

# **Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans**

## **Sixteenth Session**

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## 1. OPENING OF THE SESSION

The Sixteenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO) was held at the Southampton Oceanography Centre (SOC), United Kingdom, Sir Anthony Laughton, Chairman GEBCO, opened the Session at 09:30 on Monday 23 June 1997. He introduced Dr. Philip Weaver, Head of Challenger Division, and invited him to make the opening address.

In welcoming the Guiding Committee to the SOC, Dr. Weaver, speaking on the behalf of Dr. John Shepherd, Director SOC, explained that the new centre had been created in 1995 from an amalgamation of several previously separate bodies. These included two NERC Units, the IOS Deacon Laboratory at Wormley and the Research Vessels Services in Barry, Wales. To these were added the Departments of Geology and Oceanography at Southampton University. The SOC houses 550 people, including students and support staff. In addition to its comprehensive scientific library, laboratories and IT installations, it also has a series of sophisticated workshops supporting ocean research projects. It is one of the biggest such institutions in Europe.

He commented that GEBCO and the former NIO/IOS had enjoyed a long and fruitful connection. He said he was especially pleased to welcome the Guiding Committee to SOC where he hoped they would derive much interest from contacts with SOC scientists and from tours of the establishment. He wished the Committee a successful meeting. Dr. Shepherd, Director SOC, joined the Session for a short time on the morning of 25 June.

Coinciding with the opening of the Guiding Committee Session and in the adjoining lecture theatre, Prof. John D. Woods of Imperial College, London, gave a keynote speech to the Institute of Electrical and Electronic Engineers at their Conference on Operational Oceanography in the Next Century. Prof. Woods has been a long and active supporter of GEBCO activities. In 1989, as Director of Marine and Atmospheric Sciences, NERC, he was instrumental in creating the two key posts of GEBCO Bathymetric Editor and GEBCO Digital Atlas Manager. The Chairman seized the opportunity to invite Prof. Woods to speak to the participants on matters germane to GEBCO interests.

The message he delivered was that operational oceanography for the next century had already started. The first global interactive model for ocean forecasting is being developed at the UK Meteorological Office for the NW European Shelf area.

Three key problems have been identified:

- There is fragmentary evidence that currents fluctuate (initial research suggests that conditions vary over a long term);
- no theory exists about the limits of predictability; and
- in all but a few areas, the true shape of the sea floor is unknown.

The delivery of true world sea floor maps was a key element to the provision of accurate ocean forecasting. It is estimated that a trillion dollars will be spent each year on the quest for accurate forecasts. Prof. Woods said that GEBCO should take heart that there are customers for its products, especially gridded data sets, over the horizon. However, he recognized the huge amounts of time required to survey the world's oceans with multibeam.

The Chairman responded by saying that so far GEBCO had delivered only vector contours. For the past three years, a small group of scientific advisers had been studying the problems of producing a gridded data set from the contours in the GEBCO Digital Atlas - one of the so far unresolved difficulties was how to create such a set in areas where little or no data exist. Discussions at the prior Sub-Committee on Digital Bathymetry (SCDB) meeting in Taunton had resolved certain key gridding issues and a first trial workplan had to be adopted.

The Chairman said that there were a number of global initiatives working towards a better description of the world's bathymetry; these included major new mapping projects in the Arctic, Antarctic, Indian, Atlantic and Pacific Oceans. SCOR WG 107, and GEBCO, although not pro-active data collectors, sought to draw together the results of the work of others, and provide a focus for the international community.

There followed some general discussion about GEBCO and its relationships with other communities, and how the quantity and flow of information to GEBCO products could be improved. Three requirements were voiced: a plea for the submission of more sounding data to the IHO DCDB; encouragement for ships on ocean transits not to repeat already sounded ship tracks; and for the continuous use of the echo sounder.

Questions were raised about the need for input specifications for the collection of survey data. Prof. Woods said he suspected that a few years would elapse before a consensus was available. Meanwhile, he was looking to SCOR WG 107 to collect evidence for specifications. He said that it was likely that funding agencies would only respond when there is agreement on this issue - perhaps within five years. Meanwhile, 23 national agencies were moving towards rationalized collaborative ventures for the seas around Europe. This is expected to be fully operational by 2003.

In thanking Prof. Woods for his address, the Chairman also paid a warm tribute for his past efforts in helping GEBCO to launch the GDA. He said it was a wonderful stimulus for the GEBCO Guiding Committee to hear first hand about the worldwide demand for the products they were developing and the realization that these will provide a key element to feed into operational oceanography in the next century.

The meeting then returned to the agenda. A full list of participants is given in Annex IX.

Apologies for absence had been received from:

Dr. Werner Bettac	Dr. Gary Robinson
Capt. Hugo Gorziglia	Lic. José Luis Frias Salazar
Dr. Ron Macnab	Dr. George Sharman
Dr. Larry Mayer	Dr. Walter Smith
Mr. David Monahan	Dr. Kunio Yashima

## 2. CONDUCT OF THE SESSION

### 2.1 ADOPTION OF THE AGENDA

The Chairman said that as a result of discussions in the preceding SCDB meeting, he wished to add one related item, "IOC International Bathymetric Chart Projects and how they relate to GEBCO". It was agreed that this should be taken as Item 12, thus allowing input from Mr. Desmond P. D. Scott who, until January 1998, remains the Chairman of CGOM. Subsequent items to be re-numbered (see Agenda, Annex I).

### 2.2 DOCUMENTATION, ADMINISTRATIVE ARRANGEMENTS, ETC.

The Permanent Secretary introduced the documentation - see Annex II.

Other additional documents were tabled.

### **3. COMPOSITION OF THE GUIDING COMMITTEE AND ITS SUB-COMMITTEES**

#### **3.1 GUIDING COMMITTEE**

Notification was received from Capitán de Navío J.M. Fernández de la Puente of his resignation from the Guiding Committee. Rear Admiral Christian Andreasen said that since Capitán de la Puente had been an IHO nominee, he would write to the Member States inviting them to put forward their proposed replacement. The final choice of an appointee would be made by the IHO Directing Committee.

The Chairman reminded the meeting of the composition rules for membership of the Guiding Committee, whereby not more than one person from any one country could be appointed.

#### **3.2 SUB-COMMITTEE ON DIGITAL BATHYMETRY (SCDB)**

There were no suggested changes in membership.

#### **3.3 SUB-COMMITTEE ON UNDERSEA FEATURE NAMES (SCUFN)**

Dr. Robert L. Fisher, Chairman SCUFN, reported that Capitão-de-Fragata Roberto F. Carvalho from the Diretoria de Hidrografia e Navegação, Brazil, had resigned from the Committee and that his place had been taken by Mr. Marco Antonio de Carvalho Oliveira, from the same office.

#### **3.4 SCIENTIFIC ADVISERS**

In recognition of their considerable active support for GEBCO, three scientists were proposed as additional names for the list of Scientific Advisers:

Dr. Michael Carron (USNOO);  
Dr. Andrew Goodwillie (Scripps Institution of Oceanography);  
Dr. Ron Macnab (Geological Survey of Canada, Atlantic).

The position of Dr. Yuri Kiselev was raised. It was noted that no word had been heard from him for several years. Dr. Gleb B. Udintsev was asked to make enquiries about Dr. Kiselev's intentions as far as GEBCO was concerned.

#### **3.5 GEBCO REVIEWERS**

Dr. Udintsev reported the recent retirement of his colleague Dr. Evgeniy Shchaulov who represented the HDNO. He said that Dr. Shchaulov would not be able to continue in his role as a GEBCO Reviewer for the Arctic Ocean. Dr. Andrey Popov added that HDNO plans to put forward a replacement candidate to fill this vacancy.

#### **3.6 GENERAL REVIEW OF THE GEBCO PERSONALITY LIST**

The Chairman asked whether it was still appropriate to include certain names in the "Other Personalities" category. After some debate the following changes were agreed upon:

Dr. Philippe Bouysse (CGMW), delete;  
Mr. Gerald Ewing (Retired), retain permanently;  
Mr. Michel Louis (IGN), delete;  
Mr. Desmond P. D. Scott, add.

Additionally, the Chairman suggested that the Chairman of SCOR WG 107, Dr. Colin Summerhayes, should be included in the list of "Other Personalities" - this was accepted.



RAdm Andreasen said that the new IHO Directors had yet to finalize their respective involvements with numerous committees. He expected announcements for GEBCO representation to be made shortly.

#### **4. MATTERS ARISING FROM REPORTS OF PREVIOUS MEETINGS**

##### **4.1 SUMMARY REPORT OF THE FIFTEENTH SESSION OF THE JOINT IOC-IHO GUIDING COMMITTEE FOR THE GEBCO (DOC. IOC-IHO/GEBCO-XV/3)**

All matters arising from this report were covered by other agenda items.

##### **4.2 SUMMARY REPORT OF THE TENTH SESSION OF GEBCO OFFICERS (DOC. IOC-IHO/GEBCO OFFICERS-X/3)**

*Item 5.2 Discussion on Undersea Feature Names and Activities.* The Chairman asked whether the IHO had received a reply from Mr. Ron Furness to their objections concerning those parts of the Terms of Reference for the ICA Working Group on Marine Cartography which appeared to conflict with GEBCO. RAdm Andreasen said he was pleased to report that the Terms of Reference had been restructured to remove any possible suggestion of conflict.

#### **5. THE GEBCO DIGITAL ATLAS (GDA)**

##### **5.1 INTRODUCTION AND DEMONSTRATION OF THE 1997 EDITION OF THE GEBCO DIGITAL ATLAS BY DR. MEIRION T. JONES, CHAIRMAN SCDB**

Dr. Jones thanked the Chairman for the opportunity to present the Second Release of the GDA, and to add some background to the development of the product, including some thoughts about its next release. The presentation was accompanied by a series of OHP images which traced the progress from the origin of the GDA in 1994, as digitized contours of the GEBCO 5<sup>th</sup> Edition, to its Second Release with the addition of a number of significant contour updates and other features. These include:

Revised GEBCO bathymetry for three areas:

- Southern Indian Ocean. 31°S to 72°S; 20°E to 140°E.  
(Author: Dr. Robert L. Fisher, Scripps Institution of Oceanography);
- Weddell Sea. 65°S to 79°S; 66°W to 0°  
(Authors: Officers of the Alfred-Wegener-Institut, Bremerhaven); and
- North east Atlantic off the British Isles. 47°N to 64°N; 37°W to 6°E.  
(Author: Mr. Peter Hunter, SOC).

Additional other features:

- Five scale versions of the coastline of Antarctica taken from the SCAR Antarctic Digital Database (1993) at a range of scales from 1:30 million up to 1: 250,000. Unlike the World Vector Shoreline (WVS) (South of 60°S) which this data set replaces, the SCAR versions include details of seven different types of coastline;
- updated inventory of the track lines of the digital sounding data held at the IHO Data Centre for Digital Bathymetry (updated to January 1997);

- IHO-IOC Gazetteer updated to include historical background material on the naming of many individual features and recently approved names (updated to January 1997); and
- modification and improvements to the Software Interface.

He added that the GEBCO-97 package consists of three items:

- “GEBCO-97 CD-ROM” containing the Atlas data sets and the GDA Software Interface;
- “Supporting Volume to the GEBCO Digital Atlas” (as published with the First Release of the GDA in March 1994) describing the activities of GEBCO and including a User Guide to the GDA Software Interface; and
- “1997 Supplement” to the Supporting Volume, describing the updates incorporated in GEBCO-97.

The GEBCO-97 CD-ROM supersedes and replaces the CD-ROM and floppy disk issued with the First Release of the GDA. It is an updated version of the First Release and essentially follows the same layout and format. Only minor modifications have been made to the GDA Software Interface.

Dr. Jones concluded his presentation by expressing his thanks to the countless marine scientists who, by their activities, had contributed to the success of the GDA and in particular to Dr. Robert L. Fisher, Dr. Hans-Werner Schenke and Mr. Peter Hunter for their work on the updated contours for the GDA Second Release. He also thanked NERC for their continued funding support for the project, and the GEBCO Guiding Committee for their help and advice.

Finally, he explained that, although the Second Release of the GDA was free to all recipients of the First Release, it was necessary for users to complete a two-page questionnaire to claim their free copy of GEBCO-97. The questions are listed under six main categories: (A) Gridded Bathymetry, (B) Shallow Water Bathymetry, (C) Paper Charts, (D) Suggestions, (E) User Profile, and (F) Mailing Addresses. These categories are further divided into subsections.

The information on the completed forms should provide the GEBCO community with a much clearer picture of the real needs of scientific users of the GDA providing valuable input to the debate about the design and content of future GEBCO products.

The Chairman thanked Dr. Jones for his informative presentation and added his congratulations to him and his team for their hard work in overcoming a number of technical and work loading problems in the preparation of the Second Release of the GDA. Its high quality was a tribute to the dedication of all concerned.

Mr. Michel Huet reported that GEBCO-97 had been installed at the IHB. At IHO-XV, the GDA was successfully demonstrated to Prince Rainier III, who showed much interest in the achievement.

## 5.2 GEBCO REVIEWING SYSTEM

Mr. Peter Hunter, GEBCO Bathymetric Editor, recalled that at GEBCO Officers-X, held in Hawaii, he and the Permanent Secretary were asked to prepare a pro-forma type letter on the lines of the PWGCA enquiry form, for use when requesting reviewers to give details about new data sets/maps in their area of responsibility. He said that they had considered the format of the PWGCA enquiry form and examined several alternative variations. Each of these had the drawback of using text to describe areas.

To avoid this problem, he had compiled a series of A4-sized area diagrams, using GMT software, and distributed these to reviewers. The diagrams included coastline, graduation, and outlines of any other

mapping known about in the area in question, or at its margins. Mr. Hunter said that although the number of reviewers who had replied was still low, he considered that the quality of responses to this form of enquiry had been encouraging.

The Chairman summed up the debate which followed. He recognized the shortcomings of the present Reviewing System set against the overwhelming need to develop a pro-active response in the search for suitable data sets and contour mapping for inclusion in the GDA, and to increase the range of search, perhaps by including survey organizations not normally accessible to GEBCO Reviewers. He asked Messrs. Hunter and Harper to design an enquiry system which would meet these needs.

### 5.3 CONTINENTAL MARGIN DATA

The Chairman said that ocean modellers, working on global circulation and tidal friction losses, were voicing increasing demands for a comprehensive world wide gridded data set of ocean contours which included information on the continental shelves. He said that the bulk of these data were held by National Hydrographic Offices. Some of these are willing for such data, suitably generalized at a small scale, to be added to the GDA. The question was how might the others be encouraged to follow suit.

RAdm Andreasen agreed that obtaining detailed contour data from HOs, in national waters, was a difficult issue. However, he believed that if the Member States were approached along the lines of restricting use of data to a scale of 1:500,000, they might well be persuaded to follow the example of the Japanese and give their support. He agreed to discuss the implications of map scales, contour selections, and gridding requirements with Dr. Jones and Mr. Hunter before drafting a Circular Letter to Member States seeking their agreement to release such data.

### 5.4 ANNUAL REPORT OF THE GEBCO BATHYMETRIC EDITOR

Mr. Hunter submitted a report on his activities: Report of the GEBCO Bathymetric Editor, May 1996 - June 1997 (see Annex IV). His tasks throughout the intersessional period were of a varied nature, although once again, no visits to other data collectors or map makers had been possible, owing to continued financial constraints. The major task was the compilation of contours for four areas of the Atlantic Ocean for inclusion in the Second Release of the GDA.

### 5.5 ANNUAL REPORT OF THE GEBCO DIGITAL ATLAS MANAGER

Ms. Pauline Weatherall submitted a report on her activities: Report of the GEBCO Digital Atlas Manager, April 1996 - June 1997 (see Annex V). Her main activity during the intersessional period had been the continuing co-operation with Dr. Fisher over the long-term task of digitizing the hand-drawn contour sheets of his major work in the greater Indian Ocean.

Other achievements included edge matching new sheets from North east Atlantic and Weddell Sea Bathymetry Data to provide seamless connections for the Second Release of the GDA, and reformatting the SCAR Antarctic coastline data sets and the IHB's Gazetteer of Undersea Feature Names.

The Chairman said he would like to acknowledge Ms. Weatherall's contribution in the successful publication of GEBCO-97.

### 5.6 NEW BATHYMETRY AND TECHNICAL CHANGES IDENTIFIED FOR INCLUSION IN THE THIRD RELEASE OF THE GDA

Mr. Hunter tabled a world outline diagram, on Mercator Projection, showing the limits of known bathymetry which could be considered for inclusion in the Third Release of the GDA planned for 1999 (see Annex VI). In acknowledging the practical value of the diagram, the Chairman asked if it was possible to

produce a polar stereographic version for the Arctic. (Diagram was subsequently created - see Annex VI, page 2).

After studying the world outline diagram a long debate took place about the maps/data shown, and what other data might be available or might be released with some persuasion. Other topics discussed included the need to add the 500 metre contours to some maps (see Agenda Item 12), and in others, noting that depths were shown in uncorrected, rather than in the standard GEBCO specification of corrected metres. In responding to questions on prioritization and how he made his choice of additional maps for each new release of the GDA, Mr. Hunter replied that until now choices had been made simply on the basis of what was suitable and available. Dr. Jones added that another key consideration in deciding what could be incorporated in each edition, was how much could be realistically achieved by Ms. Weatherall in the time available. Any attempt to include a large data set, submitted near the end of the new edition cycle, was likely to fail on the grounds of insufficient time to process its inclusion.

It was recognized that in the future, as the digitization of the Indian Ocean contours drew to a close, and acceptable digital mapping began to be available for inclusion in the GDA, the Digital Atlas Manager might be released to process more mapping into the GDA, thus leading to a potential increase in maps for subsequent releases, provided suitable data were available. The Chairman summarized the debate by observing two stages in the capture of new data for inclusion in each edition of the GDA:

- encouraging others to release maps/data (see also item 5.2); and
- making choices on the basis of what can be realistically achieved.

Noting that several of the participants were proposing to attend the Arctic Mapping Steering Committee to be held in St. Petersburg, Russian Federation, September 1997, the Chairman asked if the Arctic diagram for maps and charts, for consideration by the GEBCO Bathymetric Editor for the GDA, could be updated from the findings of the meeting. Mr. Norman Cherkis offered to undertake this task.

## 5.7 SALES AND DISTRIBUTION

Dr. Jones presented details of the Distribution/Sales of the GEBCO Digital Atlas (1 June 1997) and a Summary of Statistics - see Annex VII. He said that, to date, 756 copies of the GDA had been distributed to more than 500 organizations in 67 countries - of these 562 had been sold.

## 5.8 GDA PROMOTION

Dr. Mike Loughridge offered to include notification of the GDA Second Release in NGDC's "What's New" web site listing with a hyper-text link to BODC. He added that some of NGDC's products were experiencing one million hits per year on the web. Dr. Jones said he would be interested in following up this proposition.

Dr. Philippe Blondel enquired whether other language versions were available or if advertisements were carried in other languages. Although the answer to both questions was no, it was agreed that the latter merited some investigation and it was proposed that this idea should be addressed by IOC and IHB. Advertisements in French, Spanish and Russian were suggested.

Numerous other promotional ideas were put forward including poster displays and sessions; advertisements in Geo Times, ICA and Regional Mapping Conferences, InterRidge Publications, SCI.GEO OCEANOGRAPHY Internet News Group, National Journals, Oil Industry Publications, IHO Bulletin, and any other magazines by way of having an article review the GDA. Dr. John K. Hall added his offer to include a special GDA postcard in the next reprint of his IBCM card series. Dr. Jones thanked the participants for their suggestions which he would consider carefully. He added that he is writing a two-page article on the GDA for inclusion in the October edition of Hydro International.

## **6. REPORT BY THE CHAIRMAN OF THE SUB-COMMITTEE ON DIGITAL BATHYMETRY**

### **6.1 INTRODUCTION**

Dr. Jones, Chairman, Sub-Committee on Digital Bathymetry (SCDB), introduced this item and presented the report of the Fourteenth Meeting of his Sub-Committee (to be issued as Doc. IOC-IHO/GEBCO-SCDB-XIV/3), which was held 17-20 June 1997 at the Hydrographic Office, Taunton, United Kingdom. In total, 26 experts from 19 organizations in 11 countries participated in the meeting - the highest attendance yet. A record 25 papers were tabled.

He said he was heartened at such widespread interest in the work of GEBCO. Each year, new experts joined the meetings and this year it was his particular pleasure to welcome Dr. Bob Anderson, Deputy-Director, US Navy Arctic Submarine Laboratory, San Diego, USA, Dr. Blondel, Chairman of the InterRidge Group, SOC, Southampton and Dr. Peter Morris, British Antarctic Survey. He explained that, by taking the SCDB meetings around the world, it allowed technical interchanges with local experts at the host organization, and also informed them of current GEBCO thinking - on this occasion he expressed his thanks for the contributions made by Mr. Gordon Taylor and Mr. Graeme Potter of the Hydrographic Office.

The SCDB had focussed on four main topics:

- review of bathymetric mapping activities worldwide and activities relating to this theme;
- update on the status of the collection and management of echo-sounding data;
- development of the GEBCO Digital Atlas; and
- development of other GEBCO products.

### **6.2 REVIEW OF BATHYMETRIC MAPPING ACTIVITIES WORLDWIDE AND ACTIVITIES RELATING TO THIS THEME**

Dr. Jones said that it was the aim of the SCDB to develop GEBCO as an up-to-date and authoritative source of bathymetry for the world's oceans - no longer constrained by scale. He gave a brief summary of worldwide mapping activities.

#### **Arctic Ocean**

There is growing international recognition that the Arctic Ocean is the least well charted of all ocean areas and that GEBCO sheet 5.17, although the authoritative international portrayal of the Arctic, is nevertheless crucially in need of revision. For details of some new collaborative mapping initiatives in this region, see item 9.

The US Naval Research Laboratory (NRL) (Cherkis) - reported on work being carried out in collaboration with colleagues in Russia, mainly in regions of the Kara and Barents Seas.

The Head Department of Navigation and Oceanography (HDNO) (Popov) - work continued with a programme of digitizing sounding sheets along the north coast of Russia.

The Alfred-Wegener-Institut (AWI) (Schenke) - focussed on data from 40 cruises collected by R/V *Polarstern* since 1983. All data will be available to the IHO DCDB.

## Atlantic Ocean

Southampton Oceanography Centre (SOC) and IFREMER, France (Hunter) - reviewed the work undertaken by both institutions in revising the NE Atlantic bathymetry, and its links to the IBCEA project.

Vernadsky Institute of Geochemistry (Udintsev) - reported that new Russian data was available in the equatorial Atlantic.

Canadian Geological Survey and Canadian Hydrographic Service (Macnab, by letter) - surveys in NW Atlantic/Labrador Sea for Law of the Sea purposes - will be fed into GEBCO.

IBCM (Hall) - reported on his work in the Eastern Mediterranean Sea where he has collected 6,000,000 soundings in digital form, in preparation for creating a high resolution DTM.

IBCCA (Frias, by letter) - sheets 1.04 and 1.09 are published. Digital versions of these have been incorporated into the Digital Data Base. It is forecast that 80% of the bathymetry will be in digital form by the end of 1998.

## Indian Ocean

The Scripps Institution of Oceanography (Jones) - reported on Dr. Fisher's work of contouring the greater Indian Ocean, his maps are being prepared in collaboration with BODC. In parallel with this work, Dr. Goodwillie (Scripps Institution) is developing a DTM and shaded relief map of Dr. Fisher's contours.

IBCWIO (Hunter) - Although the Board has not met since 1994, much intersessional work has been carried out. All source data have been plotted on 1:250,000 or 1:1,000,000 sheets and distributed to each area on CD-ROM. It is hoped that the first two sheets could be printed by the end of 1998. Additionally, he said that there was expected to be an arrangement for an exchange of contours and ship tracks between Dr. Fisher and Dr. Bettac (Chief Editor IBCWIO) to ensure that IBCWIO had all the known data in their area of responsibility. The first of the Russian compilation sheets (off Kenya) will be sent to Dr. Fisher for his comments.

NRL (Cherkis) - said that his map of the Arabian Gulf was being held in abeyance.

Geological Survey of Israel (Hall) - reported on his mapping work in the Red Sea. When completed it will be made available for the GDA.

## Pacific Ocean

IBCWP (Hunter) - Work in Sub-Regions 1-4 was progressing with a range of data collection and sheet compilations. It is expected that 13 completed charts in these regions will be submitted for approval at the next Session of the Editorial Board, in 1998. Since the Second Session in October 1996, SOPAC has indicated their wish to join the scheme, taking responsibility for Sub-Region 6. Meanwhile, news is awaited from New Zealand on their acceptance of responsibility for Sub-Region 5.

National Institute of Water and Atmospheric Research (NIWA) (Falconer) - presented bathymetric map of New Zealand waters at scale 1:4,000,000 @ 46° S. The map was digitized from 1:1,000,000 - it contains much new swath mapping data. He said he would try to obtain this map for inclusion in the GDA.

SOPAC (Woodward) - reported that the Japanese and the Koreans were working on selected areas in the region. The Germans will return in 1998 to do more work. He listed several large scale maps which may be available for inclusion in the GDA.

NRL (Cherkis) - said that a collaborative project had begun with KORDI to survey the seas around Korea. NRL is exploring possibilities of extending the collaboration to include China.

Vernadsky Institute of Geochemistry (Udintsev) - provided information on work being carried out by several Russian scientists in the Sea of Okhotsk and other regions of the NW Pacific. He added that new maps are being prepared of these regions. They will be incorporated into the GAPA Pacific Atlas.

Maritime Safety Academy (Yashima, by letter) - reported on Japanese initiative begun in 1995, to cover their 200-mile EEZ with a series of 16 maps at scale 1:1,000,000. Each map has four components, including bathymetry. Two of the maps have been published.

### **Southern Oceans**

AWI (Schenke) - said that at their last meeting, the PWGCA had agreed that all data collected in the area should be passed to the IHO DCDB. This resolution will have considerable beneficial impact on the next edition of GEBCO sheet 5.18. The PWGCA has now been replaced by a Hydrographic Commission.

Sheet 5.67 was printed by AWI. Sheets 5.51-5.53, 5.66 and 5.68 are expected to follow in the next few months. Plans are in hand for a collaborative venture with Dr. Udintsev, and possibly BAS, to revise the Bathymetry of the north Weddell Sea.

AWI and University of Frankfurt were preparing a revised Antarctic coastline, accurate up to 100 metres, particularly for the area of the Antarctic Peninsula.

British Antarctic Survey (BAS) (Morris) - expressed a willingness to release BAS data in the Scotia Sea and Drake Passage. This offer was made on the condition that others, who also hold data in the area, agree to release their holdings.

### **Global Oceans**

InterRidge (Blondel) - gave a presentation of the international programme InterRidge and the establishment of a Global Ridge Bathymetry Data Base. More than 50,000 km of ridges girdle the earth. These areas are the most dynamically active places on the Earth's surface. The aim of InterRidge is to synthesise the processes hitherto carried out under national scientific programmes such as BRIDGE (UK), De-Ridge (Germany) and Dorsales (France), and regroup the bathymetry into one single dataset.

6.3 GEBCO DIGITAL ATLAS (for details, see Item 5.1)

6.4 ECHO-SOUNDING DATA - COLLECTION AND MANAGEMENT

### **World Wide Sea floor Swath Mapping Systems**

NRL (Cherkis) - presented a six-page detailed updated version of Swath Mapping Systems that have been, or are, in use throughout the World.

## **IHO Data Centre for Digital Bathymetry**

IHO DCDB (Loughridge) - in the past year 219 cruise legs of data were assimilated into GEODAS including 2,600,000 soundings from 16 agencies in 10 countries - an increase of 8% in data holdings. Responses were made to 86 requests for data or information from 28 countries, of which 22 are IHO Member States.

The Hydrographic Survey Data Base HYDAS continues its development with the introduction of a sophisticated user interface. Additionally, the NGDC has developed a number of inventory and search systems including advancing their World Wide Web page services.

### **6.5 OTHER DATA PRODUCTS**

#### **GEBCO Gridded Data Set**

A draft paper entitled "On the preparation of a gridded data set from the GEBCO Digital Atlas contours" was prepared by the SCDB task group on gridding the GEBCO. The paper, in eight sections, is a comprehensive review which includes the needs of potential users, the history of gridded bathymetry, mathematical considerations, strengths and weaknesses of various methods and reports on the discussions and recommendations of the task group.

In commenting on the discussion at the SCDB meeting, Dr. Jones said the main conclusions did not lead to a simple solution for GEBCO, a pragmatic approach was required to produce a global grid for publishing in GEBCO-99. Dr. Carron (USNOO) offered to co-ordinate the next phase of the work which is to discover what is reasonably possible to achieve with the time and resources available. A number of participants volunteered to help with this work.

## **7. REPORT BY THE CHAIRMAN OF THE SUB-COMMITTEE ON UNDERSEA FEATURE NAMES**

### **7.1 INTRODUCTION**

Dr. Fisher, Chairman, Sub-Committee on Undersea Feature Names, introduced this item and presented the report of the Twelfth Meeting of his Sub-Committee, which was held at the Hydrographic Office, Taunton, United Kingdom, the previous week 17-20 June 1997. He said he was pleased to report that there was a strong forum with six full-time participants and three others joining on an opportunity basis. The meeting was extended by a full day.

### **7.2 YAP TRENCH - NEWLY REPORTED DEPTH**

Before addressing the main concern of the SCUFN meeting, Dr. Fisher introduced two letters from Dr. Toshiya Fujiwara of the Deep-Sea Research Department, Japan Marine Science and Technology Centre (JAMSTEC) dated 6 and 19 June 1997. The letters were addressed to the Permanent Secretary. They concerned notification of the discovery of a depth of 8946 m. in the Yap Trench at 10° 29.957'N., 138° 40.987'E: the first of these letters was accompanied by a meticulous On board Report for which Dr. Fisher voiced his commendations.

Dr. Fisher recalled that in 1962, Dr. Udintsev, aboard the R/V *Vitiaz*, and he, aboard the R/V *Spenser F. Barrd* also undertook PDR surveys of the Yap Trench. The details of the discovery by the R/V *Yokosuka* will be included in the historical text of the IHB Publication B-8, Gazetteer of Undersea Feature Names, and the new depth of 8946 m. will replace the current one of 8510 m. shown on GEBCO sheet 5.06 approximately 200 miles to the South.



### 7.3 NAMING PROPOSALS

Turning to the SCUFN meeting, Dr. Fisher said that the Sub-Committee, having first revised their work from the previous meeting in 1995, then examined proposals for 180 names worldwide of which a number were rejected. Neither of the two completed IBCCA sheets was available for examination at the Taunton meeting.

In responding to a question why B-8 did not contain some Arctic names held on the Advisory Committee on Undersea Features (ACUF) lists, Dr. Fisher said that SCUFN's mandate differed from that of ACUF. He explained that the ACUF Standing Committee for Undersea Feature Names is formally concerned with mandating names to be used by US Government employees. Once ACUF has named a feature, GEBCO generally accepts the fact; however, if SCUFN disagrees then that feature is not available, i.e., open for another name. In practice, the very close contact between the two naming bodies ensures that problems are minimized. There were instances where ACUF had reconsidered and changed some of their names to accommodate GEBCO. It had proved very valuable to have the Secretary of ACUF at the SCUFN meetings.

The Chairman asked Dr. Fisher if they had considered naming a suitable feature after John Harrison who, between 1730 and 1760, built four revolutionary timekeepers in his pursuit of the longitude prize. Dr. Fisher agreed that this was indeed the type of name that SCUFN would like to use. He said he welcomed and indeed solicited the submission of worthy names and invited others to bring their suggestions forward.

In this context Dr. Fisher asked the Guiding Committee to consider an informal proposal drafted at the SCUFN meeting. After some debate the following text was agreed:

*"The Sub-Committee viewed with concern the frequent en bloc proposal and acceptance by national authorities of many names of persons having marginal qualifications or demonstrated relationship to oceanic exploration or development. One particular facet of this concern is directly related to the increasing submission of proposals for the names of living agency employees, or contractors, upon retirement. Such a practice, if it spreads internationally, could overwhelm or skew the orderly processes of sea floor nomenclature. The Sub-Committee considers that there is a need to be very selective, and recommends this approach to other national authorities."*

Dr. Fisher reported that he had received a fax, dated 6 June 1997, from Dr. Kunio Yashima, Maritime Safety Academy, Japan, informing him that the Japanese marine community had revised their sea floor feature-naming policy to reflect concordance with GEBCO practices. He said he was delighted to receive this news, adding that the revised principle will be applied immediately to several Indian Ocean occurrences discovered/delineated by Japanese polar programme ships. As a result of this change of policy, he anticipated many name proposals from Japanese experts, with emphasis on commemoration of individuals who had made very significant contributions to earth and marine science exploration.

### 7.4 UNDERSEA FEATURE TERMS AND DEFINITIONS

Dr. Fisher presented a draft 4-page list describing 42 types of Undersea Feature Terms and Definitions appearing in publication B-6, Standardization of Undersea Feature Names. Proposed changes to many of the listed Terms and Definitions were made by SCUFN in consideration of the Comparison Study of B-6 (1995 Ed) and S-32 (1994 Ed) carried out by Erich Frey, US/C&GS, as a member of the IHO Working Group on the Hydrographic Dictionary. The contents of the SCUFN proposed list generated a great deal of discussion.

The Chairman ruled that although the meeting agreed with most of the proposed changes, it was evident that some required a great deal more consideration. He said it was inappropriate to discuss this

subject further in such a large committee. He said that arrangements will have to be made to resolve the different opinions voiced at the meeting. He added that the list, as drafted by SCUFN, will be included in Doc. IOC-IHO/GEBCO SCUFN-XII/3.

He thanked Dr. Fisher for his presentation and paid tribute to the colossal amount of correspondence work he had undertaken during the previous months and for his activities at the SCUFN Meeting in Taunton.

## 8. GEBCO GUIDELINES

RAdm Andreasen said that some work on Part 4 (Multibeam Echo Sounders) is still outstanding, requiring some additional input from the IHB. He said that extensive comments had been received from France but he thought these could be accommodated. He was also anxious to keep the Guideline compatible with S-44.

Dr. Jones said that one of the issues confronting the SCDB concerned the fate of the old data on the abandoned analogue plotting sheets. In reply, RAdm Andreasen said that a Circular Letter had been sent to Member States asking them a series of questions on the status of their plotting sheets. He promised to summarize the replies at the earliest opportunity. It was agreed that the large collections of such data, held by the Member States, should be digitized and incorporated into the IHO DCDB. Dr. Loughridge reminded the meeting of the facilities offered by NGDC to Member States for the capture of this type of data. The same offer is also open to academic institutions.

Mr. Huet said that changes were required to Part 2 Bathymetric Data Management "Section A, Analogue Data" should be deleted, and "Section B" renamed and revised to underline the link between the Member States and the IHO DCDB, including the required validation and quality control routines, which do not appear to be well known in the hydrographic community. The Chairman asked if a draft could be made available for discussion at the next meeting. RAdm Andreasen replied that he will make a start but it will be up to the new Directing Committee to review the role of the IHO in this context.

## 9. ARCTIC OCEAN - BATHYMETRY

The Chairman recalled the background to this topic. For some years, several scientists have actively sought ways to address the problems of updating current Arctic maps. Although some large-scale piecemeal high quality maps have been made, the bulk of the region remains inadequately depicted. In 1992, the International Arctic Science Committee (IASC) established a Working Group on Geophysical Information and Mapping. One of the developments, following the conclusion of their work, was a suggestion for a New Bathymetric Map of the Arctic Ocean.

An interim group, The Arctic Mapping Steering Committee, was formed as an *ad hoc* body initially comprising Dr. Ron Macnab (Geological Survey of Canada), Dr. Bernie Oakley (Lamont-Doherty Earth Observatory) and Mr. Norman Z. Cherkis (US Naval Research Laboratory). They were joined later by Mr. David Monahan (Canadian Hydrographic Service). The Committee is seeking a fifth member, who will represent the Russian bathymetric community. One of the first observations made by the Committee was that the density of data in the main part of the Arctic Ocean is totally inadequate for an accurate portrayal of the sea floor, and that any new map would be seriously incomplete without the US nuclear submarine under-ice data. Overtures were made to the US Navy Arctic Submarine Laboratory (ASL).

Dr. Bob Anderson, Deputy-Director, US Arctic Submarine Laboratory, said that due regard had been given to the requests for data release from hitherto classified records. As a result of numerous negotiations within the US Navy, he was optimistic about the release of US submarine data in the Arctic (1957-1982), and also from the US Navy Submarine Science Exercise (SCICEX) Cruises to the Arctic

Programme 1993, 1995 and 1996, and for Multibeam data to be collected in 1998 and 1999. He hoped an announcement would be made soon. (In August 1997, the US Navy and the US Arctic Research Commission announced the declassification of 140,000 miles of bathymetric data in the Arctic, collected between 1957 and 1982).

He added that in the two remaining years of the SCICEX programme swath depths, logged by the Lamont Data Acquisition System, will be collected from one million square miles of the deep Arctic Basin. Although the US National Science Foundation allows the data from such cruises to be held by the collector for two years, Lamont wants the data to be released into the public domain at the earliest opportunity. When processed, these data will be passed to NGDC. He reported the concerns of Lamont that their sophisticated Data Acquisition System, which is bolted on to the hull of the surveying submarine, will only be used for two more seasons. They are looking to redeploy the system for under-ice work on other ships. The Chairman said he would raise the matter with colleagues in the Royal Navy.

Prompted by the efforts of the Arctic Mapping Steering Committee, Mr. Geoffrey L. Holland, Chairman IOC, met with the Chairman IASC to discuss this project. In October 1996, he wrote to the Executive Secretary IOC, Dr. Gunnar Kullenberg, formally raising the need for a new Bathymetric Chart of the Arctic Ocean. He suggested that the IOC-IHO GEBCO machinery would be the most appropriate vehicle for such an undertaking. In agreeing with this view, Dr. Kullenberg had replied that it would be wise to start by inviting IASC to specify their requirement so as to initiate a programme.

Meanwhile, the Chairman said the Arctic Bathymetric Map initiative had been raised at the SCOR WG 107 meeting in Southampton, 11-12 November 1996, by Dr. Macnab. He presented a non-exhaustive list of 13 potential users of high resolution bathymetry and outlined the issues confronting the development programme. Dr. Macnab also presented a paper to the SCOR WG meeting entitled "Regional Compilations: A low-cost approach for improving bathymetric maps in selected areas". This paper contained a section for "A Proposed Compilation of Bathymetric Data from the Arctic Region" which argues in detail for the production of such a chart.

The IASC held its Annual and Council Meetings in St. Petersburg, Russian Federation, 5-7 May 1997. At those meetings they agreed to meet a request made by the Arctic Steering Committee for funding to support a workshop to be held at VNIIOkeangeologiya, St. Petersburg, 18-19 September 1997. The aims of the workshop are to bring together data gatherers, holders, and users to discover the extent of data held in various archives and to open discussion as to how these might be released into the public domain, and help build the new Arctic Chart. Thirty participants have been invited. IASC has requested a workshop report to the Executive Committee suggesting how this project idea should be further developed. IASC will have to decide whether the scale and coverage of GEBCO 5.17 is large enough for their purposes. If they want several sheets on a larger scale, they may have to be produced as a regional IBC rather than an update of sheet 5.17.

The Chairman said that the Guiding Committee recognized the inadequacy of current Arctic mapping including GEBCO sheet 5.17. He welcomed the efforts of the Arctic Steering Committee, IASC and many others to resolve the problems of compiling an accurate and comprehensive map of the region and promised the full support of GEBCO.

He added that, following the usual scientific reviewing procedures, any such mapping would be incorporated into the GDA and the next revised edition of sheet 5.17.

**10. REPORT ON IOC RESOLUTION XVIII-10 (JUNE 1995) "SUPPORT FOR THE JOINT IOC-IHO OCEAN MAPPING PROGRAMME" AND ON THE SIXTH SESSION OF THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM) (APRIL 1997)**

The Chairman read the first instruction of Resolution XVIII-10 (June 1995) to the Executive Secretary IOC: *"to initiate discussions on how to establish scientific priorities for bathymetric surveys of the world's oceans and then, in collaboration with the International Hydrographic Organization, to establish a well co-ordinated and comprehensive plan for the coming decade;"*

Mr. Scott said that the subsequent formation of the SCOR WG 107 (September 1996) meant that there was no point in IOC establishing a joint plan until WG 107 had completed their report - this will not be available until after the next and final meeting of the Working Group in November 1997.

The Chairman said that some impetus was required to support the acquisition and use of new data and that SCOR WG 107 was attempting to do this. Mr. Scott replied that this matter will be raised at the Nineteenth Session of IOC Assembly, July 1997, where Dr. Summerhayes, Chairman SCOR WG 107, will inform the Assembly of the progress being made by the Working Group.

The Sixth Session of the IOC Consultative Group on Ocean Mapping (CGOM) held in Monaco, April 1997, was noted. Although no report of that meeting was available, there was a verbal update about the progress of the IBC mapping projects. The subject of the relationship between these projects and GEBCO was discussed in detail - see item 12.

**11. SCOR WG 107: IMPROVED GLOBAL BATHYMETRY - REPORT ON ACTIVITIES**

After reviewing the need for establishing SCOR WG 107, the Chairman read out its Terms of Reference:

- *to establish the scientific needs for improved ocean bathymetry;*
- *to determine the specifications for accuracy and resolution in different areas; and*
- *to recommend actions and priorities.*

He said that the Working Group, which comprises ten members and seven corresponding members, met for the first time at the SOC, Southampton, 11-12 November 1996. Several important papers were presented, which - he suggested - may be of considerable interest to the GEBCO community. Mr. Hunter offered to send copies of the Summary Report of the First Session to all those on the GEBCO Personality List who did not attend the SCOR Working Group meeting.

The Chairman remarked that nine of the seventeen members of this very interdisciplinary group were associated with GEBCO. He added that one of the goals of the WG was to generate pro-active data collection, as opposed to the aims of GEBCO which tended more towards data assimilation. The WG will hold its concluding meeting at Johns Hopkins University, Baltimore, USA, 27-28 October 1997, where participants will report on different aspects of the global bathymetry situation. Results of these investigations will contribute to a draft series of recommendations, and to preparation of a paper for publication in an appropriate journal.

The Chairman said that the conclusions of the SCOR WG 107 were eagerly awaited and would be likely to have a profound impact on future policy for the design and content of GEBCO products.

## 12. IOC INTERNATIONAL BATHYMETRIC CHART PROJECTS AND HOW THEY RELATE TO GEBCO

Mr. Hunter, GEBCO Bathymetric Editor, informed the meeting on the progress of the IOC/IBC mapping projects. Leaving aside the IBCM Bathymetric Contour Maps which were completed in 1990, he said that progress on compilation in the four other IOC/IBC projects was steady but as yet had only resulted in the publication of two maps in the IBCCA series. Indications from all the regions suggested that work, currently in hand, would lead to a significantly increased flow of publications during the next five years.

Dr. Jones said he was concerned about the timing of the release of these maps and their inclusion in the GEBCO Digital Atlas. He recognized that IBCs have their own timetables divorced from GEBCO. He asked if formalized machinery existed whereby contours and track lines can be delivered to GEBCO at the earliest opportunity, even if that delivery precedes publication by the IBC. Mr. Scott replied that the Terms of Reference for the IBCs were drawn up in the 1980s before the concept of the GDA was developed, and therefore they did not contain clauses expressing this requirement. There was clearly a case for these Terms of Reference to be updated.

The Chairman turned to the GEBCO Guidelines, Annex 2: Specifications for International Bathymetric Charts (IBC) produced under IOC's Regional Ocean Mapping Projects. He read the first part of the opening statement: *"The Specifications which follow have been reproduced in this volume to provide information for compilers of bathymetric material outside the GEBCO structure on the standards to be followed to ensure that their work can be incorporated into the GEBCO Digital Atlas...."* Ingénieur général André Roubertou, Chief Editor IBCEA, said that it was the intention of the IBCEA to make their digital and paper maps available to GEBCO. Mr. Scott stated that intentions were not so clear with other projects so CGOM will be invited to develop a requirement which would ensure that all IBC sheets were made available to GEBCO as they were completed. He agreed to pursue this requirement with CGOM.

Dr. Jones said he was aware that digital and paper versions of the IBC maps will be published. The case for the direct inclusion of the digital map into the GDA was attractive but experience at BODC had shown that, to date, resolving the complications associated with digital files far outweighed the extra time spent digitizing contours directly from paper maps. However, yet to be convinced about the quality control of digital files, he was willing to compare one of the files from the IBCCA sheets against a paper copy of the map digitized by BODC.

The Chairman raised the issue of the reported use of automated contouring packages in the compilation of some IBC maps. He said that such practices, which ignored geophysical evidence and expertise, were unacceptable for GEBCO mapping purposes and that such maps could not be incorporated into the GDA. He cited the recent IBC maps off the West Coast of Africa which were discovered to contain errors generated by automated contouring.

Ingénieur général Roubertou indicated that the errors discovered in the IBCEA maps, which were presently being rectified through a new compilation, had nothing to do with automatic contouring. This technique is indeed used in the initial phase to prepare a first draft, but the following compilation process is entirely done by hand, taking account of all available geophysical data. In general, the meeting discouraged the use of automated contouring packages, and supported the notion of raising this problem with CGOM.

Also, at the CGOM Session, the subject of the 500-metre contour had been discussed. A request was made by the GEBCO Bathymetric Editor that within the IBC mapping projects, wherever 500-metre contour intervals were not included, a separate overlay should be made at the time of the compilation to be used for inclusion in the GDA. This request was supported.

In summarizing, the Chairman said that although it was preferable to see the IOC/IBC mapping projects and GEBCO more closely linked, nevertheless it was essential that GEBCO maintains its

credibility by having a mechanism for the rejection of certain maps if they do not meet GEBCO specifications.

### **13. EXPO'98, LISBON - PROPOSED GEBCO EXHIBITION**

RAdm Andreasen said that some months ago, the IHO had tried to take this matter forward with the Monaco Government, suggesting a GEBCO related display. The IHO was awaiting a response to its proposals. He agreed with the feelings of the meeting that an exhibition of GEBCO history and products would be beneficial in raising awareness of the achievements and future plans of GEBCO during the International Year of the Ocean and at a major International Fair. However, he recognized that time is now very short to arrange and mount such an exhibition.

### **14. GEBCO CENTENARY (2003-2005)**

Mr. Scott introduced this item. He first drew the Guiding Committee's attention to the change in dates that he was now proposing should be accepted for the Centenary celebration. It appears that although the idea of a general chart of the oceans was conceived at the Seventh International Geographic Congress in Berlin in 1899, in fact no action of any kind was taken until a Commission set up by the Congress first met in April 1903. Plans were then drawn up for such a chart and work started in June of the same year. The second date commemorates the publication of the First Edition of the GEBCO in May 1905.

Mr. Scott therefore now proposed that the first planned (edited) publication be written with a view to issue in early 2003 (for details of the proposed layout, see Annex VIII), and the "well written book directed towards the general public" be scheduled for publication in 2005. This timetable was agreed.

Mr. Scott reported that he had held a number of discussions with appropriate persons concerning the various parts of the edited publication and had received very satisfactory positive responses from all those he had approached. So far as the 'well written book' was concerned, he had approached Ms. Dava Sobel, author of a recently published non-fiction best seller 'Longitude', but she had declined owing to the fact that at the present, she has two other books in production. However, now that the date for publication of this book had been postponed until 2005, he would ask her to reconsider her previous decision.

Other publicity projects being considered were television programmes and postage stamp issues in Monaco, the United Nations and countries' members of IOC and IHO.

A verbal approach had already been made to Prince Albert (heir to HSH Prince Rainier III) who had shown considerable interest in the project.

### **15. UNITED NATIONS INTERACTIVE ATLAS OF THE OCEANS**

The Chairman said that during the intersessional period there had been an exchange of letters between IOC, BODC and himself seeking clarification about this ambitious project and how it might impact on GEBCO. It now seems that this initiative, which is not proceeding at its original intended pace, is unlikely to concern the GEBCO community for some time, if at all.

## **16. IOC-IHO EDITORIAL BOARD - CONTINENTAL SHELF DEFINITION UNDER UNCLOS**

The Chairman reported that some GEBCO Officers were contributing chapters of the IOC-IHO publication "Sovereign Limits Beneath the Oceans Delimiting the New Continental Shelf". The book, written to interpret Article 76 of the United Nations Law of the Sea, is edited by Cmdr. Chris Carleton and will be published by the Oxford University Press.

## **17. DATES AND PLACES FOR THE SEVENTEENTH SESSION OF THE JOINT IOC-IHO GUIDING COMMITTEE FOR THE GEBCO, THE ELEVENTH SESSION OF GEBCO OFFICERS, TOGETHER WITH MEETINGS OF THE SUB-COMMITTEES**

### **17.1 1998 MEETINGS**

The venues and dates for the 1998 GEBCO meetings were considered. The Chairman said that the Permanent Secretary had received a verbal promise from Commodore Willis, Australian Hydrographic Service, to host GEBCO Officers-XI in Wollongong - although precise dates had not been discussed. However, the prospects for the SCDB Meeting were in considerable doubt. Despite repeated attempts to secure a meeting venue for the SCDB at AGSO, Canberra, no confirmation had been received. Dr. Jones said that the last message from Mr. Phil Symonds, dated 21 May, was optimistic, but higher approval to host the meeting was still awaited. Additionally, he had gathered something of AGSO's impending change of office location, scheduled for spring 1998. The prospect of delaying the meeting until June was debated, but in addition to the existing doubts about AGSO, it transpired that several of the key GEBCO Officers, including the Chairman, would be unavailable for most of that month.

RAdm Andreasen pointed out that the first meeting of the Hydrographic Commission on Antarctica will be held in New Zealand, 9-11 March 1998. Several of the participants of this meeting are also members of the GEBCO Sub-Committees. It was argued that if the GEBCO meetings could be held directly after the Commission meeting, there was the very attractive prospect of securing the participation of several key officers in the southern hemisphere and, additionally, saving on travel costs for participants. The possibility of holding the GEBCO meetings directly afterwards, in Wollongong, was considered but rejected on the grounds that there was no guarantee that officers would find the transfer between the two countries an acceptable solution, nor that they would join the GEBCO meetings.

Dr. Falconer then offered to host the meetings in New Zealand, timed, he suggested, to commence on 12 March, directly after the session of the Hydrographic Commission on Antarctica. The Chairman concluded that, in the absence of any news from AGSO, and mindful of the likely timing of AGSO's intended location change, the kind offer made by Dr. Falconer should be seen as the preferred option. After some debate, the meeting took the view that the unexpected offer from New Zealand, together with the benefits outlined above, was their only practical choice.

### **17.2 1999 MEETINGS**

Bearing in mind the likely progress in the gridding programme, it was suggested that the 1999 meetings should be held in the USA where the bulk of the development work on this project was being carried out. NAVOCEANO, Bay St. Louis, and NOAA, Seattle, perhaps coupled with the University of Victoria, British Columbia, were identified as suitable venues. Dr. Loughridge offered to make preliminary investigations.

Capitão-de-Fragata Lucas de Campos Costa added that the Brazilian Diretoria de Hidrografia e Navegação would be willing to host the 1999 meetings.

**18. OTHER BUSINESS**

**18.1 RADM ANDREASEN**

The Chairman said that, in September 1997, RAdm Andreasen is retiring as President of the IHO and thus regrettably, would no longer be a participant at future GEBCO meetings. On behalf of the GEBCO community he paid a warm tribute to RAdm Andreasen for his many contributions and valued advice over the past five years. He wished him all success in his next venture.

**19. CLOSURE OF THE SESSION**

The Chairman closed the Session at 12.30 on Wednesday 25 June 1997. He thanked Dr. Fisher, Chairman SCUFN, and Dr. Jones, Chairman SCDB, for their considerable and invaluable work during the intersessional period and acknowledged the role played by the participants for their papers and contributions to the debates.



**ANNEX I**

**AGENDA**

- 1. OPENING OF THE SESSION**
- 2. CONDUCT OF THE SESSION**
  - 2.1 ADOPTION OF THE AGENDA
  - 2.2 DOCUMENTATION, ADMINISTRATIVE ARRANGEMENTS, ETC.
- 3. COMPOSITION OF THE GUIDING COMMITTEE AND ITS SUB-COMMITTEES**
  - 3.1 GUIDING COMMITTEE
  - 3.2 SUB-COMMITTEE ON DIGITAL BATHYMETRY (SCDB)
  - 3.3 SUB-COMMITTEE ON UNDERSEA FEATURE NAMES (SCUFN)
  - 3.4 SCIENTIFIC ADVISERS
  - 3.5 GEBCO REVIEWERS
  - 3.6 GENERAL REVIEW OF THE GEBCO PERSONALITY LIST
- 4. MATTERS ARISING FROM REPORTS OF PREVIOUS MEETINGS**
  - 4.1 SUMMARY REPORT OF THE FIFTEENTH SESSION OF THE JOINT IOC-IHO GUIDING COMMITTEE FOR THE GEBCO (DOC. IOC-IHO/GEBCO-XV/3)
  - 4.2 SUMMARY REPORT OF THE TENTH SESSION OF GEBCO OFFICERS (DOC. IOC-IHO/GEBCO OFFICERS-X/3)
- 5. THE GEBCO DIGITAL ATLAS (GDA)**
  - 5.1 INTRODUCTION AND DEMONSTRATION OF THE 1997 EDITION OF THE GEBCO DIGITAL ATLAS BY DR MEIRION JONES, CHAIRMAN SCDB
  - 5.2 GEBCO REVIEWING SYSTEM
  - 5.3 CONTINENTAL MARGIN DATA
  - 5.4 ANNUAL REPORT OF THE GEBCO BATHYMETRIC EDITOR
  - 5.5 ANNUAL REPORT OF THE GEBCO DIGITAL ATLAS MANAGER
  - 5.6 NEW BATHYMETRY AND TECHNICAL CHANGES IDENTIFIED FOR INCLUSION IN THE THIRD RELEASE OF THE GDA
  - 5.7 SALES AND DISTRIBUTION
  - 5.8 GDA PROMOTION

- 6. REPORT BY THE CHAIRMAN OF THE SUB-COMMITTEE ON DIGITAL BATHYMETRY**
  - 6.1 INTRODUCTION
  - 6.2 REVIEW OF BATHYMETRIC MAPPING ACTIVITIES WORLDWIDE AND ACTIVITIES RELATING TO THIS THEME
  - 6.3 GEBCO DIGITAL ATLAS
  - 6.4 ECHO-SOUNDING DATA - COLLECTION AND MANAGEMENT
  - 6.5 OTHER DATA PRODUCTS
- 7. REPORT BY THE CHAIRMAN OF THE SUB-COMMITTEE ON UNDERSEA FEATURE NAMES**
  - 7.1 INTRODUCTION
  - 7.2 YAP TRENCH - NEWLY REPORTED DEPTH
  - 7.3 NAMING PROPOSALS
  - 7.4 UNDERSEA FEATURE TERMS AND DEFINITIONS
- 8. GEBCO GUIDELINES**
- 9. ARCTIC OCEAN - BATHYMETRY**
- 10. REPORT ON IOC RESOLUTION XVIII-10 (JUNE 1995) "SUPPORT FOR THE JOINT IOC-IHO OCEAN MAPPING PROGRAMME" AND ON THE SIXTH SESSION OF THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM) (APRIL 1997)**
- 11. SCOR WG 107: IMPROVED GLOBAL BATHYMETRY - REPORT ON ACTIVITIES**
- 12. IOC INTERNATIONAL BATHYMETRIC CHART PROJECTS AND HOW THEY RELATE TO GEBCO**
- 13. EXPO'98, LISBON - PROPOSED GEBCO EXHIBITION**
- 14. GEBCO CENTENARY (2003-2005)**
- 15. UNITED NATIONS INTERACTIVE ATLAS OF THE OCEANS**
- 16. IOC-IHO EDITORIAL BOARD - CONTINENTAL SHELF DEFINITION UNDER UNCLOS**
- 17. DATES AND PLACES FOR THE SEVENTEENTH SESSION OF THE JOINT IOC-IHO GUIDING COMMITTEE FOR THE GEBCO, THE ELEVENTH SESSION OF GEBCO OFFICERS, TOGETHER WITH MEETINGS OF THE SUB-COMMITTEES**
  - 17.1 1998 MEETINGS
  - 17.2 1999 MEETINGS

**18 OTHER BUSINESS**

**18.1 RADM ANDREASEN**

**19. CLOSURE OF THE SESSION**

**ANNEX II**

**LIST OF DOCUMENTS <sup>1</sup>**

IOC-IHO/GEBCO-XVI/1 prov.	Provisional Agenda
IOC-IHO/GEBCO-XVI/3	Summary Report of the Session
IOC-IHO/GEBCO-XVI/4	List of Documents
IOC-IHO/GEBCO-XVI/5	The GEBCO Bathymetric Editor - Annual Report
IOC-IHO/GEBCO-XVI/6	The GEBCO Digital Atlas Manager - Annual Report
IOC-IHO/GEBCO-XVI/7	GEBCO Digital Atlas - Promotion, Sales and Servicing
IOC-IHO/GEBCO-XVI/8	Resolution XVIII-10 adopted at the Eighteenth Session of the IOC Assembly, Paris, France, 13-26 June 1995
IOC-IHO/GEBCO-XV/3	Summary Report of the Fifteenth Session of the Joint IOC-IHO Guiding Committee for the GEBCO, Monaco, 15-17 May 1995
IOC-IHO/GEBCO SCDB-XIV/3	Summary Report of the Fourteenth Meeting of the GEBCO Sub-Committee (to be prepared later) on Digital Bathymetry, Taunton, United Kingdom, 17-20 June 1997
IOC-IHO/GEBCO SCUFN-XII/3	Summary Report of the Twelfth Meeting of the GEBCO Sub-Committee on (to be prepared later) Undersea Feature Names, Taunton, United Kingdom, 17-20 June 1997
IOC/INF-988	Report of the IOC Consultative Group on Ocean Mapping (CGOM) to the Eighteenth Session of the IOC Assembly, 15 May 1995
B-7	Guidelines for the GEBCO (excepting Part 4)
GEBCO Personality List	Revised 16 June 1997

### ANNEX III

#### LIST OF REVIEWERS

Antarctic Waters South of 46°40'S	Hans-Werner Schenke	Accepted
North Atlantic Ocean (excluding Caribbean Sea and Gulf of Mexico)	Peter Hunter David Monahan (link to Galina Agapova for area 0°-7°N)	Accepted Accepted
Caribbean Sea and Gulf of Mexico	Troy Holcombe	Accepted
Mediterranean and Black Seas	John K. Hall Andrey Popov	Accepted Accepted
Arctic Ocean	David Monahan & HNDO candidate (to be named)	Accepted
South Atlantic Ocean	Norman Z. Cherkis (link to Brazilians, also Robert L. Fisher)	Accepted
Indian Ocean	Robert L. Fisher	Accepted
North west Pacific Ocean	Gleb B. Udinstev Alexander Svarichevskiy	Accepted Accepted
Central west Pacific Ocean	Kunio Yashima	Accepted
South west Pacific Ocean	Alfred Simpson	Accepted
North east Pacific Ocean	George Sharman	Accepted
Central east Pacific Ocean	Juan Garcia Abdeslem Luis Delgado Argote	Accepted Accepted
South east Pacific	Patricio Carrasco Hellwig	Nominated
New Zealand region	Ian Wright	Accepted

## ANNEX IV

### ANNUAL REPORT OF THE GEBCO BATHYMETRIC EDITOR (May 1996 - June 1997)

During the past year, the GEBCO Bathymetric Editor (GBE) attended meetings of the GEBCO Officers and the Sub-Committee on Digital Bathymetry in Hawaii. In response to a request by the GEBCO Guiding Committee, he attended a meeting with the Chairman of the International Bathymetric Chart of the Central Eastern Atlantic (IBCEA) Editorial Board and representatives of the French Hydrographic Office, EPSHOM, at the offices of the IHO in Monaco. The purpose of this meeting was to present an improved bathymetry of part of sheet 5.08. The GBE also attended the Sixth Session of the CGOM to report on his work regarding the IBCEA and to renew contacts with the Chairmen of the other IBC editorial boards.

The GBE worked with the GDA Manager on providing additional information in the North east Atlantic region in the form of contours, tracks and source references for producing the revision of the GEBCO CD-ROM, "GEBCO-97".

The GBE and the GEBCO Chairman carried out a final review of all the contours, with the track line controls, in the southern Indian Ocean, the Weddell Sea and the North east Atlantic Ocean, which had been selected as being suitable updating material for GEBCO-97

Contours were prepared in four areas of the North east Atlantic Ocean:

- (i) Completion of contours in the region of Rockall Plateau and the western margin of the United Kingdom. (47° to 64° North x 37° West to 6° East)
- (ii) A revision of the bathymetry of part of the continental margin region of IBCEA sheet 1.08
- (iii) Bathymetry of substantial parts of GEBCO plotting sheets 79, 80, 103 and 104
- (iv) A special bathymetric map of the sea floor to the South of the Wyville-Thomson Ridge, North west of Scotland

All the above compilations were prepared with contours in corrected metres and at a contour interval of 100 metres.

As part of the United Kingdom's Natural Environment Research Council's commitment to the GEBCO, bathymetric data collected during scientific research cruises by NERC funded ships were collected, edited and deposited with the World Data Centre (WDC) at the National Geophysical Data Centre at Boulder, USA.

As a member of the SCOR Working Group 107 "Improved Global Bathymetry", the GBE prepared a report which examined the status of GEBCO bathymetry, the availability of bathymetric data for updating purposes and the problems that affect GEBCO's ability to provide the definitive global bathymetry. This report was presented at the First Meeting of the Working Group held at the Southampton Oceanography Centre, 12-13 November 1996.

## ANNEX V

### ANNUAL REPORT OF THE GEBCO DIGITAL ATLAS MANAGER (April 1996 - June 1997)

#### Indian Ocean/Southern Ocean Area Bathymetry Data

Work has continued with the digitization of Dr. Robert L. Fisher's bathymetric contour and track line control charts. During the year, a further 42 charts were digitized to complete the coverage of the digital data set from 10°W - 140°E; 23°S - 72°S. The majority of which was published on the second release of the GEBCO Digital Atlas, GEBCO-97, as sheet 97.1.

In addition, a number of update charts were also received for this area, 90 in total of varying sizes. The material from these charts was also digitized, quality controlled and added to the data set shown on the CD-ROM.

Following the release of the GEBCO-97 CD-ROM, work is continuing on the data set. Dr. Fisher has been working on updating the region 20°E - 140°E; 40°S - 71°S. BODC has recently received a number of update charts for the region which have yet to be digitized. Dr. Fisher also intends to send charts for digitization for the region 140°E-170°E by the end of the year. Update material, in digital form, was also received for the Andrew Bain Fracture Zone area (10°E - 30°E; 40°S - 53°S).

Work will also continue on the quality control of the digital data for the charts North of 31°S. The majority of the data for this region is already in digital form. In the region 29°S - 3°N; 120°E - 140°E 15 charts remain to be digitized.

#### North east Atlantic Bathymetry Data

As reported last year, BODC had received a number of update data sets for this region, 37°W - 6°E; 47°N - 64°N. The majority of the area is covered by the Institute of Oceanographic Sciences Bathymetry of the North east Atlantic, (IOS BNEA), sheets 1 and 2, (scale: 1:2,400,000 at 41°N), with additional data sets for:

#### Charlie Gibbs Fracture Zone

1. Rockall Bank
1. Rockall Plateau
2. Continental Margin - South west Approaches to the British Isles (Porcupine Sea bight; Porcupine Bank; Goban Spur and Meriadzek Terrace)

These data sets were edge matched together to produce a seamless map for the region.

The track line control for the region covered by IOS BNEA sheets 1 and 2 was taken from the original 1:1,000,000 scale compilation sheets. For the areas covered by the higher scale charts, (1 - 4 above), the track line control was either digitized from the original chart or taken from the GEODAS CD-ROM.

The above region, i.e. 37°W - 6°E; 47°N - 64°N, was published as sheet 97.3 on the GEBCO-97 CD-ROM.

A chart of the Bay of Biscay region, 42°N - 50°N; 16°W - 0°, (scale 1:1,200,000 at 41°N), supplied by Dr. Jean-Claude Sibuet of IFREMER, was also digitized during the year.

### **Weddell Sea**

BODC received the digital track line control files from the AWI, which accompany their Weddell Sea bathymetric contour data set, (66°W - 0°; 65°S - 79°S). This data set (bathymetric contours and tracks) was published as sheet 97.2 on the GEBCO-97 CD-ROM.

### **Preparation of the GEBCO-97 CD-ROM Data Sets**

To provide a global seamless bathymetric data set, it was necessary to edge match the updated charts, (97.1, 97.2 and 97.3) with the surrounding 5<sup>th</sup> Edition GEBCO data sets.

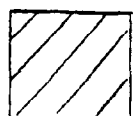
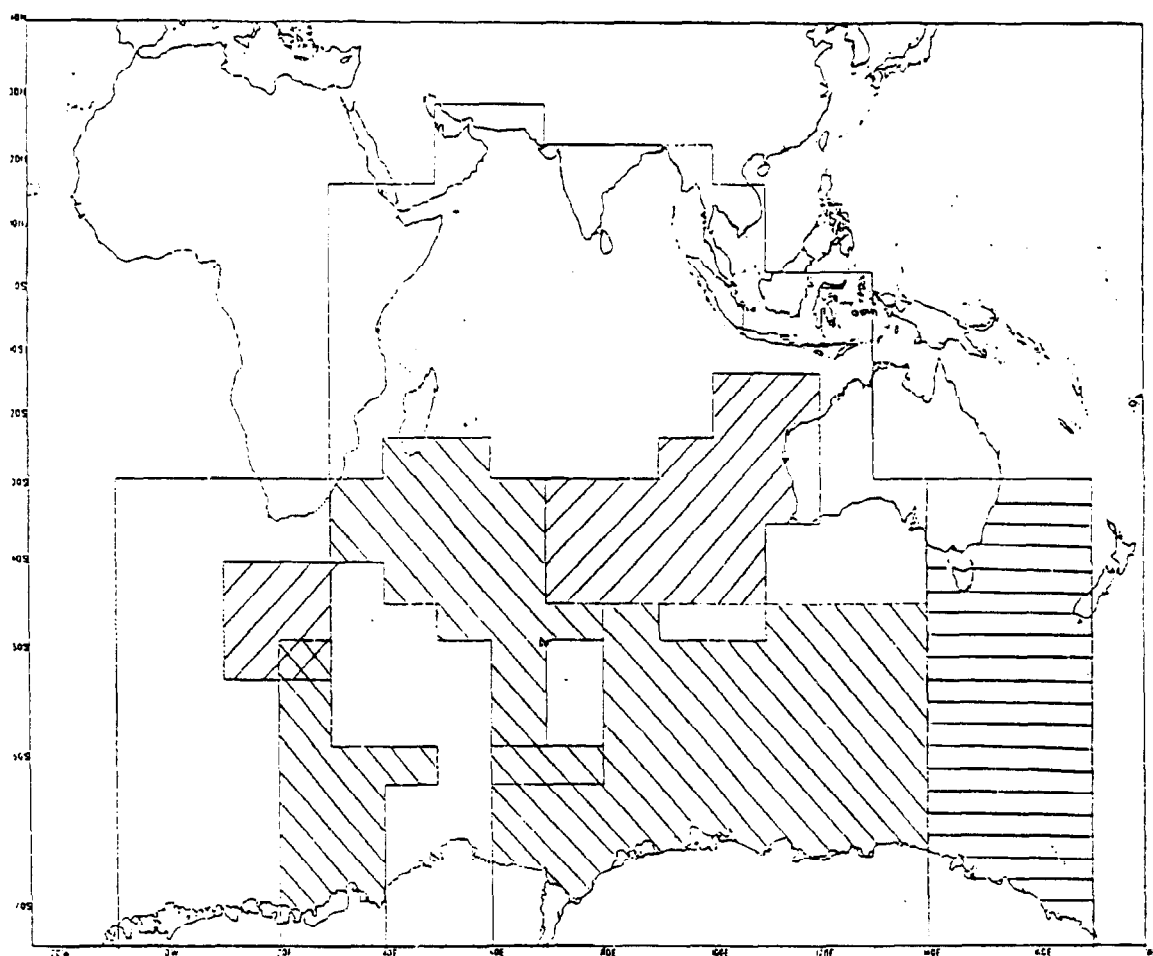
Work was also done on the reformatting the SCAR Antarctic coastline data sets and the IHB's Gazetteer of Undersea Feature Names.

### **Additional Data Sets Received**

A CD-ROM containing the SOPACMAPS bathymetry data sets was received from SOPAC. The data set consists of 10 data files in both DXF and MAPINFO formats.



### Bathymetry of the Indian Ocean: Update Work



Update charts in digital form

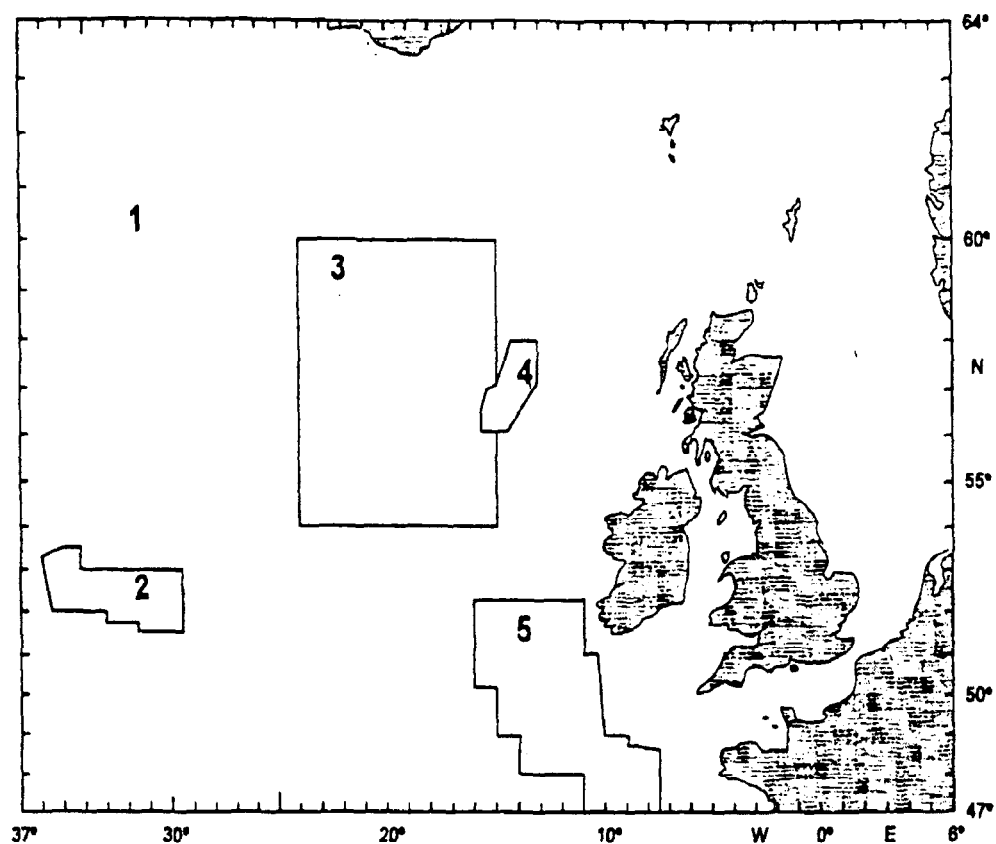


Update charts to be digitised



Area being contoured

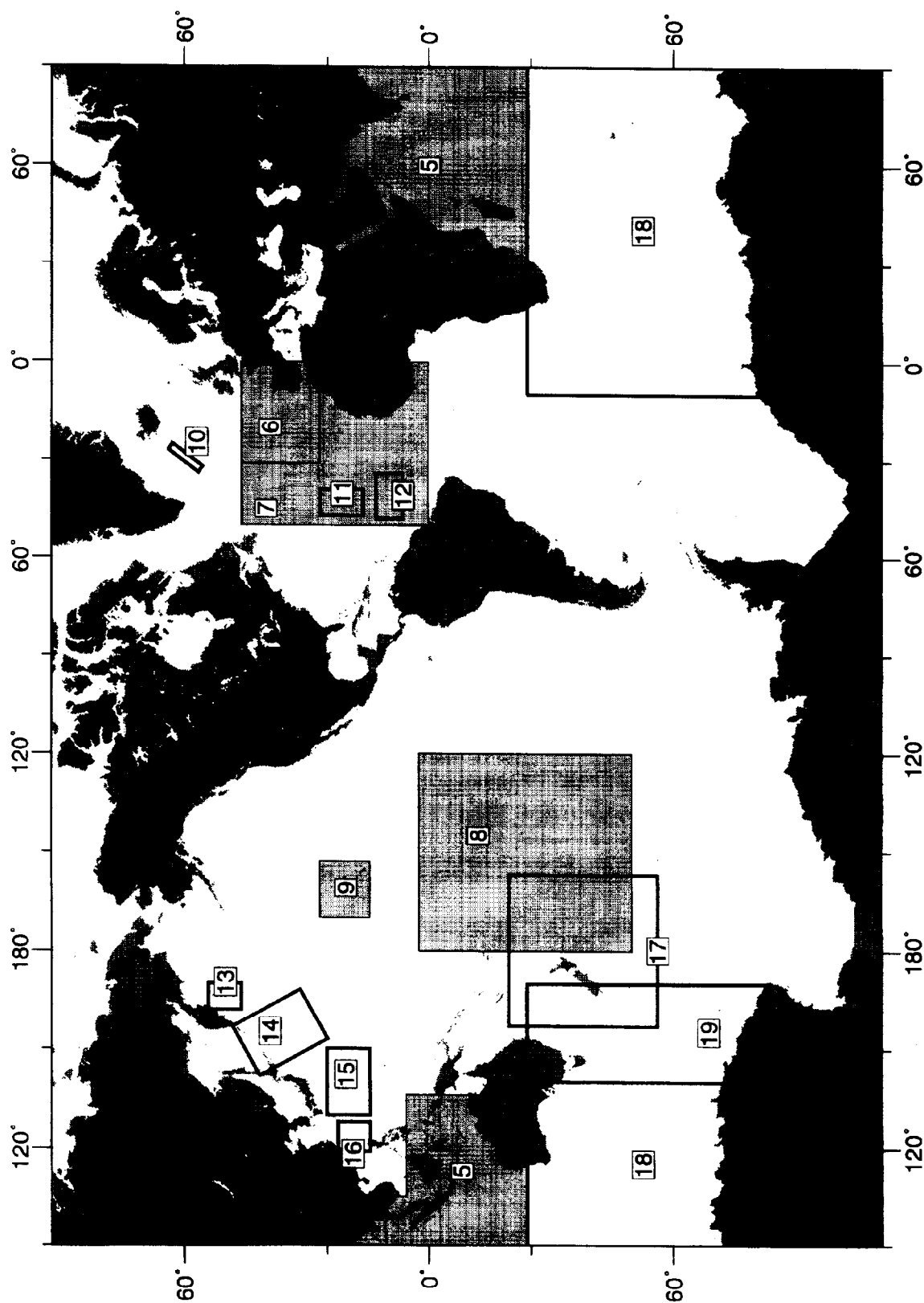
Geographic Coverage of GEBCO Sheet 97.3



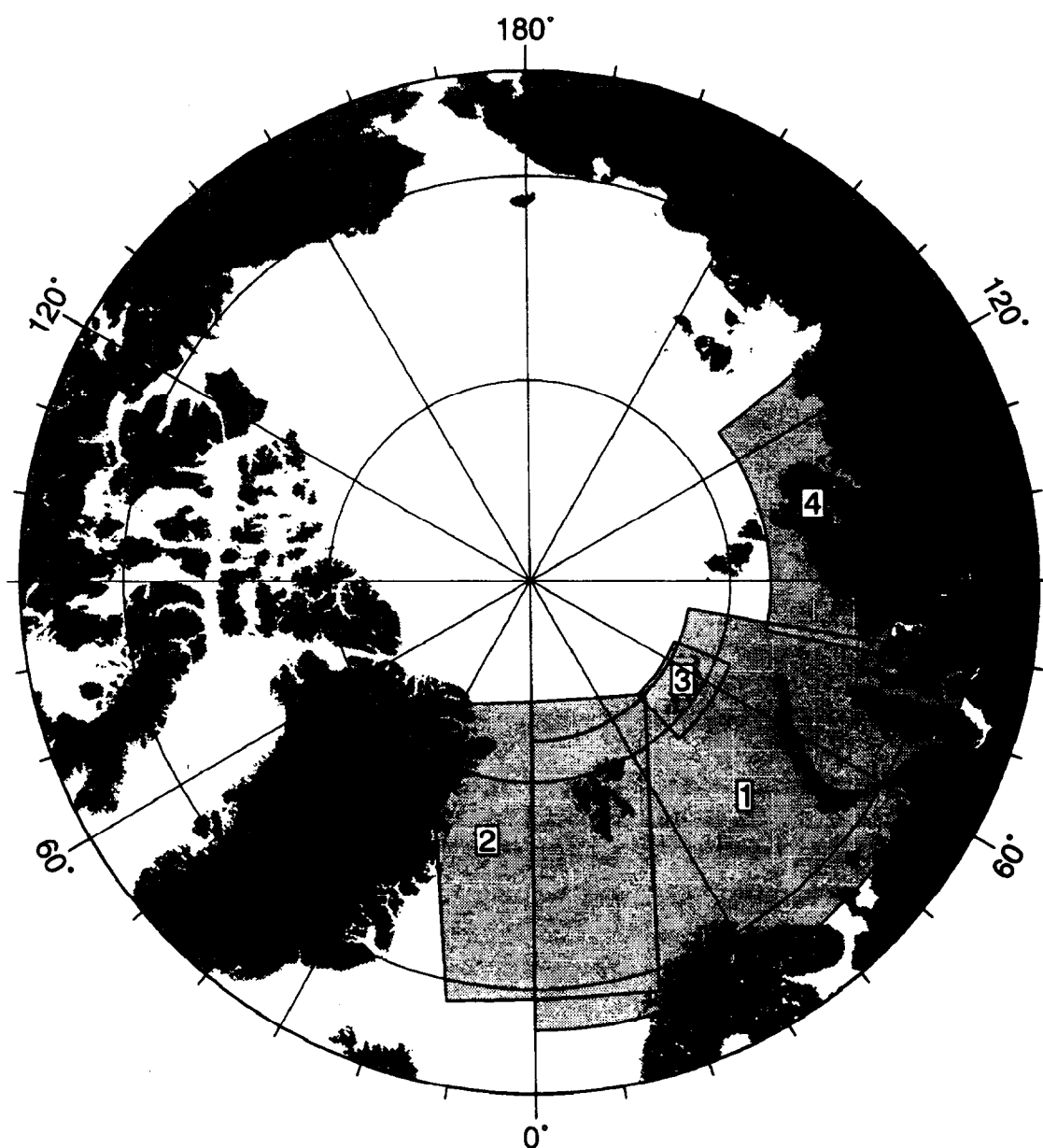
1. Institute of Oceanographic Sciences Bathymetry of the Northeast Atlantic sheets 1 and 2
2. Charlie Gibbs Fracture Zone
3. Rockall Plateau
4. Rockall Bank
5. Continental Margin - Southwest Approaches to the British Isles (Porcupine Seabight, Porcupine Bank, Goban Spur and Meriadzek Terrace)

## ANNEX VI

Bathymetry to be considered for inclusion in the Third Release of GDA "GEBCO-99"  
(Arctic bathymetry: Page 2. Inventory of Bathymetry: Page 3)



**Arctic bathymetry to be considered for inclusion in the Third Release of GDA "GEBCO-99"**  
(Inventory of bathymetry: page 3)



**Inventory of bathymetry to be considered for inclusion in the  
Third Release of GDA "GEBCO-99"**  
(Full details of each item are held by the GEBCO Bathymetric Editor)

N	Author	Source	Date	Title	Scale
1	Cherkis, N.Z	NRL	1991	Bathymetry of the Barents and Kara Seas	1:2,313,000
2	Cherkis, N.Z. & Vogt, P.R.	NRL	1994	Regional Bathymetry of the Northern Norwegian - Greenland Sea	1:3,000,000
3	Matishov, G.G.	MMBI/NRL	1995	Bathymetric Map of the Franz Josef Land Area	1:500,000
4	IIDNO	HDNO	1995	GEBCO Plotting Sheet Areas 593 & 594	1:1,000,000
5	Fisher, R.L.	SIO	—	Bathymetry of the Northern Indian Ocean	Approx. 1:1,000,000
6	Sibuet, J-C.	IFREMER	—	Bathymetry of the North east Atlantic	1:1,000,000
7	Hunter, P.M.	SOC	—	Bathymetry of the North east Atlantic	1:1,000,000
8	Mammerickx, J.	SIO	1992	Bathymetry of the South central Pacific	1:6,442,194
9	Duennebir, T et al.	HIGP	1995	Northwestern Hawaiian Islands	1:4,000,000
10	Keeton, J.A. et al.	SOC	1997	Bathymetry of the Reykjanes Ridge	1:200,000
11	RIDGE	LDEO	1996	Northern Mid-Atlantic Ridge Terrain Model. Multibeam Synthesis Project	Grid
12	EQUARIDGE Project	Geol. Inst. RAS	—	Equatorial Atlantic	Various
13	Svarichevskiy, A.	?	1995	Bathymetric Map of the Obruchev Rise	1:2,500,000
14	Svarichevskiy, A.	?	1995	Bathymetric Map of the North west Pacific Basin	1:5,000,000
15	Japan HD	JapanHD	1995	Continental Shelf Areas of Japan	1:1,000,000
16	Hsu, S-K. et al.	IFREMER	1996	Bathymetric Map Around Taiwan	1:1,600,000
17	CANZ	NIWA	1997	New Zealand Region Bathymetry	1:4,000,000
18	Fisher, R.L.	SIO	1996-1997	Bathymetry of the Southern Indian Ocean (Revised from GEBCO-97)	Approx. 1:1,000,000
19	Fisher, R.L.	SIO	1997	Bathymetry of the South west Pacific/Southern Ocean	Approx 1:1,000,000

## ANNEX VII

## Distribution/Sales of GEBCO Digital Atlas - Summary Statistics (1 June 1997)

a) Total number sold/distributed	=	756 copies
Total number sold	=	562 copies
Number of complementary copies	=	194 copies

b) Copies sold/distributed to 67 countries

c) Breakdown of copies sold/distributed by sector:

Government bodies	324 copies
University groups	223 copies
Commercial bodies	147 copies
Other organisations	62 copies

d) Distribution of 174 complementary copies:

GEBCO community	79 copies
International exchange	56 copies
UK national exchange	59 copies

e) Sales/distribution by month

Month		Copies sold	Gratis copies	Total copies
May	1994	17	18	35
June	1994	33	52	85
July	1994	20	3	23
August	1994	8	9	17
September	1994	21	7	28
October	1994	16	1	17
November	1994	18	2	20
December	1994	13	6	19
January	1995	16	1	17
February	1995	48	5	53
March	1995	31	8	39
April	1995	18	5	23
May	1995	28	8	36
June	1995	20	3	23
July	1995	23	6	29
August	1995	16	2	18
September	1995	18	4	22
October	1995	15	3	18
November	1995	20	3	23
December	1995	13	2	15
January	1996	10	1	11
February	1996	10	23	33
March	1996	10	1	11
April	1996	9	-	9
May	1996	17	5	22
June	1996	6	-	6
July	1996	6	2	8
August	1996	4	2	6
September	1996	3	-	3
October	1996	15	2	17
November	1996	11	1	12
December	1996	5	2	7
January	1997	7	2	9
February	1997	13	-	13
March	1997	5	3	8
April	1997	11	2	13
May	1997	8	-	8
		<hr/> 562	<hr/> 194	<hr/> 756

## Distribution/sales of GEBCO Digital Atlas (1 June 1997)

Country	GOV	UNIV	Sector COMM	Other	Total (sold)
Albania	1	-	-	-	1 (0)
Algeria	1	-	-	-	1 (1)
Argentina	1	-	-	-	1 (0)
Australia	22	11	6	-	39 (34)
Austria	1	-	-	-	1 (1)
Barbados	-	-	1	-	1 (1)
Belgium	2	5	1	2	10 (8)
Brazil	8	4	-	-	12 (11)
Bulgaria	1	-	-	-	1 (0)
Canada	16	14	4	2	36 (30)
Chile	2	2	-	-	4 (4)
China	2	1	-	-	3 (1)
Colombia	2	-	-	-	2 (0)
Cote d'Ivoire	2	-	-	-	2 (1)
Croatia	2	-	-	-	2 (1)
Cuba	1	-	-	-	1 (0)
Denmark	7	3	1	1	12 (10)
Ecuador	2	-	-	-	2 (0)
Egypt	1	-	-	-	1 (0)
Falkland Is.	1	-	1	-	2 (2)
Faeroes	2	-	1	-	3 (3)
Fiji	-	-	-	1	1 (0)
France	13	6	5	9	33 (23)
Germany	23	25	5	2	55 (53)
Greece	3	1	-	1	5 (3)
Guinea	1	-	-	-	1 (0)
Iceland	3	2	1	-	6 (6)
India	3	1	-	-	4 (2)
Iran	1	-	-	-	1 (0)
Ireland	1	-	2	-	3 (1)
Israel	1	1	-	-	2 (1)
Italy	6	5	-	6	17 (15)
Japan	6	9	19	1	35 (33)
Kenya	1	-	-	-	1 (0)
Korea	6	-	-	-	6 (4)
Malaysia	1	-	-	-	1 (0)
Malta	-	1	-	-	1 (1)
Mauritania	1	-	-	-	1 (0)
Mexico	1	1	-	-	2 (1)
Monaco	-	-	-	9	9 (7)
Morocco	1	-	-	-	1 (1)
Netherlands	4	1	6	2	13 (12)
New Caledonia	-	-	-	1	1 (1)
New Zealand	3	1	2	1	7 (5)
Nigeria	1	-	-	-	1 (0)
Norway	11	3	8	2	24 (19)
Papua New Guinea	-	1	-	-	1 (0)
Peru	1	-	-	-	1 (1)
Philippines	-	1	-	1	2 (1)
Poland	2	-	-	-	2 (2)
Polynesia (French)	-	1	-	-	1 (1)
Portugal	1	2	-	-	3 (3)
Russia	16	1	-	1	18 (1)
Singapore	1	-	-	-	1 (1)
South Africa	4	-	2	-	6 (5)
Spain	8	7	6	3	24 (22)
Sri Lanka	-	-	-	1	1 (1)
Sweden	1	-	-	-	1 (0)
Switzerland	-	1	1	-	2 (2)
Taiwan	-	1	-	-	1 (1)
Tanzania	1	-	-	-	1 (0)
Tunisia	1	-	-	-	1 (0)
Turkey	2	1	-	-	3 (2)
Ukraine	3	-	-	-	3 (0)
UK	70	52	38	11	171 (102)
USA	44	58	37	5	144 (120)
Vietnam	1	-	-	-	1 (1)
<b>TOTAL</b>	<b>324</b>	<b>223</b>	<b>147</b>	<b>62</b>	<b>756 (562)</b>

Figures above refer to total number of copies sold or distributed up to 1 June 1997. GOV = Government/Public funded organization; UNIV = University; COMM = Commercial organization. Number in parenthesis refers to total number of copies sold as opposed to complementary copies.

## ANNEX VIII

### PROPOSED LAYOUT FOR GEBCO CENTENARY VOLUME (for publication early 2003)

Photograph of Prince Albert I

Introductory Remarks by Prince Rainier III (or Prince Albert)

Preamble (President of the Directing Committee IHO and Executive Secretary IOC)

Introduction (Chairman GEBCO)

Reproductions of the various editions (or parts thereof)

Preface            Desmond Scott - this will be an updated (shortened) version of Section 1 of the present GEBCO Supporting Volume.

Part 1            Jacqueline Carpine-Lancré. The early history from conception in 1899 to the death of Prince Albert I in 1922, followed by publication of the remaining sheets of the 2<sup>nd</sup> Edition by 1930 under the supervision of the Musée Océanographique.

Part 2            Adam Kerr. The IHB period. 3<sup>rd</sup> and 4<sup>th</sup> Editions (which overlap). Involvement of ICSU (Mike Baker) and the French Service Hydrographique de la Marine, 1930 - 1972. (It is understood that IHB will be employing a French 'stagiaire' in Summer 1997 to collect together material from the archives.)

Part 3            Desmond Scott. SCOR Working Group 41 "Morphological Mapping of the Sea Floor". Formation of a joint IOC-IHO Guiding Committee for the GEBCO. Publication of the 5<sup>th</sup> Edition 1975 - 1982 (World Sheet 1984). Digitization. Issue on magnetic tape, then on CD-ROM. Up to 1995.

Part 4            Meirion Jones. 1996 - latest date pending publication. To be written just before publication, bringing it right up to date with the latest developments.

Appendices       Biographical notes on all persons involved with each edition from the original Commission set up in 1903, and Prince Albert's Scientific Committee, up to the membership of the GEBCO Guiding Committee and Sub-Committees at the time of publication.

Bibliography and References

Note:            Part 1 will be written in French. All quotes/extracts from documents will be in their original language (with translation if considered necessary).



## ANNEX IX

## LIST OF PARTICIPANTS

**I. Members of the Joint IOC-IHO Guiding Committee for the GEBCO**

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**ANNEX X****LIST OF ACRONYMS**

(Acronyms used only in the paragraph in which they are already defined are not included)

ACUF	Advisory Committee on Undersea Features (BGN)
AGSO	Australian Geological Survey Organization
ASL	Arctic Submarine Laboratory (USA)
AWI	Alfred-Wegener-Institut für Polar- und Meeresforschung (Germany)
BAS	British Antarctic Survey
BGN	Board on Geographic Names (USA)
BNEA	Bathymetry of the North east Atlantic
BODC	British Oceanographic Data Centre (UK)
BRIDGE	British Mid-ocean Ridge Project of NERC
CD-ROM	Compact Disc-Read Only Memory
CGOM	IOC Consultative Group on Ocean Mapping
CHRIS	Committee on Hydrographic Requirements for Information Systems
CMG	Commission for Marine Geology (IUGS)
CoE	Committee on Electronic data (IHO) (formerly Committee on ECDIS, predecessor to CHRIS)
DCDB	Data Centre for Digital Bathymetry (IHO - at NGDC, USA)
ECDIS	Electronic Chart Display & Information System (IHO)
EEZ	Exclusive Economic Zone
EPSHOM	Etablissement Principal du Service Hydrographique et Océanographique de la Marine (France)
GBE	GEBCO Bathymetric Editor
GDA	GEBCO Digital Atlas
GEBCO	General Bathymetric Chart of the Oceans (IOC-IHO)
GEODAS	GEophysical DATA System for Marine Geophysical Data (NGDC)
GMT	Generic Mapping Tools (P. Wessel & W.H.F. Smith)
GPS	Global Positioning System
HDNO	Head Department of Navigation and Oceanography (Russian Federation)
HIGP	Hawaii Institute of Geophysics and Planetology
HO	Hydrographic Office
HYDAS	HYdrographic DATA System for Marine Geophysical Data (NGDC)
IASC	International Arctic Science Committee
IBCCA	International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IOC)
IBCEA	International Bathymetric Chart of the Central Eastern Atlantic (IOC)

IBC	International Bathymetric Chart
IBCM	International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series (IOC)
IBCWP	International Bathymetric Chart of the Western Pacific (IOC)
IBCWIO	International Bathymetric Chart of the Western Indian Ocean (IOC)
ICA	International Cartographic Association
ICSU	International Council of Scientific Unions
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
IGN	Institut Géographique National (France)
IHB	International Hydrographic Bureau (Monaco)
IHO	International Hydrographic Organization
INEGI	Instituto Nacional de Estadística, Geografía e Informática (Mexico)
IOC	Intergovernmental Oceanographic Commission (UNESCO)
IOS	Institute of Oceanographic Sciences (United Kingdom)
IOSDL	Institute of Oceanographic Sciences, Deacon Laboratory (now part of SOC)
IUGS	International Union of Geological Sciences
IT	International Technology
JAMSTEC	Japan Marine Science and Technology Centre
KORDI	Korea Ocean Research and Development Institute
LDEO	Lamont-Doherty Earth Observatory (USA)
MMBI	Murmansk Marine Biological Institute (Russian Federation)
NAVOCEANO	Naval Oceanographic Office (USA)
NERC	Natural Environment Research Council (UK)
NGDC	National Geophysical Data Centre (USA)
NIMA	National Imagery and Mapping Agency (USA)
NIO	National Institute of Oceanography (predecessor to IOSDL) (United Kingdom)
NIWA	National Institute of Water and Atmospheric Research (New Zealand)
NOAA	National Oceanic and Atmospheric Administration (USA)
NRL	Naval Research Laboratory (USA)
PWGCA	Permanent Working Group for Co-operation in the Antarctic
RAS	Russian Academy of Sciences
R/V	Research Vessel (IHO Hydrographic Dictionary)
SCAR	Scientific Committee on Antarctic Research (ICSU)
SCDB	Sub-Committee on Digital Bathymetry (GEBCO)
SCICEX	Submarine Science Exercise (US Navy)
SCOR	Scientific Committee on Oceanic Research (ICSU)
SCUFN	Sub-Committee on Undersea Feature Names (GEBCO)



<b>SHOM</b>	<b>Service Hydrographique et Océanographique de la Marine (France)</b>
<b>SIO</b>	<b>Scripps Institution of Oceanography (USA)</b>
<b>SOC</b>	<b>Southampton Oceanography Centre (UK)</b>
<b>SOPAC</b>	<b>South Pacific Applied Geoscience Commission</b>
<b>UNCLOS</b>	<b>United Nations Convention on the Law of the Sea</b>
<b>UNESCO</b>	<b>United Nations Educational, Scientific and Cultural Organization</b>
<b>USNOO</b>	<b>US Naval Oceanographic Office</b>
<b>WDC</b>	<b>World Data Centre</b>
<b>WG</b>	<b>Working Group</b>
<b>WVS</b>	<b>World Vector Shoreline (NIMA)</b>
<b>WWW</b>	<b>World Wide Web</b>