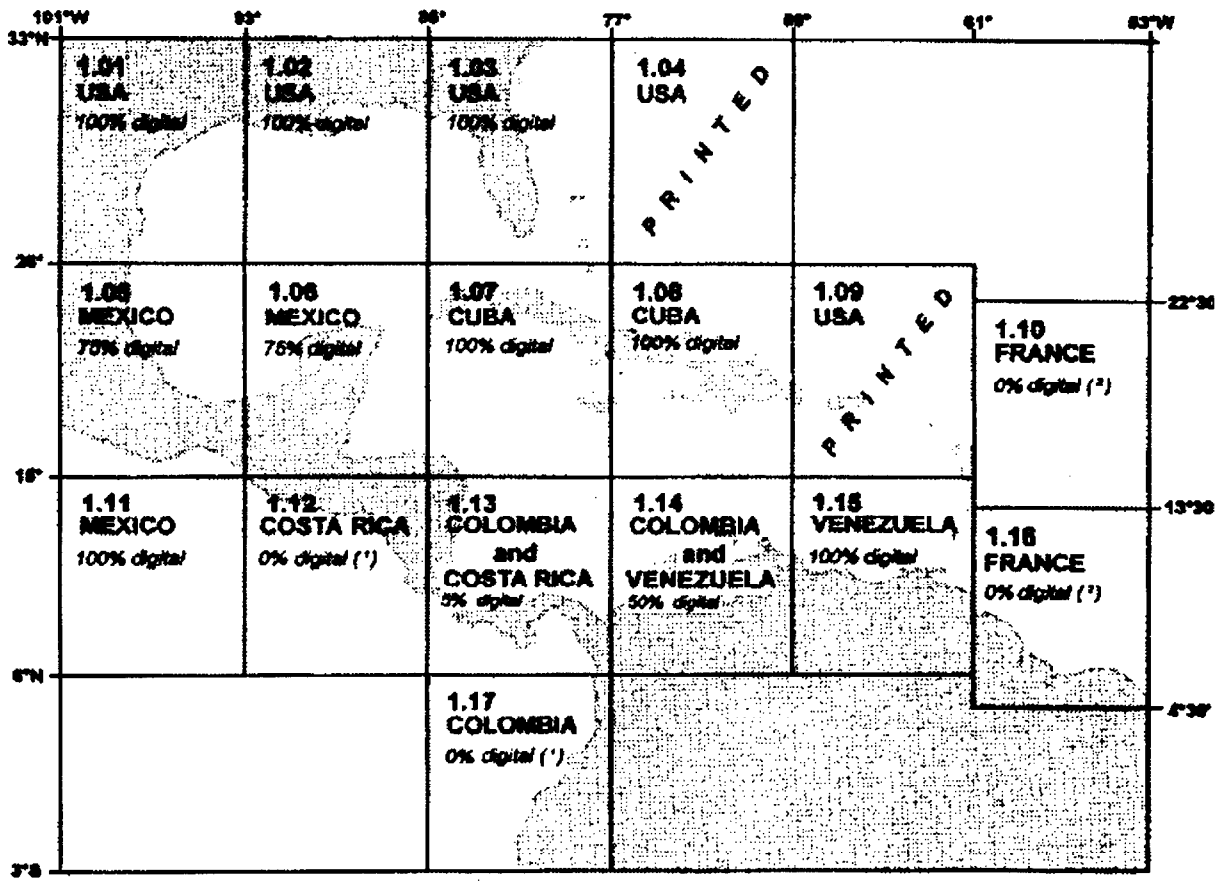


**ASSEMBLY DIAGRAM OF THE INTERNATIONAL BATHYMETRIC CHART OF THE MEDITERRANEAN (IBCM)**

Scale 1: 1 million at 38 "N

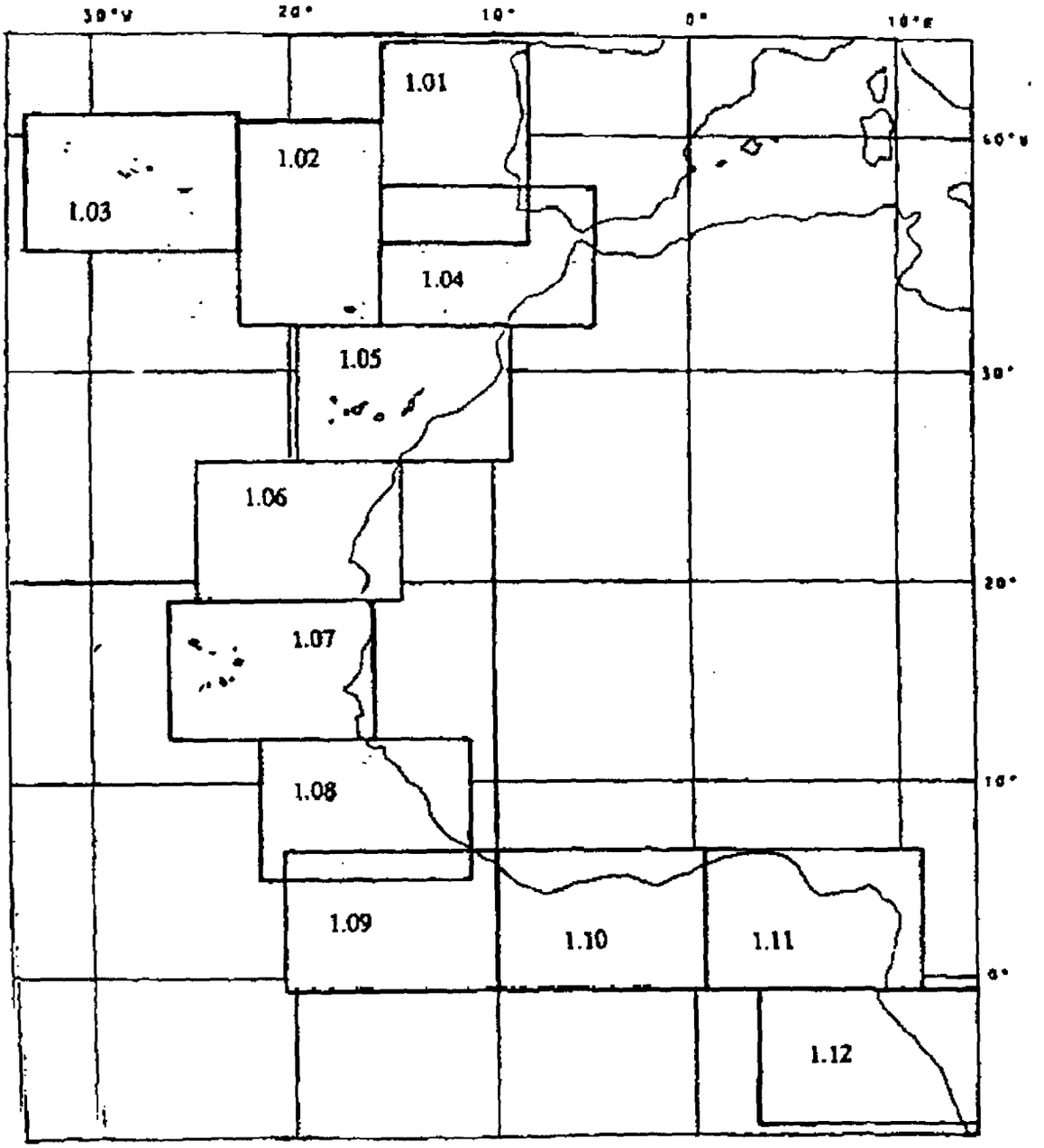


**ASSEMBLY DIAGRAM OF THE INTERNATIONAL BATHYMETRIC CHART OF THE CARIBBEAN SEA AND GULF OF MEXICO (IBCCA)**
Scale 1: 1 million at 15"N

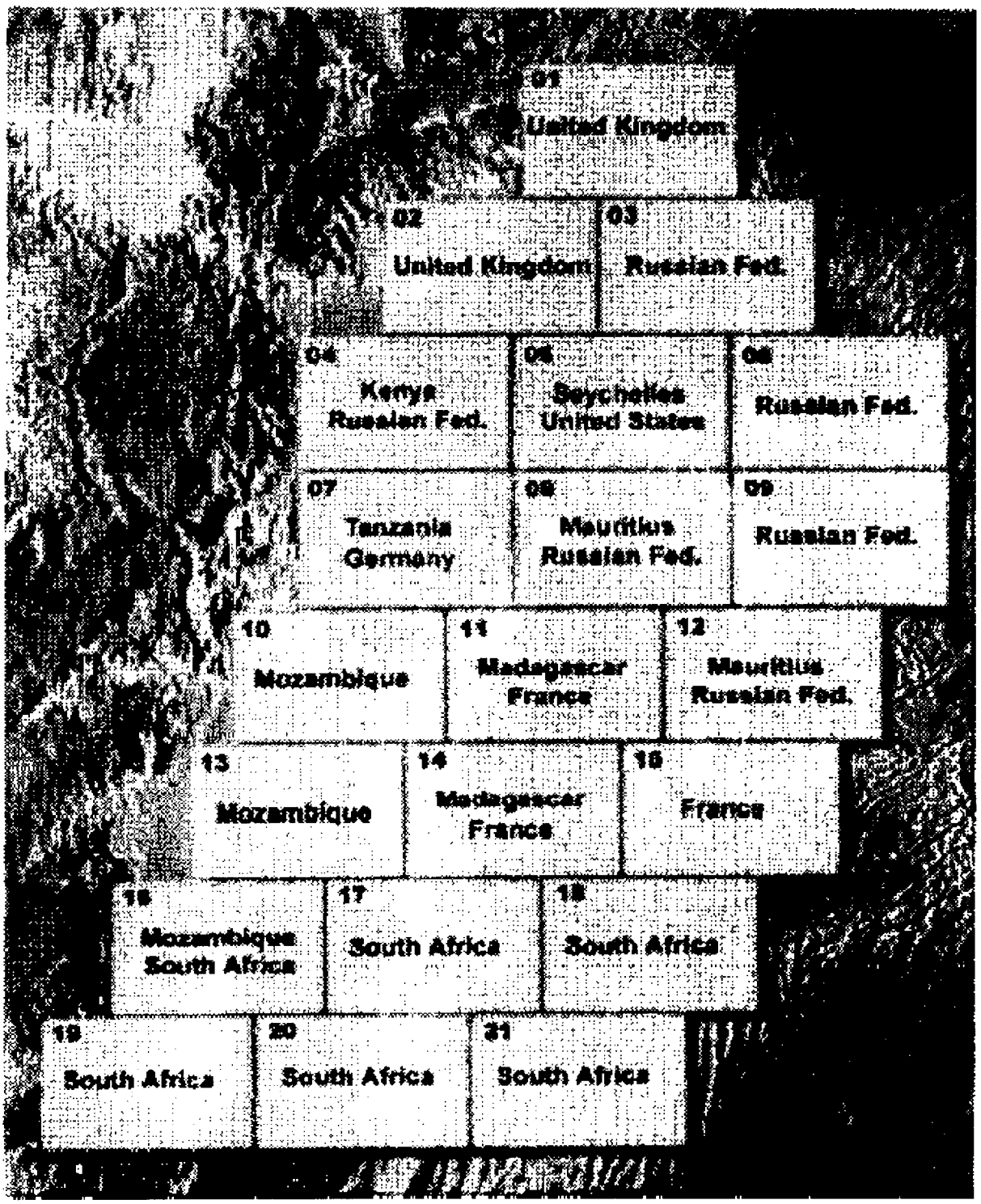


**ASSEMBLY DIAGRAM OF THE INTERNATIONAL BATHYMETRIC CHART OF THE CENTRAL EASTERN ATLANTIC (IBCEA)**

Scale 1: 1 million at 20"N

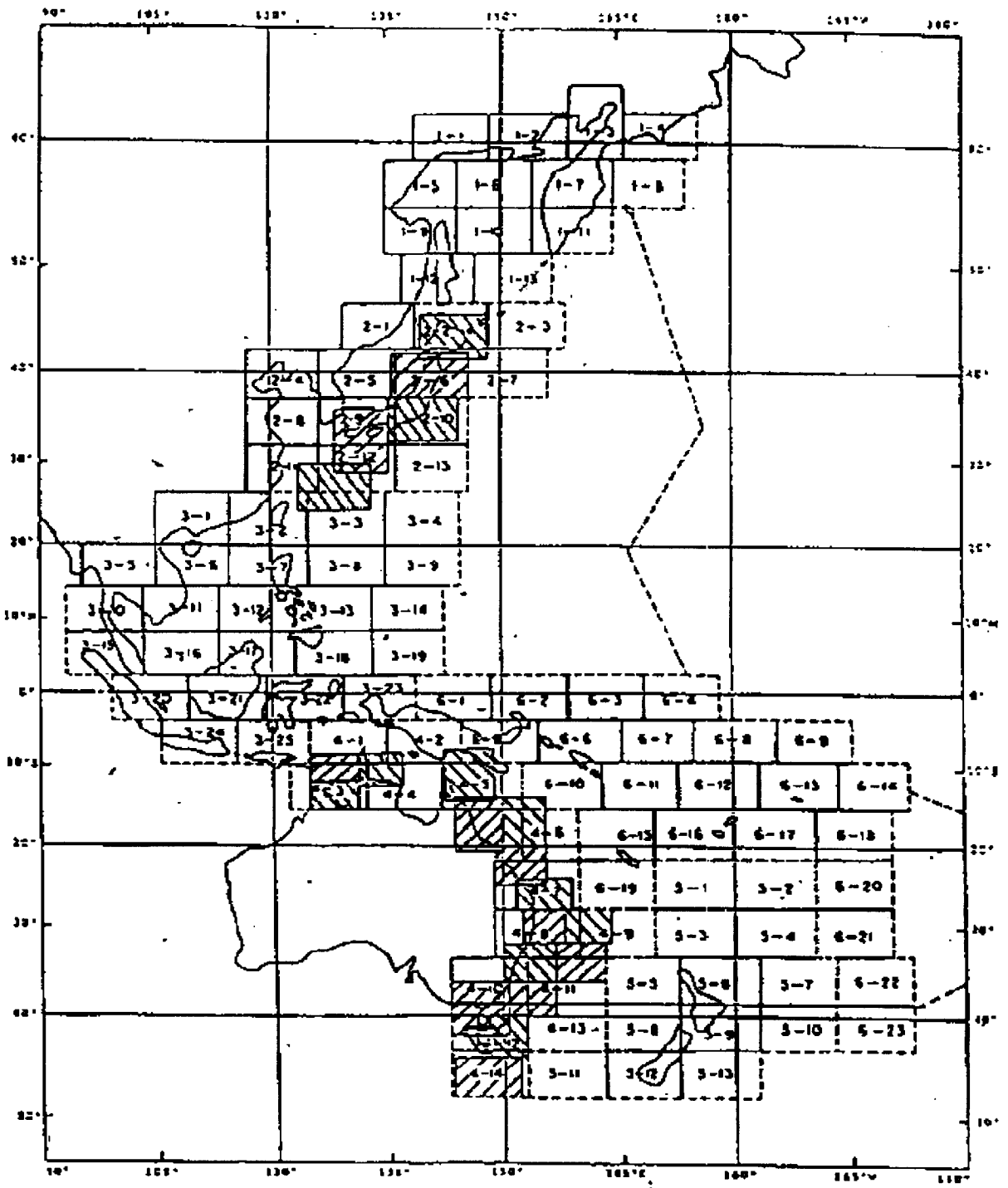


**ASSEMBLY DIAGRAM OF THE INTERNATIONAL BATHYMETRIC CHART OF THE WESTERN INDIAN OCEAN (IBCWIO)**
Scale 1: 1 million at the Equator

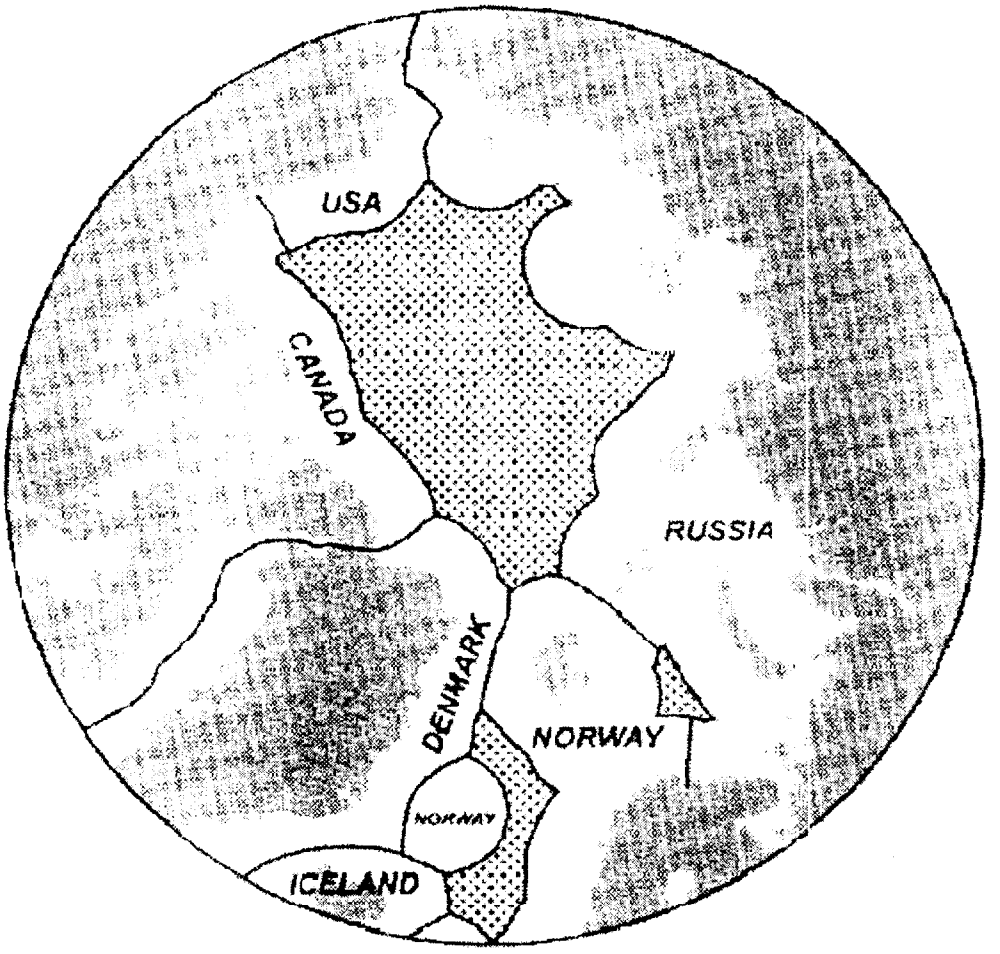


**ASSEMBLY DIAGRAM OF THE INTERNATIONAL BATHYMETRIC CHART OF THE WESTERN PACIFIC (IBCWP)**

Scale 1: 1 million at 33 o latitude



**INTERNATIONAL BATHYMETRIC CHART OF THE ARCTIC OCEAN (IBCAO)**
High Seas (patterned) and approximate limits of Zones of National Interest (ZNIs)
north of 64N



ANNEX III

## LIST OF IOC OCEAN MAPPING PRODUCTS

### 1. THE GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)

[Jointly sponsored with the International Hydrographic Organization]
(see Assembly Diagram in Annex II, page 1)

Flat sheets:

- 16 sheets 72°N to 72°S, Mercator projection
  Scale 1: 10M at the equator;
- 2 polar sheets to 65° lat. Polar Stereographic projection
  Scale 1:6M at 75° latitude;
- 1 world sheet, 72°N to 72°S, Mercator projection
  Scale 1: 3 SM at the equator and 2 polar insets
  (as above) Scale 1:25M at 75° latitude.
- Supporting Volume.

Boxed Set containing all above 19 sheets (folded)
Supporting Volume and legend.

GEBCO Digital Atlas (GDA) on CD-ROM (GEBCO-97)
GEBCO-97 (February 1997) is the Second Release of the GEBCO Digital Atlas (GDA). It is an updated version of the First Release (March 1994). The following new (updated) data sets are included in the GEBCO-97 CD-ROM:

- bathymetry of the southern Indian Ocean, the north-east Atlantic off the British Isles, and the Weddell Sea
- five versions of the SCAR Coastline of Antarctica at a range of scales from 1: 30 million up to 1:250,000 (a new data set replacing the World Vector Shoreline south of 60°S)
- a trackline inventory ofthe digital echo-sounding data held at the MO Data Centre for Digital Bathymetry (updated to January 1997)
- a digital set of geographically referenced feature names including the MO-IOC Gazetteer of Geographical Names of Undersea Features, a list of the ports/cities and Antarctic islands portrayed on the printed sheets of the GEBCO (5th edition), a list of Antarctic stations and a specially prepared list of oceanic islands (MO/IOC Gazetteer updated with recently approved names)
- a set of supporting documents describing each of the data sets included on the CD-ROM (updated to cover new data sets)
- GDA Software Interface Version 2 (with modifications to correct bugs and some new features)

Guidelines for the GEBCO - IHO/IOC publication B-7
The present state of production is as follows:

| | |
|---|---|
| Part 1 | GEBCO Organizational Framework |
| Part 2A | Bathymetric Data Management - Analogue Data |
| Part 2B | Bathymetric Data Management - Digital Data |
| Part 3 | Digital Bathymetric Data (Single-Beam Echo Sounders) |
| Part 4 | Digital Bathymetric Data (MultiBeam Echo Sounders) (Publication expected 1997) |
| Part 5 | Underway Geophysics Data |

Catalogue of Bathymetric Plotting Sheets and its Annex - MO/IOC publications B-2 and B-3

| | |
|---|---|
| B-2 | 4th Edition published March 1991; |
| B-3 | 6th Edition published May 1991. |

Note: 2 contains indexes showing the 1: 250,000 plotting sheet coverage of IOC' s regional ocean mapping projects.

Standardization of Undersea Feature Names * - IHO/IOC publication B-6
Versions: English/French [2nd Edition published 1989]
English/Russian) [2nd Edition published 1990]
English/Spanish) [2nd Edition published 1993]
English/Japanese [1 st Edition published 199l]
English/Chinese [1 st Edition published 1992]

* These publications are provided free of charge on request.

Gazetteer of Geographical Names of Undersea Features shown (or which might be added) on the GEBCO and on the IHO small-scale international chart series (1:2,250,000 and smaller)
[IHO/IOC publication B-8, 2nd Edition, July 19961
This item is now being maintained and regularly updated in digital form.

## 2. THE INTERNATIONAL GEOLOGICAL-GEOPHYSICAL ATLASES

The Geological-Geophysical Atlas of the Indian Ocean (published 1975)

The International Geological-Geophysical Atlas of the Atlantic Ocean (published 1991)

The International Geological-Geophysical Atlas of the Pacific 0cean (in preparation)

## 3. THE INTERNATIONAL BATHYMETRIC CHART OF THE MEDITERRANEAN AND ITS GEOLOGICAL/GEOPHYSICAL SERIES (IBCM)

(see Assembly Diagram in Annex II, page 2)

Flat sheets:

Bathymetric Chart in 10 sheets Mercator projection
Scale 1: 1M (at 38°NO.) Black Sea 1:2M.
Bathymetric Chart in 1 sheet Mercator projection
Scale 1:5M (at 38°N.) Black Sea 1: 1OM.

Digitized contours

These are contained in the GEBCO Digital Atlas (see above).

Geological/Geophysical series
(same scales and sheet limits as the bathymetric chart):

Bouguer Gravity Anomalies (IBCM-G)

Seismicity (IBCM-S)

Thickness of Plio-Quaternary Sediments (IBCM-PQ)

Unconsolidated Bottom Surface Sediments (IBCM-Sed)

Magnetic Anomalies (IBCM-M)

List of Geographical Names of Undersea Features shown (or which might be added) on the International Bathymetric Chart of the Mediterranean (IBCM) and on the IHO small-scale international chart series for the Mediterranean [IHO/IOC publication B-8 Supplement No. 1 (IBCM), 1st Edition, 1990]

## 4. THE INTERNATIONAL BATHYMETRIC CHART OF THE CARIBBEAN SEA AND GULF OF MEXICO (IBCCA)

(see Assembly Diagram in Annex II, page 3)

Flat sheets:

Bathymetric Chart Mercator projection Scale 1: 1M (at 15°N.)

Sheet 1.04 Published 1994 (USA);
Sheet 1.09 Published 1993 (USA).

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## 5. THE INTERNATIONAL BATHYMETRIC CHART OF THE CENTRAL EASTERN ATLANTIC

Flat sheets:

Bathymetric Chart Mercator projection Scale 1: 1M

Sheet 1,08 Published 2000 (France)

ANNEX IV

# IOC RESOLUTIONS AND RECOMMENDATIONS WITH REFERENCE TO OCEAN MAPPING

## Resolution XX-5

## OCEAN MAPPING

The Intergovernmental Oceanographic Commission,

**Recalling** that Ocean Mapping is a matter of high importance to all IOC Member States as well as to global and regional science and service programmes, such as climate programmes, ICAM, tsunamis and storm surges,

**Noting with satisfaction:**

(i) that, in accordance with Resolution XIX.3 of the IOC Assembly, the Joint IOC-IASC-IHO Editorial Board for the International Bathymetric Chart of the Arctic Ocean (IBCAO) has been established and held its inaugural meeting in the Royal Danish Administration of Navigation and Hydrography in Copenhagen, Denmark, 19-20 October 1998,

(ii) the close co-operation in Ocean Mapping with the International Hydrographic Organization (IHO) and the progress made in Ocean Mapping due to the efficient co-operation of the IOC Consultative Group on Ocean Mapping (CGOM) with the Editorial Boards for the International Bathymetric Charts for six selected areas of the World Ocean, of which the Arctic Ocean is the most recent,

**Takes note of:**

(i) the Report of the Seventh Session of the Consultative Group on Ocean Mapping (CGOM), which met in the International Hydrographic Bureau in Monaco, 12-14 April 1999;

(ii) the comprehensive Report of the Consultative Group on Ocean Mapping (CGOM) which was submitted to the Twentieth Session of the Assembly in accordance with Clause 1 of its Terms of Reference;

**Considering** the international co-operative aims of Agenda 21 and in recognition of the demands of the Ocean Scientific Community for seamless gridded data sets embracing deep ocean and continental margin data,

**Invites** Member States:

(i) to provide assistance to the Centenary Conference for the General Bathymetric Chart of the Ocean (GEBCO), to be held in Monaco in the year 2003;

(ii) to assist developing countries, at their request, in the exploration and protection of their Exclusive Economic Zones (EEZs) in providing technical assistance, or assisting in the production of large-scale bathymetric charts for areas of particular interest such as coastal zones and near-shore shelf areas;

(iii) to give increased support to TEMA and capacity building in Ocean Mapping in national and regional programmes, for instance by offering shipborne and land-based courses for professional and student trainees of developing countries; and

**Instructs** the Executive Secretary IOC to support the United Nations' initiative to publish the UN Atlas under the auspices of the ACC Sub-Committee on Oceans and Coastal Areas.

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Financial implications for 2000-2001:

- Participation of Ocean Mapping officers, staff and experts in relevant activities of Ocean Mapping and other programmes and organizations in 2000-2001 : US$ 25,000

- Biennial cycle of meetings of the IOC Consultative Group on Ocean Mapping and GEBCO Guiding Committee in 2001: US$ 25,000

- Meetings of the Editorial Boards for the biennial cycle: IBCM, IBCWIO, IBCCA, IBCEA, IBCWP, IBCAO: US$ 115,000

- Contracts for the organizations of related Ocean Mapping activities: US$ 80,000

Total required: US$245,000 (US$50,000 from Regular Programme)
(US$195,000 from Extra-budgetary Sources)

**Resolution EC-XXXIII.7**

**GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)**

The Executive Council,

**Recalling** that IOC Resolutions XVIII-10 (1995), XIX-3 (1997) and XX-5 (1999) emphasised the high importance of Ocean Mapping to all IOC Member States as well as to global and regional science programmes, such as climate programmes, ICAM, tsunamis and storm surges,

**Noting with satisfaction:**

(i) the close cooperation in Ocean Mapping, especially GEBCO, with the International Hydrographic Organization (IHO), the importance of mapping data from the IOC International Bathymetric Chart series and the numerous significant contributions for updated bathymetry thoughout the world's oceans,

(ii) the continued success of the second release of the GEBCO Digital Atlas (GDA) and the plans for the updating and inclusion of gridded contours for the third release of the GDA (planned for 2001),

**Taking note of:**

(i) the findings of the SCOR Working Group 107 and in particular the stated needs of the scientific community for high resolution grids of the bathymetry of the ocean floor,

(ii) the need for extensive updating of the world's bathymetry and of the Pacific Ocean and Arctic Ocean in particular,

(iii) the requirement to develop the technology of the GDA and make optimum use of emerging information technologies,

(iv) the need to create a new 6th edition of the GDA by print-on-demand technology,

**Considering** that at present GEBCO depends on limited IOC funding, UK funding for salaries, IHO (non-financial) sponsorship, part-time participation of numerous organizations, substantial voluntary contributions from the scientific communities and hydrographic offices,

**Invites** Member States:

(i) to support the determination of the morphology of the ocean floor especially in those areas of scientific and commercial importance as identified by SCOR/IOC;

(ii) to assemble, collate and contour such areas so as to contribute to the improvement of the global charts of GEBCO;

(iii) to take into account all other relevant geological, geophysical and satellite data to aid in interpolation and interpretation;

(iv) to generate and make available to the GEBCO global grid, gridded and/or contoured data of their continental margins if appropriate;

(v) to support financially the GEBCO Centenary Conference on ocean floor mapping to be held in Monaco in April 2003;

(vi) to consider and support the GEBCO proposal to prepare an educational GEBCO CD-ROM for wide distribution to schools and Universities;

(vii) to consider creating and supporting GEBCO Centenary Fellowships to enable well qualified geoscientists to accelerate the updating of global bathymetry;

**Instructs** the IOC Executive Secretary to provide support towards the GEBCO Centenary Conference, the printing of the 6th edition of the GDA and partial support of a GEBCO Centenary Fellowship.

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Financial implications: US$20,000 from extra-budgetary sources

## IOC/CGOM-VIII.1

The Consultative Group on Ocean Mapping,

**Recognizing** the increasing demand for both improved contoured charts of the ocean floor and for a bathymetric ocean grid from oceanographers, and from governments, and the need to collect all possible sounding data from countries throughout the world,

**Noting** the importance of ensuring close communications with coastal states,

**Recommends** to the Commission that funds are made available to ensure regular meetings of GEBCO and its sub-committees at centers of data and of excellence;

**Recognizing** the value placed on accurate bathymetry by many climate relate and modeling oceanographic programmes,

**Recommends** to the IOC Executive Secretary that these IOC and other programmes also contribute towards the expenses of GEBCO;

**Recognizing** the importance of the input of the IBC Programmes to GEBCO,

**Reminds** Editorial Boards that IBC contours, once approved by the Boards, be made available for the GEBCO Data Digital Atlas (GDA), prior to publication.

## IOC/CGOM-VIII.2

The Consultative Group on Ocean Mapping,

**Noting** with satisfaction the progress made in the implementation of the two main programme components of Ocean Mapping, namely GEBCO and the IBCs,

**Accepts** the Reports of GEBCO-XVII, IBCM-VIII, IBCWIO-V, IBCWP-II and IBCAO-II, and verbal information on GEBCO-SVIII,

**Invites** Mr. Walter Smith, NOAA, to prepare Guidelines on how to combine predicted sea floor topography with the bathymetric survey data to produce IBC contours,

**Invites** the Executive Secretary to hold an informal meeting on progress of officers of the Editorial Board of IBCCA before the end of the year making sure that the new chairperson will attend, and **recommends** that the 9th Session of the Editorial Board be held no later than May 2002,

**Advises** Member States to exchange data in the Western Pacific (IBCWP) through the IHO Data Center for Digital Bathymetry,

**Recommends** that Member States include in their training programmes for IBCWP subjects such as quality control of bathymetric data, combining conventional and multibean data, and standardization.

**Invites** Member States to review their unreleased data holdings in the Artic Ocean, and to identify information that could be made available to improve the present version of the IBCAO.

## IOC/CGOM-VIII.3

The Consultative Group on Ocean Mapping,

**Taking into consideration** the initiative of the Chilean Delegation during the 33rd Session of the IOC Executive Council, supported by IOC Member States mentioned in Resolution EC-XXXIII.7 "*...as needs for extensive updating of the world bathymetry and of the Pacific and Artic Oceans in particular...*",

**Recommends** to the Assembly to establish and Editorial Board for the Southeast Pacific (IBCSEP), and **invites** the IOC Executive Secretary to set Terms of Reference and Specifications, as well as to arrange the 1st Meeting of the Board before the end of 2001.

## IOC/CGOM-VIII.4

The Consultative Group on Ocean Mapping,

**Noting** the increase in the flow of new names of undersea features resulting from the more detailed mapping undertaken by the regional mapping projects of IOC,

**Recommends** to the IOC Executive Secretary that funding for Ocean Mapping is increased to enable meetings of the GEBCO Sub-Committee on Undersea Feature Names (SCUFN) to take place yarly, alternate meetings being held at IHB, Monaco.

ANNEX V

## STATEMENTS MADE BY THE CHAIRMAN CGOM

1. INTRODUCTORY STATEMENT BY THE CHAIRMAN AT XX SESSION OF IOC ASSEMBLY, 1999

Mr. Chairman,

Ocean Mapping is a priority action of the IOC - this was decided by the Assembly at its 17th Session, in 1993.

There are three components:

1. GEBCO, the General Bathymetric Chart of the Oceans, a global overview at a scale of 1:10 mio. GEBCO is directed by a joint IOC-IHO Guiding Committee. It will celebrate its centenary in the year 2003.

2. The IBCs, the International Bathymetric Charts of six regions of the World Ocean of particular interest, at a scale of 1:1 mio. IBCs are prepared by Editorial Boards with the help of Member States.

3. CGOM, the IOC Consultative Group on Ocean Mapping, which coordinates the implementation of GEBCO and the IBCs, and which establishes close cooperation with IHO. CGOM gives advice to the IOC governing and regional bodies. It held its 7th Session in April this year in the new premises of the IHO in Monaco.

   It is about the recommendations of this meeting I wish to speak now.

   The Group concentrated on four main topics:

   1. Progress made in GEBCO, and in the preparation and publication of the IBCs;
   2. Digitization and inclusion of data in the GEBCO Digital Atlas;
   3. A concept for selected local charts at large scale, p. ex. 1:100 000, for the exploration, but also preservation of the EEZs of developing countries
   4. TEMA and capacity Building in Ocean Mapping.

Items 3 and 4 were new on the agenda. Item 3 is a new, 4th component of Ocean Mapping as described above.

Under 1, the Group welcomed the progress made in the Mediterranean (IBCM), where all overlay sheets with geological-geophysical parameters have now been printed (with 10 sheets in each series). In the Caribbean (IBCCA) two sheets out of 17 are published, in the Western Indian Ocean (IBCWIO) one sheet out of 21 has been printed, one more is in the process of being printed. In the Eastern Atlantic (IBCEA) with its 12 sheets the state of printing has not yet been reached; the same is true in the Western Pacific (IBCWP), where an ambitious programme involves 102 sheets split into five sub-regions. In the Artic Ocean (IBCAO) individual sheets have not yet been established.

IBCs fully on the partnership of developed countries with the developing countries of a region. In this context I also wish to mention Russia's engagement in GAPA and the International World Ocean Atlas.

There is no doubt that GEBCO and the IBCs profit from the close and friendly cooperation eith IHO. An expression of thanks therefore should go to the President, Rear-Admiral Angrisano, and the Members of the Directing Committee.

Under 2, digitization makes considerable progress. It is worth mentioning that Mexico provided a CD-ROM with data for all IBCCA sheets thus making available sheets on PC before the paper sheets are printed. The Consultative Group noted this approach with considerable interest.

Under 3, based on an initiative from IOMAC, the Indian Ocean Marine Affairs Cooperation with headquarters in Colombo, and from IOCINCWIO, the new item on the agenda on large-scale charts raised great interest in the Group. It agreed that such special charts would assist developing countries in the exploration, but also preservation of the marine environment, of their 200-mile zones. Coastal development, tourism, mineral resources research and prospecting, artisanal fisheries, archaeology, but also tsunami forecasting, all depend on such charts.

Under 4, the requirements to implement item 3 demand for TEMA and Capacity Building, in particular in form of partnership and financial support.

The successful training courses on board the German RV METEOR and on land - in 1987 in Madagascar, in 1993 in South Africa - were regarded by the Group as good examples not only to increase knowledge in bathymetry in a region, but also to establish contacts with and between the respective local institutions.

The substance of the 4 above-mentioned points is reflected in a Draft Resolution which the Consultative Group herewith submits to the Assembly for its consideration and adoption.

I wish to repeat: Ocean Mapping is since six years a priority action of the Commission.

I invite both, developed and developing Member States of the Commission, as well as its Regional Sub-Commissions and Committees, to provide increased attention and support to mapping, remembering that charts are the basis, and often first step, to make scientific work and services in the ocean and along the coasts possible.

Thank you!