

**Intergovernmental Oceanographic Commission**  
*Reports of Meetings of Experts and Equivalent Bodies*



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

## **Thirteenth Session**

Leningrad, USSR, 10-12 June 1991

**UNESCO**

In this Series, entitled

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

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

IOC-IHO/GEBCO-XIII/3  
Paris, 9 September 1991  
English and French only

SC-91/WS-47

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         IHO Working Group on Oceanic Plotting Sheets  
         (WG/OPS), 2nd Draft, July 1991
- VI      List of Participants
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**1. OPENING OF THE SESSION**

The Thirteenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO) was held at the Head Department of Navigation and Oceanography, USSR Ministry of Defence, Leningrad. Sir Anthony Laughton, Chairman GEBCO, opened the session at 10.00 on Monday 10 June 1991. 1

Vice Admiral Yu.I.Zheglov, Chief of the Head Department of Navigation and Oceanography, welcomed the Participants and spoke of the close co-operation that had developed between his Department and both the International Hydrographic Organization and the Intergovernmental Oceanographic Commission with its Ocean Mapping Programme, in particular the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical series (IBCM). 2

The Chairman welcomed Dr Hans-Werner Schenke (Germany) and Dr Lysandros Tsoulos (Greece) as new members of the Guiding Committee. 3

A full List of Participants is given in Annex VI. Apologies for absence were received from the following Committee Members: 4

Dr Robin K.H.Falconer	(through the Chairman);
Mr David Monahan	(through IHB);
Rear Admiral V.K.Singh	(through HDNO);
Lt.Cdr.Lucas de Campos Costa	(through HDNO).

**2. CONDUCT OF THE SESSION****2.1 Adoption of the Agenda**

The Agenda was adopted without alteration - see Annex I. 5

**2.2 Documentation; Administrative Arrangements; etc.**

The Permanent Secretary introduced the documentation - see Annex II. It was noted that some documents were in short supply. 6

The Administrative Arrangements and Social Programme were presented. 7

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

It was reported that the following changes have taken place since the Twelfth Session of the Guiding Committee in May 1989: 8

**GEBCO Guiding Committee**

- Dr Hans-Werner Schenke (Germany) had replaced Lic. Félix Mouzo (Argentina). 9

- Dr Lysandros Tsoulos (Greece) had replaced Mr Achilleas-Spyridon D.Gazis (Greece), who had in his turn replaced Cdr.D.Francisco Nuche Benito (Spain). 10

- 11 - Lieut.Cdr.Lucas de Campos Costa (Brazil) had replaced Captain Francisco J.Penido Salles (Brazil) who had retired.
- 12 - Ingénieur en Chef Jean Laporte (France) had resigned and his position was under advertisement.
- 13 It was decided to place on record that the Guiding Committee would welcome the nomination of a further candidate from Asia, having the necessary expertise as well as to improve the geographical representation on the Committee.

#### Scientific Advisers to the GEBCO

- 14 The Chairman reported that the following new appointments had been made by the GEBCO Officers:  
- Mr Carl Brenner (USA), Mr Norman Cherkis (USA), Mr Carl Nelius (USA) and Mr Donald E.Pryor (USA).
- 15 - Following a statement in the 'Report of the Bureau gravimétrique international (BGI)' to the Sub-Committee on Digital Bathymetry (Leningrad, June 1991): "The contribution of the BGI to the GEBCO project .... is now considered to be terminated, as expressed at the last meeting of the Directing Board of BGI.", the name of Dr Georges Balmino was deleted from the List of Scientific Advisers.
- 16 - The name of Professor Roger C.Searle (U.K.) was also deleted due to his having taken up a new appointment.
- 17 - Following a proposal from Rear Admiral Viacheslav Romanov, Dr Yuri Kiselev from the Institute of Ocean Geology (VNII OKEANGELOGIA) of the Ministry of Geology of the USSR, Leningrad, was appointed.
- 18 The Guiding Committee expressed their great appreciation to Dr Balmino and Professor Searle for their considerable contributions to the GEBCO project, and welcomed Dr Kiselev to the GEBCO community.

#### Sub-Committee on Digital Bathymetry

- 19 It was reported that new appointments had been made as follows:  
- Shin Tani (Japan), Dr Lysandros Tsoulos (Greece) and Ing. en Chef Michel Huet (IHB).
- 20 - The name of M. Denis Toustou [BGI] (see paragraph 15 above) was deleted from the membership.
- 21 The Guiding Committee decided to place on record its great appreciation of the work carried out by IGN/BGI over a number of years and their considerable contribution to the work of the SCDB.



**Sub-Committee on Geographical Names and Nomenclature of Ocean Bottom Features**

- Dr Richard R.Randall, Executive Secretary, U.S. Board on Geographic Names, who has worked with the Sub-Committee for some years, was formally welcomed to membership. 22
- Ing. en Chef Michel Huet (IHB) had replaced M. Antoine Ferrero-Regis (IHB) as Secretary of the Sub-Committee. Thanks were expressed to M. Ferrero-Regis for his very valuable contribution to the work of the Sub-Committee over a number of years. 23
- On the suggestion of Dr Randall, Mr Anthony Gregory, Secretary, Advisory Committee on Undersea Features of the U.S. Board on Geographic Names, was appointed as an Adviser to the Sub-Committee. 24

The Representative of the IHB said that greater participation from IHO Member States in the activities of this Sub-Committee would be very welcome. 25

It was noted that the work of the Sub-Committee had expanded considerably in recent years, due in no small part to the increase in submission of geographical names by the IOC's Regional Bathymetric Mapping projects. It was agreed that it was highly desirable that regional experts be appointed as advisers to the Sub-Committee and it was suggested that these should be either the Chief Editors of the regional projects or their representatives most aware of nomenclatural problems. These experts would be expected to attend meetings of the Sub-Committee when appropriate, and be prepared to discuss name proposals from their regions which had been submitted in advance. The Secretary IOC was invited to consider inserting this requirement in the Terms of Reference of the various Editorial Boards. 26

**Sub-Committee on Technical Problems related to the Convention on the Law of the Sea (SCLOS)**

This small Sub-Committee, which has been in abeyance for some years, was abolished. 27

**GEBCO Bathymetric Editor and GEBCO Digital Atlas Manager**

The Chairman welcomed Mr Peter M.Hunter, GEBCO Bathymetric Editor, and Ms Pauline Weatherall, GEBCO Digital Atlas Manager, who had been appointed since the last session. Full details of these appointments and other linked matters are contained in the report of the seventh meeting of the GEBCO Officers (see item 4.2 below). 28

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

**4.1 Summary Report of the Twelfth Session of the Joint IOC-IHO Guiding Committee for the GEBCO (doc. IOC-IHO/GEBCO-XII/3)**

29 All matters arising from this report were dealt with under item 4.2 or other agenda items.

**4.2 Short Summary Record of Discussion at the Seventh Meeting of the GEBCO Officers (doc. IOC-IHO/GEBCO Officers-VII/3)**

30 Paragraph 31 *Contract with the Institut géographique national (IGN), France*

This matter has been left in abeyance over the past year pending completion of the digitization of the GEBCO (5th Edition). Further negotiation will be necessary when the 'GEBCO Digital Atlas' is operational.

31 Paragraph 52 *Letter from the Chairman to all members of the wider GEBCO Community*

The Chairman reported that he had sent out a letter as requested to inform members of the structure which had been set up to support the 'GEBCO Digital Atlas', including details of the above appointments (para.28 above) and other arrangements. Amongst the responses he had received was one from the Secretary IOC (ref: IOC 3/1.8.0/VS dated 24 September 1990), copies of which were included in the documentation for the session.

32 Paragraph 53 *Comments from IHO Member States on the Report*  
The Representative of the IHO reported that the Report had been distributed to all IHO Member States. No comments had been received which presumably meant that all Member States were satisfied with the action which had been taken.

33 Item 12.1 *Industrial Research Chair at the University of New Brunswick*

Donald Pryor reported that Larry Mayer from Dalhousie University had been appointed to the Chair, and John Hughes Clark to an associate position. It was agreed that they should be invited to next year's meetings (see item 13 below).

**5. FOURTH SESSION OF THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM), MONACO, 22-24 OCTOBER 1990 (doc. IOC/CGOM-IV/3)**

**5.1 Report of the CGOM to the Sixteenth Session of the IOC Assembly, Paris, 5-21 March 1991 (doc. IOC/INF-822)**

34 This item and sub-item, which were taken together, were introduced by the Chairman CGOM, Desmond Scott.

35 The Chairman CGOM reported that the Session, which had been held in the Musée Océanographique, Monaco, had as its chief task the preparation of a biennial report on all the Ocean Mapping activities

of the Commission (including the GEBCO) to the Sixteenth Session of the IOC Assembly. This report (doc. IOC/INF-822) had been well received by the Assembly which had endorsed the various activities detailed therein.

He suggested that there were two important matters which were of concern to the GEBCO Guiding Committee. These were: 36

(i) The decision to incorporate digitized versions of the various IOC Regional Bathymetric Mapping projects into the 'GEBCO Digital Atlas' meant that the Guiding Committee and the Sub-Committee on Digital Bathymetry must take an active interest in these projects and provide necessary assistance and guidance where needed. 37

The Consultative Group considered that the Chief Editors of these projects, or their representatives, should if possible attend meetings of the Sub-Committee on Digital Bathymetry so that they could understand the need, and obtain the necessary expertise, to digitize their products during compilation. 38

(ii) The responsibility of CGOM to supervise the Ocean Mapping component of IOC's activities in Training, Education and Mutual Assistance in the Marine Sciences (TEMA). One of the most important tasks of the Intergovernmental Oceanographic Commission was to provide active training and education for scientists from developing countries. 39

In the opinion of the Chairman CGOM the IOC's Ocean Mapping programme should be looked on as a whole, with the GEBCO project providing a global activity of 'outstanding quality and lasting importance', as asserted by Dr Roger Revelle, and the regional projects providing the necessary training and education (working closely with the IHO) for Member States with little infrastructure and expertise in this field of endeavour. This was another reason for the Guiding Committee and its Sub-Committees to work closely with the regional Editorial Boards. 40

The Chairman CGOM also reported that he had recently received a letter (IOC/7/0/KK/yb dated 17 May 1991) from the new Chairman of the IOC Committee for TEMA, Professor Michel Vigneaux, asking CGOM to "identify specific subjects where urgent TEMA assistance is required." His reply would be based on the deliberations of the Fourth Session of CGOM but further input would be welcome. 41

## **6. REPORT ON ACTIVITIES BY THE GEBCO BATHYMETRIC EDITOR (GBE)**

Mr Peter M. Hunter, GEBCO Bathymetric Editor, made a verbal report on his activities since the Seventh Meeting of the GEBCO Officers, Bremerhaven, 30 May-1 June 1990. 42

- 43 He reported that his principal activities had included:
- 44 (i) attending sessions of the IOC Consultative Group on Ocean Mapping in Monaco and the Editorial Board for the International Bathymetric Chart of the Western Indian Ocean (IBCWIO) in Mauritius;
- 45 (ii) a tour of North America made during October and November 1990, during which thirteen establishments were visited, representing oceanographic, hydrographic and government research institutes and data centres, both in the USA and Canada;
- 46 (iii) a visit to Brest, France, for meetings with EPSHOM and IFREMER (Centre de Brest);
- 47 (iv) supporting the IOC International Bathymetric Charts of the Western Indian Ocean and the Central Eastern Atlantic;
- 48 (v) co-ordinating the revised edition of GEBCO sheet 5.12 (South Atlantic) - see item 9 below;
- 49 (vi) compiling and contouring bathymetric charts of the Madeira and Porcupine Abyssal Plains in the north-east Atlantic Ocean, and part of the Lau Basin in the south-west Pacific Ocean; and
- 50 (vii) investigating the handling of bathymetric data using readily available techniques that include: inputting data through PC-based CAD and Graphics packages, gridding and contouring on a mainframe computer, and displaying data on Geographical Information Systems.
- 51 The most important of the above activities was the tour of North America. He was made very welcome at all the establishments visited, and without the generous support of his hosts would not have been able to complete his complicated schedule.
- 52 Of particular note during the tour was the identification of active bathymetric mapping programmes, not only continuing at establishments such as NRL, NOS, SIO and USNOO, but of new staff taking up this sort of work at USGS, Menlo Park, and NGDC, Boulder.
- 53 The visit to the Canadian Atlantic Geoscience Centre at Dartmouth, Nova Scotia, identified similar work to the GEBCO that is being carried out by a team led by Dr Ron McNab on compilations of magnetic data in the Arctic and North Atlantic Oceans. This group has developed an extensive suite of computer software, based on the VMS operating system that handles the processing of large volumes of data from post-data acquisition to their final display. Because of the similarity to the GEBCO, Dr McNab has offered this software for evaluation, with a view to sharing its support and further development. In connection with this a pilot project will be arranged, probably involving NUTIS.

On the subject of collecting bathymetric data by single beam echo-sounders, and their subsequent submission to a data centre, it came to light that Woods Hole Oceanographic Institution no longer supports this activity, save for a few individual efforts. 54

A current trend noted was the extensive use of satellite altimetry to infer labelled bathymetric contours in places of little or no coverage by shipborne echo-sounders. Workers should use these data with considerable caution; this is not bathymetry but gravity, and in no way should such data ever be allowed to replace the use of measured depths. See also item 14 below. 55

Visits to the Instituto Hidrográfico and the Servigos Geológicos of Portugal in Lisbon will take place during July. Others are planned to Japan and the north Pacific, northern Europe (in particular Norway and Germany) and the south-west Pacific. 56

The Guiding Committee emphasised that during these visits, the GBE must sell the various concepts of the GEBCO, and also the possibilities for collaboration. He must communicate with the GEBCO reviewers and act as a link between them, the Guiding Committee and the GDA. The opportunities for data exchange should be reiterated whenever possible, and the bathymetric community should be made aware of the existence of the IHO DCDB, both as a source of useful data and as an archive for their own data; they should be encouraged to deposit their data therein. 57

The Guiding Committee on its own part must speak with a single, clear voice in support of the GBE's activities. 58

To aid the above, it was suggested that the GBE should circulate to all persons listed in the GEBCO Personality List his proposed programme of visits, in order to encourage ideas for individuals and establishments that could with advantage be included in his itineraries. 59

The job of the GBE will evolve as the Network of Reviewers (Annex IV) system activates, and decisions are made on the updating of the GDA. At present however he should be an initiator and prober so as to maintain the system during the intersessional periods. 60

**7. NINTH MEETING OF THE SUB-COMMITTEE ON GEOGRAPHICAL NAMES AND NOMENCLATURE OF OCEAN BOTTOM FEATURES, LENINGRAD, 5-7 JUNE 1991**

The Chairman of the Sub-Committee, Dr Robert L. Fisher, introduced this item and presented the approved draft report of the Ninth Meeting of his Sub-Committee (doc. IOC-IHO/GEBCO SCGN-IX/3) which had been held the previous week in the offices of the Head Department of Navigation and Oceanography, Leningrad. 61

- 62 Robert Fisher took the Guiding Committee through his report in some detail explaining the method of working of the Sub-Committee both intersessionally and during the ninth meeting. He pointed out that the Sub-Committee had had great difficulty in completing its work in the three days allocated for the meeting, owing chiefly to the large amount of additional work which had come from a study of the names recently submitted by Dr Troy Holcombe for inclusion in the first sheet (no.1.09) of the International Bathymetric Chart of the Caribbean Sea and Gulf of Mexico (IBCCA).
- 63 He emphasized that in future such names should be proposed - with specific justification - for Sub-Committee review before they are typeset on coloured proof sheets of IBC charts. By no means all of the names appearing on a well-advanced copy of IBCCA Sheet 1.09 were approved by the Sub-Committee.
- 64 The Guiding Committee congratulated the Sub-Committee on its work and in accepting the report made some suggestions as to presentation, in order to clarify the reasons for the decisions reached.
- 65 Concern had been expressed that there might be a conflict of interests when names were proposed by members of the Sub-Committee. The Guiding Committee wished to place on record that it has complete confidence that names proposed by members of the Sub-Committee will be scrutinised with the same care as names from any other source.
- 66 It was considered highly desirable that the procedures for naming underwater features, together with the availability of Proposal Forms (in numerous languages), be widely publicised. It was suggested, in particular, that such material, including copies of the publication 'Standardization of Undersea Feature Names' (see item 7.2 below) should be supplied to all oceanographic research and hydrographic ships, as well as to scientists in marine science disciplines other than marine geology and geophysics.
- 67 The Guiding Committee noted the large increase in the workload of the Sub-Committee caused by submissions from the International Bathymetric Chart of the Caribbean Sea and Gulf of Mexico (IBCCA), and invited the Chief Editor IBCCA (and in due course other regional projects) to submit detailed proposal forms in good time before sheets are finalised (see also paragraph 26 above).

**7.1 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)**

- 68 At their Seventh Meeting the GEBCO Officers considered 'the need to expand and maintain the Gazetteer to contain all the names of undersea features in international waters', and in this context the relationship of the Sub-Committee with the United States Board on

Geographic Names, Advisory Committee on Undersea Features, was raised. This had led to 'cordial, informative and constructive' talks between the Chairman of the Sub-Committee and Dr Richard Randall, Executive Secretary of the U.S. Board on Geographic Names (and now a member of the Sub-Committee).

While it was suggested that full and complete copies of all relevant correspondence and proposals (i.e. justifications) received by each group, and decisions reached, be exchanged, for inclusion in IHB and ACUF files, Richard Randall noted that he could not agree to ACUF providing such information. He stated that he would have to consult with ACUF and the Board on Geographic Names as to compliance with the suggestion. It was recognized that while the two groups on occasion would agree to disagree over a particular name, such situations should be carefully investigated and avoided whenever possible. 69

The Guiding Committee considered that it would be useful if other national names committees could also send in to IHB copies of any proposals they receive for naming features in international waters. 70

In response to an enquiry, the Representative of the IHO stated that new names (and other decisions of the Sub-Committee) are inputted into the IHO-IOC Gazetteer database, maintained at the IHB, without delay, but that they will only appear in the printed Gazetteer when it is taken in hand for reprinting. He envisaged that the next printing would be before the end of 1991. 71

Galina Agapova handed over during the session a camera-ready copy of the Russian version of the Gazetteer for reproduction by IHB. 72

## 7.2 Standardization of Undersea Feature Names

The Permanent Secretary reported on the state of preparation and publication of the various language versions of this publication: 73

English/French	2nd Edition published;
English/Russian	2nd Edition compilation complete - a camera-ready copy was handed over to IHB during the session;
English/Spanish	First draft of 2nd Edition complete - comments awaited from EB/IBCCA;
English/Chinese	Chinese report compilation complete - a camera-ready copy is being prepared;
English/German	Work has been delayed but will be resumed;
English/Japanese	No recent information;
English/Portuguese	Being compiled.

### 7.3 Letters to Editors of major Marine Science Journals

- 74 Since the last session appropriate articles have appeared in the 'Geophysical Journal' of the Royal Astronomical Society, 'Marine Geophysical Researches' and in 'Geo-Marine Letters'.
- 75 The Chairman agreed to write to Dr Arnold Bouma to enquire whether he would be willing for his paper 'Naming of Undersea Features' (Geo-Marine Letters Vol.10 No.3 1990) to be offered to the Marine Technology Society Journal for reissue therein.

### 8. EIGHTH MEETING OF THE GEBCO SUB-COMMITTEE ON DIGITAL BATHYMETRY, Leningrad, 5-7 JUNE 1991

- 76 In the absence of the Chairman of the Sub-Committee, Dr Meirion T.Jones, the Eighth Meeting of the Sub-Committee, which had been held the previous week in the offices of the Head Department of Navigation and Oceanography, Leningrad, had been chaired by Dr Michael S.Loughridge.
- 77 Michael Loughridge reported that, despite the absence of its Chairman, the Eighth Meeting of the Sub-Committee had once again provided an excellent forum for information and discussion.
- 78 The main themes discussed were:
- (i) a review of current activities in this field [see paragraph 79 below];
  - (ii) digitization of the GEBCO (5th Edition) [item 8.1 below];
  - (iii) IHO Data Centre for Digital Bathymetry (DCDB) [item 8.4 below];
  - (iv) report of the IHO Working Group on Oceanic Plotting Sheets(WG/OPS) and revision of the GEBCO Guidelines [items 10 & 11 below];
  - (v) digital world coastline [see paragraph 93 below];
  - (vi) future development of the 'GEBCO Digital Atlas' [see paragraph 81 below].
- 79 Reports had been made on the relevant activities of:
- (i) IHO Committee on Exchange of Digital Data (CEDD) [Pryor];
  - (ii) United States Naval Oceanographic Office (USNOO) [Marchant];
  - (iii) United Kingdom Hydrographic Office (HO) [Harper];
  - (iv) Naval Research Laboratory, USA (NRL) [Cherkis];
  - (v) NERC Unit for Thematic Information Systems (NUTIS) [Robinson];
  - (vi) Geological Survey of Israel [Hall];
  - (vii) Alfred-Wegener-Institut für Polar- und Meeresforschung (AWI) [Schenke];
  - (viii) Service Hydrographique et Océanographique de la Marine (SHOM), France [Le Gouic];
  - (ix) Hellenic Navy Hydrographic Service [Tsoulos];



- (x) Head Department of Navigation and Oceanography (HDNO), USSR [Popov];
- (xi) IUGS Circum-Atlantic Project (CAP);
- (xii) Commission of European Communities (CEC);
- (xiii) US National Activities [Pryor];
- (xiv) IOC Regional Ocean Mapping projects [Sedov];
- (xv) GEBCO Bathymetric Editor - tour of North America [Hunter] (see item 6 above).

The workplan for the GDA Manager had been approved by the Sub-Committee. It was considered to be a full and ambitious schedule. [This workplan appears in the Chairman SCDB's Report on Intersessional Activities June 1990 to June 1991 (doc. IOC-IHO/GEBCO SCDB-VIII/4)]. 80

Presentations had been made to the Sub-Committee by Gary Robinson (NUTIS), John Hall (Geological Survey of Israel) and Hans-Werner Schenke (AWI) on modelling bathymetry and Digital Terrain Models (DTMs). These provided the basis for discussion on the longer term views for the development of the GDA. 81

The Sub-Committee on Digital Bathymetry was congratulated and thanked for its extremely valuable work which formed the basis for the future of the GEBCO, and ensured that the project was in the forefront of modern technological developments without losing its reputation for excellence which was so essential for the future. Michael Loughridge was thanked for chairing the eighth meeting in the unavoidable absence of Meirion Jones. 82

### 8.1 Progress with the 'GEBCO Digital Atlas'

The GEBCO Digital Atlas Manager reported that, following the installation of a new workstation at BODC, good progress had been made with final digitization work on contours and coastlines of the GEBCO (5th Edition). 83

The present state of digitization of the GEBCO (5th Edition) is as follows: 84

*North Atlantic (Sheets 5.01, 5.04 & 5.08)* - Final release was delayed due to concern about registration problems (ref: GEBCO Officers-VII report paragraphs 39a & 59). This has now been resolved. In April 1991 a magnetic tape was issued containing the finalized version of the digital contours from these three sheets and the Arctic (sheet 5.17). 85

*South Atlantic (Sheet 5.12)* - Digitization of the area covered by this sheet will depend on progress with the revision of the sheet at present in hand (see item 9 below). It is confidently expected that it will be possible to start the preparation of a digital contour dataset for this area within two to three months. 86

- 87 *Indian Ocean (Sheets 5.05 & 5.09)* - These were the last two sheets to be digitized by IGN/BGI. The final version of the digitized contours for these two sheets is now available for general release.
- 88 *Eastern Pacific (Sheets 5.03, 5.07 & 5.11)* - These three sheets were digitized by NUTIS. Some problems were encountered by BODC in editing the depth labels on sheets 5.07 and 5.11 due to numerous ambiguities and inconsistencies but the final dataset is now available. These data will shortly be reformatted into their final form on magnetic tape.
- 89 *Western Pacific (Sheets 5.02, 5.06 & 5.10)* - The digitized contours for sheet 5.02 supplied by HDNO, Leningrad, have been checked, edited and finalized. In a teletype message of October 1990, Shin Tani had stated that an updated version of JODC's digital file covering the area of sheet 5.06 between 120°E. and 180° was scheduled for release in April 1991. This is now awaited. BODC has digitized the area from 100° to 120° and will redigitize the section from 90° to 100° to replace an earlier version already available from sheet 5.05. Work has started at NUTIS on digitizing Sheet 5.10 and the digitized dataset is scheduled for delivery to BODC in July 1991.
- 90 *Antarctic Waters (Sheets 5.13, 5.14, 5.15, 5.16 & 5.18)* - The digitized contour dataset for this region was finalized in 1989 and has been on sale for over a year.
- 91 Subject to the availability of the digital dataset from the South Atlantic (revised Sheet 5.12), a complete digital edition of the GEBCO contours will be available later this year.
- 92 Digital files of shiptracks for quality control are being prepared. Hans-Werner Schenke confirmed that shiptracks on sheets 5.16 and 5.18 will be digitized at AWI. Preparation of the remaining files, which will be shared between HDNO and the Digital Atlas Manager, should be complete by mid-1992.
- 93 DMA have stated that they will be releasing a new version of the World Vector Shoreline (WVS) in August 1991. Members of the GEBCO Community were invited to report comments on, and problems with, the WVS back to the Director DMA, and also the Chairman SCDB who should become a focal point for this purpose. The Chairman SCDB was authorised to transfer the GEBCO to the WVS when he considers that it is technically desirable to do so. It was suggested that DMA's Digital Chart of the World (DCW) could provide a source for a unified set of land contours.

## 8.2 GEBCO Structural Diagram

- 94 This diagram, which has gone through a number of evolutionary versions since the 'GEBCO Digital Atlas' concept was first envisaged, was studied by the Guiding Committee and further

modifications were made to the current version (Annex III to doc.IOC/INF-822) in the light of the findings of the IHO Working Group on Oceanic Plotting Sheets (WG/OPS) and comments received from IHO Member States.

Brian Harper, as Chairman WG/OPS, was invited to prepare a revised version taking into account these comments, for final approval by the Chairman, the Permanent Secretary and IHB (see Annex III). This version will also appear in BP-0007 'The GEBCO Guidelines' (see item 11 below). It is hoped that this version will remain unchanged for a number of years. 95

### 8.3 Global Network of Reviewers

The List of GEBCO Reviewers was checked and updated (Annex IV). Evgeniy Shchaulov from the HDNO Charts Division (present at the session) was appointed a joint reviewer with David Monahan (Canada) for the Arctic region. 96

A number of suggestions were made for Reviewers for the four quadrants of the Pacific Ocean. In view of the imminent completion of digitization of the GEBCO (5th Edition) (paragraph 91 above) at which time the 'GEBCO Digital Atlas' will become fully operational, the Permanent Secretary was instructed to make every effort to complete this Network by the end of the year. 97

The GEBCO Bathymetric Editor was asked to prepare a plan showing outlines of responsibility. The limits of responsibility should be shown thereon by broad shaded bands as these should not be considered as sharp delimitations, but rather as areas where discussions should be held with adjacent Reviewers. 98

### 8.4 IHO Data Centre for Digital Bathymetry (DCDB)

Michael Loughridge reported that the DCDB had become operational from 1 June 1990 and had had a successful first year of operation. He presented a paper 'IHO Data Center for Digital Bathymetry Archives June 1, 1990 - May 31, 1991' (doc. IOC-IHO/GEBCO-XIII/8). 99

A senior level geophysicist/bathymetrists has been recruited to assist in the development of DCDB programmes and operations. Also a permanent scientific data specialist position has been established with responsibilities for processing and assimilation of underway marine geophysical data, including bathymetry. 100

During the year digital bathymetric data had been received from 187 cruises carried out by 21 agencies in 9 IHO Member States. 101

He also noted that NGDC is actively developing programs to digitize bathymetric data from the traditional (paper) bathymetric 102

plotting sheets. Preliminary internal standards for such digitization have now been established.

- 103 The Guiding Committee expressed its pleasure at these developments which, although separate, provide very valuable support for the GEBCO Digital Atlas.

#### 8.5 Liaison with the IUGS Circum-Atlantic Project (CAP)

- 104 With the agreement of M. Olivier Dottin, Secretary-General CGMW, who was appointed by the Guiding Committee to liaise with CAP, Merion Jones has been corresponding (and generally dealing) direct with Paul Teleki, Secretary CAP, on technical matters.

- 105 More recently, due to Paul Teleki's absence abroad on secondment, Meirion Jones has once again been dealing with Dr Terence Edgar, Chairman CAP, and on 26 March 1991 a magnetic tape containing the digitized contours and coastlines for the North Atlantic and Arctic Oceans (see paragraph 85 above) was forwarded to CAP. This only leaves the South Atlantic (equator to 46°40'S.) outstanding, but see item 9 below.

#### 8.6 Electronic publishing of GEBCO Products

- 106 This item was included on the agenda as a result of a request made at their seventh meeting in 1990 by the GEBCO Officers (doc. IOC-IHO/GEBCO Officers-VII/3, para.28). The Permanent Secretary reported that Meirion Jones had informed him that he has considered the requirement but has not been able as yet to prepare a paper on the subject. He had stated that he will need to discuss the matter further with colleagues before he can finalize a working document on the subject.

- 107 The attention of the Guiding Committee was drawn to a letter dated April 30th 1991 from Mr Ron Linton, Technical Manager, Maxwell Geographic Information Services (formerly a part of Pergamon Press), to Mr Peter Hunter, GEBCO Bathymetric Editor (doc. IOC-IHO/GEBCO-XIII/6). It was decided that at this stage the letter should merely be acknowledged, with a remark that the GEBCO Guiding Committee was giving the matter active consideration but that no decision had as yet been reached.

- 108 Meirion Jones was asked to investigate the whole matter further, taking into account Ron Linton's letter, and to work through correspondence over the intersessional period, with a view to reaching a decision at the next meeting of the Sub-Committee on Digital Bathymetry and its contiguous meeting of the GEBCO Officers.

### 8.7 Discussions with Petroconsultants (CES) Ltd.

The Chairman reported that he had been approached by the Managing Director of Petroconsultants (CES) Ltd., United Kingdom, with an informal proposal that the GEBCO, possibly in consultation with IOSDL/UK, undertake under contract the selection of bathymetry in specific regions of interest to the oil companies - initially the south-east Asian area had been suggested. It was understood that, though digitization of the material provided would be carried out by Petroconsultants, it would be made available to the GEBCO. 109

After discussion it was decided that this proposal should not be followed up on behalf of the GEBCO, but was more suited to a national institute such as IOSDL. It was felt that the project was insufficiently GEBCO-related and indeed could well lead to the small amount of effort available for GEBCO being diluted by a project of little relevance to its future. 110

### 9. PREPARATION OF A REVISED EDITION OF SHEET 5.12 (SOUTH ATLANTIC)

The GEBCO Bathymetric Editor reported that he had received from Robin Falconer copies of the 500m interval contours interpolated from Norman Cherkis' South Atlantic chart. There are a few areas where Robin Falconer was uncertain of the position of a contour, but the GBE has obtained a copy of the original soundings used by Norman Cherkis and he will insert the missing contours. Contours were still required for the strip between 8° and 17°S. which is also covered by the Angola-Brazil Geotraverse. 111

It was reported that, despite a serious illness, Carl Brenner had completed contouring the western part of the area between 40° and 50°S. He had received all the compilation material he had requested. He had assured the GBE that he would complete the work by early July.\* 112

Contouring of the strip to the north of the equator (0°-7°N.) was well in hand. Gleb Udintsev had passed the GBE copies of multi-beam bathymetry collected during the last two cruises of R/V AKADEMIK NIKOLAI STRAKHOV. These, in conjunction with some earlier contoured bathymetry and additional contours compiled by Peter Hunter, are being used to update this part of the sheet. 113

Norman Cherkis outlined his progress since the GEBCO Officers meeting in May/June 1990. He stated that he still had some contouring to do to complete the eastern part of the strip 0°-3°S. 114

The GBE said that when he had received all the above contoured material, he would reconcile the differences in contouring style and 115

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\* The GBE reports that some of this material has now arrived.  
10 July 1991.

edge-match the compilations. He expected to be in a position to submit the final contours to the Chairman and Roger Searle in September 1991 (reference: doc. IOC-IHO/GEBCO-XII/3, paragraph 104), and when cleared it would be sent to BODC for digitizing.

- 116 On completion of the contouring work, a plot of shiptracks would be prepared. In answer to a question on the use of boxes to represent comprehensive surveys, the GBE said that the scheme used for the rest of the 5th Edition would be followed, but that in cases where there were a number of small surveys such as multi-beam based bathymetry of parts of the Mid-Atlantic Ridge they would be coalesced to make larger boxes wherever possible.
- 117 It was suggested that the GBE should approach Dr Ken Macdonald, University of California at Santa Barbara, to ensure that his work has been incorporated.
- 118 Formal documentation on names will be needed and it will not be possible to await the next meeting of the Sub-Committee on Geographical Names and Nomenclature of Ocean Bottom Features for this. However this should not be a large task as virtually all the names to be shown could be taken from existing sheet 5.12, with additions and modifications already decided upon by the SCGN. It was noted that certain new names appearing on Norman Cherkis' 1989 chart had recently been considered by the SCGN (ref: IOC-IHO/GEBCO SCGN-IX/3, section 3.11).

#### **10. REPORT ON THE FINDINGS AND RECOMMENDATIONS OF THE IHO WORKING GROUP ON OCEANIC PLOTTING SHEETS (WG/OPS)**

- 119 Brian Harper, Chairman WG/OPS, introduced his draft report, and in particular the Summary of Recommendations therefrom which the Guiding Committee had before them (doc. IOC-IHO/GEBCO-XIII/5). He reported that the Sub-Committee on Digital Bathymetry had made a careful study of these and had suggested some modifications and one additional recommendation on the handling of multibeam data. These revised recommendations (which he accepted fully) would now have to go back to the Working Group for their approval.
- 120 He also reported that two members of the Working Group (from SHOM and DMAHTC) had previously submitted proposals for amendments to the draft report. These proposals were also discussed and, in the main, were adopted. He anticipated that the final report would be submitted to the IHB in September 1991, for presentation to the next International Hydrographic Conference (IHC-XIV) in May 1992. Copies would be made available to members of the Guiding Committee.
- 121 The GEBCO Structural Diagram was then modified to take account of these recommendations (as already reported in item 8.2 above). Brian Harper agreed to provide the necessary input to the 'GEBCO Guidelines' (item 11 below) when the report has been finalized.

The Guiding Committee congratulated Brian Harper and his Working Group on their work and confirmed the modified Summary of Recommendations (Annex V). 122

#### 10.1 Catalogue of Bathymetric Plotting Sheets (BP-0002) and its Annex (BP-0003)

The newly published Catalogue of Bathymetric Plotting Sheets BP-0002, 4th Edition, March 1991, and its Annex BP-0003, 6th Edition, May 1991 were introduced by Rear Admiral Alfredo Civetta, Representative of the IHB. Admiral Civetta drew attention to the fact that this was now a joint IHO-IOC publication and that the 1:250,000 Plotting Sheet Index Diagrams for the IOC's Regional International Bathymetric Chart series had also been included. 123

Brian Harper (Chairman WG/OPS) drew attention to the fact that his Working Group had recommended that after establishment of a 'live' digital system within a VHO, manual updating of plotting sheets should cease (recommendation 2(i) in Annex V). 124

A suggestion was made that, as the 1:1 million plotting sheets were no longer maintained by VHOs in the regional areas covered by 1:250,000 plotting sheets, it would be better to omit these sheets on the GEBCO side of the catalogue (inset C). However others thought that the present arrangement was useful as it could be used as a cross-reference to the Annex (BP-0003) and it might be better to maintain this diagram in its present form until the traditional Bathymetric Plotting Sheets are phased out (WG/OPS recommendation 2.iii. refers). 125

Lysandros Tsoulos drew attention to the fact that on Inset G no area allocation limit (in red) had been shown between Greece and Turkey in the Aegean Sea. 126

The Representative of the IHB said that this matter had been raised at a recent meeting of the Mediterranean and Black Sea Hydrographic Commission. The question remained unresolved but the Commission had agreed that this was the best solution. As there was no exchange of data between Greece and Turkey, i.e. no sheets showing all data, the IHB had proposed that both countries collect all data available to them. 127

Lysandros Tsoulos disagreed with this proposal and referred to GEBCO Letter no.24, to the Summary Report of the fourth session of the Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series (IBCM), held in Paris, 11-13 December 1989 (doc. IOC/EB-IBCM-IV/3) and to allocations in the Annex (BP-0003). He considered that IHB should be consistent in its approach to this problem. 128

- 129 The Chairman said that this was a difficulty of long standing which was largely political and therefore not within the competence of the Guiding Committee. He ruled that the correct route for the dispute was from the Hydrographic Offices involved to the IHB.

**II. 'GUIDELINES FOR THE GENERAL BATHYMETRIC CHART OF THE OCEANS'  
(BP-0007)**

- 130 The Guiding Committee had before it the 2nd Edition of the 'Guidelines', Final Draft, April 1991. This text, which has already gone through many changes and modifications, was introduced by Rear Admiral Alfredo Civetta, Representative of the IHB.
- 131 The Guiding Committee went through the text with some care, studying in particular the comments and modifications proposed by IHO Member States. Most of these were agreed and comments were noted by the representatives of the IHB. It was decided that Parts 1 and 2 should be published at an early date as there was no need to refer these back to Member States.
- 132 The Chairman GEBICO offered to rewrite the introductory section, and the section dealing with the organisation and components of the GEBICO system, in collaboration with the Permanent Secretary. This was agreed.
- 133 It was also agreed that the latest version of the GEBICO Structural Diagram (item 8.2 above and Annex III of this report) should be incorporated and it should be brought forward to page 1-3 of the publication, opposite the text entitled 'GEBICO SYSTEM COMPONENTS'.
- 134 Attention was drawn to an amendment proposed by USA/DMA to paragraph 1.3.1.2 (2) concerning membership of the Guiding Committee. The Representative of the IHB pointed out that this was a matter for the Governing Bodies of the IHO and IOC which could not be resolved by the GEBICO Guiding Committee. IHB had corresponded with the Secretary IOC on the subject and had received a negative response to their suggestion that the agreement on membership which has stood unchanged since 1974 should be altered.
- 135 Section 1.7.3 Operational Procedures, Systems and Formats supporting the Banking of Bathymetric Data at the IHO Data Centre for Digital Bathymetry, and Parts 3 Digital Bathymetric Data (Single-Beam Echo Sounders) and 4 Underway Geophysical Data all need further work on them before publication. As the publication is loose leaf, these can follow later but the Guiding Committee urged that they should be completed at an early date.
- 136 The Guiding Committee expressed its appreciation to the IHB that after so many years there was a real effort on the part of all concerned to get the 'Guidelines' revised and published in a useful format acceptable to all parties.



**12 SALES AND PUBLICITY**

Sales of the GEBCO (5th Edition) were still being maintained. 137  
A number of magnetic tape copies of the two regions so far  
available: Antarctic Waters; and North Atlantic & Arctic, have  
been distributed and sold - see doc. IOC-IHO/GEBCO SCDB-VIII/4,  
Section 5.

On completion of digitization of the GEBCO (5th Edition), 138  
including revised Sheet 5.12 (see paragraph 91 above), it is  
intended to include the whole series on one tape at 6250 bpi (two  
tapes at 1600 bpi), with a choice of ASCII or EBCDIC character code.

The Guiding Committee noted the remarks made by the Chairman 139  
SCDB in his 'Report on Intersessional Activities June 1990 to June  
1991' (doc. IOC-IHO/GEBCO SCDB-VIII/4) and agreed that greatly  
increased publicity was needed when the complete package and  
accompanying documentation were finalized and ready to market.

A draft BODC Information Note, prepared by Meirion Jones, was 140  
studied in detail and a large number of suggestions for its  
improvement passed to Pauline Weatherall (for BODC). The Guiding  
Committee considered however that although this was useful it would  
only have limited distribution. Considerably more publicity would  
be needed. Meirion Jones was asked to prepare a less detailed one  
sheet flyer for wide distribution in appropriate scientific journals  
and catalogues, and his suggestion that articles should be prepared  
for the International Hydrographic Review (or Bulletin) and the IMS  
Newsletter was endorsed. Whilst it was agreed that details of the  
product should appear in the 'GEBCO Guidelines', this was not  
considered to be an appropriate publication for sales publicity.

The Guiding Committee also considered that the time had come to 141  
publish a completely new glossy brochure to replace the existing  
small brochure which had been prepared by the Canadian Hydrographic  
Service to publicise the GEBCO (5th Edition). The Permanent  
Secretary and the GEBCO Bathymetric Editor were asked to investigate  
this possibility. It was estimated that design costs might amount  
to about £800, to which would have to be added translation and  
printing costs.

It was agreed that considerable publicity could be obtained at 142  
exhibitions but care should be taken to distinguish between a  
display designed to show progress with the project, e.g. for  
sessions of the I.H.Conference and the IOC Assembly, and what can be  
shown on the wall for the use of conference delegates.

A number of ideas for conference exhibits were discussed. 143  
Meirion Jones, Gary Robinson and Pauline Weatherall were asked to  
look into the various possibilities, in correspondence with Michael  
Loughridge and John Hall, and to prepare proposals.

### 12.1 Liaison with the National Geographic Society

144 Following initial contact with David Monahan, Charles Case of the National Geographic Society contacted Meirion Jones in September 1990 to enquire about the digitization of the GEBCO (5th Edition). He had remarked that GEBCO had become their 'bible' for sea floor topography and that they frequently used the GEBCO printed sheets as source material to be worked up by their artists/illustrators.

145 It was decided that, unless David Monahan or Meirion Jones are approached again by someone from NGS, the next move should be for Meirion Jones to inform Charles Case when the GEBCO (5th Edition) and accompanying documentation have been finalized and placed on sale (paragraphs 91 and 138 above), and the GDA has become fully operational.

### 13. DATES AND PLACES OF THE EIGHTH MEETING OF THE GEBCO OFFICERS AND THE FOURTEENTH SESSION OF THE JOINT GUIDING COMMITTEE

146 Pauline Weatherall was pleased to confirm the invitation of Meirion Jones to host the eighth meeting of the GEBCO Officers and the ninth meeting of the Sub-Committee on Digital Bathymetry at the British Oceanographic Data Centre, Proudman Oceanographic Laboratory, Bidston Observatory, Birkenhead, United Kingdom, in 1992. Provisional dates, subject to confirmation by Meirion Jones, were agreed as follows:

GEBCO SCDB-IX	8 - 10 April 1992;
GEBCO Officers-VIII	13 - 15 April 1992.

147 It was noted than an informal invitation had already been received from Shin Tani to hold a meeting of the GEBCO SCDB in Tokyo.

148 Robert Fisher agreed to explore the possibility of GEBCO-XIV, GEBCO SCGN-X and GEBCO SCDB-X being held at the Scripps Institution of Oceanography, La Jolla, at suitable dates during the period April to June 1993.

### 14. ANY OTHER BUSINESS

#### Satellite Altimetry Data

149 The Guiding Committee returned to a point made by the GEBCO Bathymetric Editor in his report (paragraph 55 in item 6 above).

150 Robert Fisher drew attention to the arguably over-reaching interpretation of satellite altimetry when the results are being portrayed or modelled as sea floor bathymetry. He had noted with considerable concern that some modellers are publishing so-called bathymetric charts, replete with newly 'named' topographic elements

where ground truth is sparse or not known to the modellers. Such charts bear no demonstrable kinship to nautical charts based on depth measurements and accepted for vessel operations, and hence very little relationship to the GEBCO and its review criteria. It is well recognized that satellite altimetry does detect and record real variations in the distribution of mass. How these values relate to the dimensions, or positions, or trends, of various topographic elements, i.e. contourable entities, is not yet definable.

Hans-Werner Schenke said that problems had also arisen from incorrectly reduced noise data from ice and coastline glacial rebound. Resulting interpretations and published models had been demonstrably unreal. 151

The Guiding Committee was of the opinion that at present such data can most properly be used for interpolation purposes or to reconnoitre little visited localities. Seafloor portrayals drawn in significant fraction from satellite altimetry data should never be entitled as bathymetric maps, but accepted as indicative. On the other hand, absence or sparseness of features on maps based on satellite gravity measurements should never be taken to indicate that there are no topographic elements on that sector of the seafloor. 152

#### 15. APPROVAL OF THE SUMMARY REPORT OF THE SESSION

This Summary Report has been approved by correspondence. 153

#### 16. CLOSURE OF THE SESSION

The Chairman closed the Session at 17.00 on Wednesday 12 June 1991, and in so doing thanked Admiral Zheglov and his staff for the outstanding hospitality and support that had been provided for the GEBCO Guiding Committee Session, for the two Sub-Committee meetings the previous week, and also for the small group of wives who had been looked after so well while the groups were in session. 154

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
4. MATTERS ARISING FROM REPORTS OF PREVIOUS MEETINGS
  - 4.1 Summary Report of the Twelfth Session of the Joint IOC-IHO Guiding Committee for the GEBCO (doc. IOC-IHO/GEBCO-XII/3)
  - 4.2 Short Summary Record of Discussion of the Seventh Meeting of the GEBCO Officers (doc. IOC-IHO/GEBCO Officers-VII/3)
5. FOURTH SESSION OF THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM), MONACO, 22-24 OCTOBER 1990 (doc. IOC/CGOM-IV/3)
6. REPORT ON ACTIVITIES BY THE GEBCO BATHYMETRIC EDITOR
7. NINTH MEETING OF THE SUB-COMMITTEE ON GEOGRAPHICAL NAMES AND NOMENCLATURE OF OCEAN BOTTOM FEATURES, LENINGRAD, 5-7 JUNE 1991
  - 7.1 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)
  - 7.2 Standardization of Undersea Feature Names
  - 7.3 Letters to Editors of major Marine Science Journals
8. EIGHTH MEETING OF THE GEBCO SUB-COMMITTEE ON DIGITAL BATHYMETRY, LENINGRAD, 5-7 JUNE 1991
  - 8.1 Progress with the 'GEBCO Digital Atlas'
  - 8.2 GEBCO Structural Diagram

- 8.3 Global Network of Reviewers
- 8.4 IHO Data Centre for Digital Bathymetry (DCDB)
- 8.5 Liaison with the IUGS Circum-Atlantic Project (CAP)
- 8.6 Electronic publishing of GEBCO Products
- 8.7 Discussions with Petroconsultants (CES) Ltd.
- 9. PREPARATION OF A REVISED EDITION OF SHEET 5.12 (SOUTH ATLANTIC)
- 10. REPORT ON THE FINDINGS AND RECOMMENDATIONS OF THE IHO WORKING GROUP ON OCEANIC PLOTTING SHEETS (WG/OPS)
  - 10.1 Catalogue of Bathymetric Plotting Sheets (BP-0002) and its Annex (BP-0003)
- 11. 'GUIDELINES FOR THE GENERAL BATHYMETRIC CHART OF THE OCEANS' (BP-0007)
- 12. SALES AND PUBLICITY
  - 12.1 Liaison with the National Geographic Society
- 13. DATES AND PLACES OF THE EIGHTH MEETING OF THE GEBCO OFFICERS AND THE FOURTEENTH SESSION OF THE JOINT GUIDING COMMITTEE
- 14. ANY OTHER BUSINESS
- 15. APPROVAL OF THE SUMMARY REPORT OF THE SESSION
- 16. CLOSURE OF THE SESSION

ANNEX II

LIST OF DOCUMENTS \*

- IOC-IHO/GEBCO-XIII/1 prov.2 Revised Provisional Agenda
- IOC-IHO/GEBCO-XIII/2 Annotated Provisional Agenda
- IOC-IHO/GEBCO-XIII/3 Summary Report of the Session
- IOC-IHO/GEBCO-XIII/4 List of Documents
- IOC-IHO/GEBCO-XIII/5 Summary of Recommendations from the  
Draft Report by the IHO Working Group  
on Oceanic Plotting Sheets 1991
- IOC-IHO/GEBCO-XIII/6 Letter dated April 30th 1991 from  
Mr Ron Linton, Maxwell Geographic  
Information Services, to Mr Peter Hunter,  
GEBCO Bathymetric Editor
- IOC-IHO/GEBCO-XIII/7 Letter IOC 3/1.8.0/VS dated 24 September  
1990 from Dr Gunnar Kullenberg, Secretary  
IOC, to Sir Anthony Laughton, Chairman GEBCO
- IOC-IHO/GEBCO-XIII/8 IHO Data Center for Digital Bathymetry  
Activities June 1, 1990 - May 31, 1991
- IOC-IHO/GEBCO-XII/3 Summary Report of the Twelfth Session of  
(in English & French) the GEBCO Guiding Committee, Boulder,  
Colorado, USA, 16-17 May 1989
- IOC-IHO/GEBCO Officers-VII/3 Short Summary Record of Discussion  
at the Seventh Meeting of the GEBCO  
Officers, Bremerhaven, FRG, 30 May-1 June 1990
- IOC-IHO/GEBCO SCGN-VIII/3 Summary Report of the Eighth Meeting  
of the GEBCO Sub-Committee on Geographical  
Names and Nomenclature of Ocean Bottom  
Features, Monaco, 10-12 May 1989
- IOC-IHO/GEBCO SCDB-VI/3 Summary Report of the Sixth Meeting of  
the GEBCO Sub-Committee on Digital  
Bathymetry, Boulder, Colorado, USA,  
10-12 May 1989

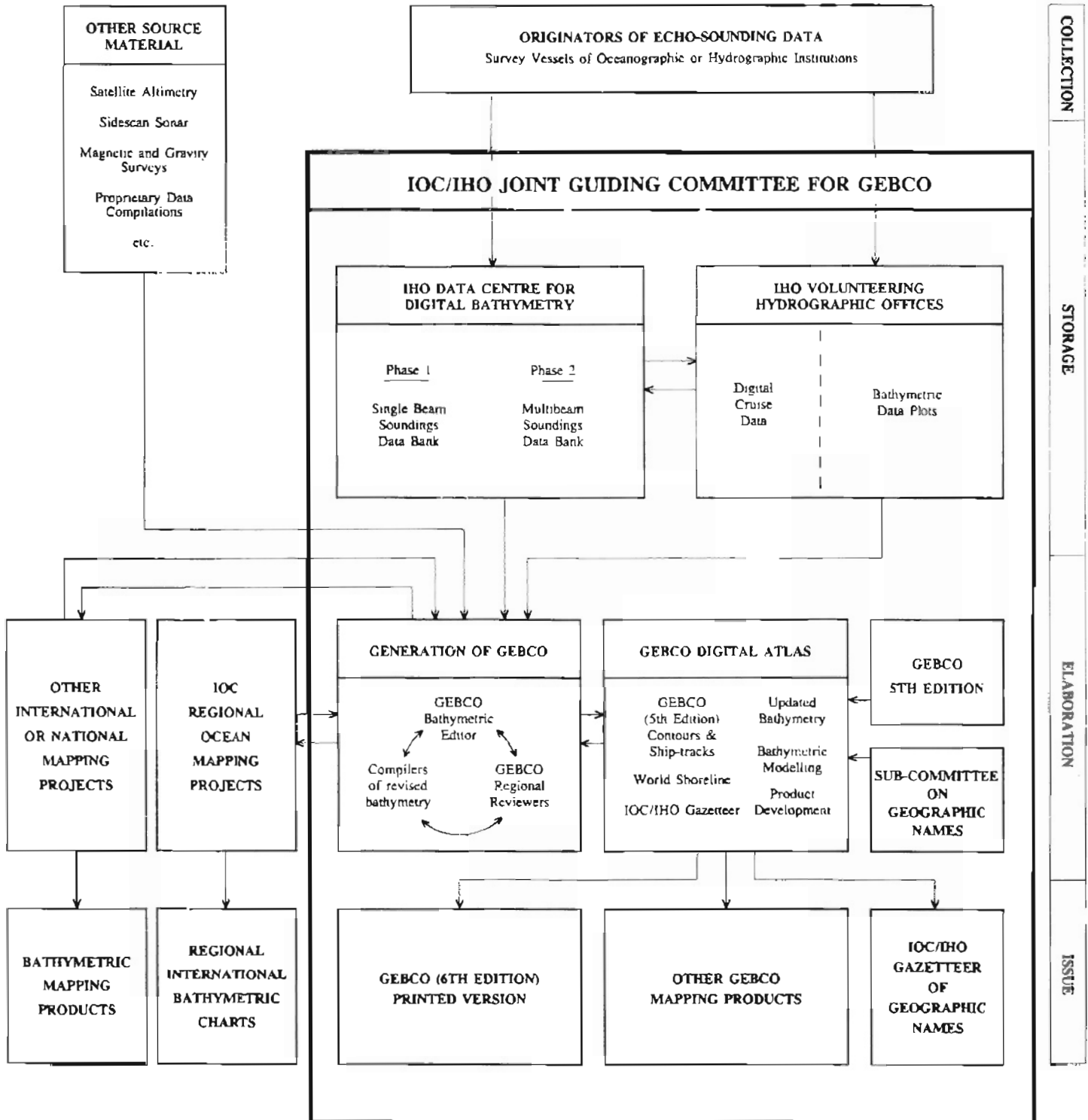
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\* For reference only. No stocks of these Documents are  
maintained, except the Summary Report of the Session.

- IOC-IHO/GEBCO SCDB-VII/3 Summary Report of the Seventh Meeting  
of the GEBCO Sub-Committee on Digital  
Bathymetry, Bremerhaven, FRG, 28-30 May 1990
- IOC/CGOM-IV/3 Summary Report of the Fourth Session of  
the IOC Consultative Group on Ocean  
Mapping, Monte Carlo, 22-24 October 1990
- IOC/INF-822 Report of the Consultative Group on Ocean  
Mapping (CGOM) to the Sixteenth Session  
of the IOC Assembly
- BP-0002 Catalogue of Bathymetric Plotting Sheets  
4th Edition, March 1991
- BP-0003 Annex to the Catalogue of Bathymetric  
Plotting Sheets 6th Edition, March 1991
- BP-0007 GEBCO Guidelines for the General Bathymetric Chart  
of the Oceans 2nd Edition, Final Draft, April 1991
- GEBCO Personality List Revised 1 June 1991

ANNEX III

GEBCO STRUCTURAL DIAGRAM





ANNEX IV

LIST OF GEBCO REVIEWERS

Antarctic waters	Hans-Werner Schenke	Accepted
North Atlantic Ocean (excluding Caribbean Sea & Gulf of Mexico)	Peter Hunter David Monahan (link with Galina Agapova for area equator to 7°N.)	Accepted Accepted
Caribbean Sea & Gulf of Mexico	Troy Holcombe	Accepted
Arctic Ocean	David Monahan Evgeniy Shchaulov	Accepted Accepted
Mediterranean & Black Seas	John Hall (S of 36°N) Operational Unit for the Mediterranean (N of 36°N) (now Dmitry Travine)	Accepted Accepted
South Atlantic Ocean	Norman Cherkis (link to Brazilians, also Carl Brenner & Robert L.Fisher)	Accepted
Indian Ocean (20°-150°E.)	Robert L.Fisher	Accepted
North-west Pacific Ocean	Identify from IBCWP activities Shoichi Oshima (Japan Hydrographic Dept.) to be asked for advice (link to Gleb Udintsev for Sea of Okhotsk area)	
South-west Pacific Ocean	Identify from IBCWP activities James V.Eade Deputy Dir. SOPAC	Proposed
North-east Pacific Ocean	Rear Admiral Christian Andreason NOAA has agreed to nominate a staff member of NOS	
South-east Pacific Ocean	José Corvalan D., Chairman South-east Quadrant Panel Circum-Pacific Map Project Also IFREMER to be approached	Proposed

ANNEX V

SUMMARY OF RECOMMENDATIONS FROM THE REPORT BY THE IHO  
WORKING GROUP ON OCEANIC PLOTTING SHEETS (WG/OPS)  
2ND DRAFT - JULY 1991

**TOWARDS A DIGITAL GEBCO**

1. We have examined the replies to the 1990 IHO Questionnaire and we are convinced that there are distinct advantages in adopting new technology in the quest for a digital GEBCO. We therefore recommend that all VHOs should be encouraged fully to embrace digital methods of data collection, storage and exchange.
2. It is recommended that:
  - i. After establishment of a 'live' digital system within a VHO, manual updating of OPS, from analogue or digital data, should cease;
  - ii. OPS should not be updated from digital data;
  - iii. All remaining analogue OPS should be phased out in five years from now - 1996.
3. We support the view that all data, from whatever source, should be subject to a standard method of quality control. For this purpose, we recommend an adapted version of SP44, Chapter 2 (see Annex B to the report of the IHO WG/OPS). This quality control is designed for both analogue and digital data.
4. We recognise the need for a structured response to deal with the conversion of analogue records to digital data. We suggest three stages in which this conversion might take place.
5. Given the need to assign quality control to all data, we recommend that the primary aim should be to capture digital data on a cruise by cruise basis.
6. We believe that the responsibility for the quality control of data from any cruise lies with the VHO/HO/Agency/Institution which is the collector or custodian of the raw data. We recommend that all HOs should actively encourage other national data collectors to send their data to IHO DCDB or through them for co-ordination and validation purposes.

7. In order to support the requirements of the 'GEBCO Digital Atlas' and the establishment of a Global Soundings Data Base, we recommend that all data collected by HOs/Agencies/Institutions should be passed to the IHO DCDB.

8. We recognise that VHOs, or regional groups of VHOs, will probably maintain their own OPS data bases. In such cases, we recommend that the administrators of such data bases should ensure that these data are also sent to IHO DCDB. This recommendation could also extend to those co-ordinators engaged in projects for the production of IOC's Regional Bathymetric Chart series.

9. We are informed by IHO DCDB that they can accept data in most well documented digital formats. Accordingly, we recommend that VHOs/HOs/Agencies/Institutions render data in whatever form suits them best, whilst ensuring that proper format documentation is included with the data.

10. To meet the basic criterion for details covering digital data sent to IHO DCDB, we recommend the use of the format in Annex A to the report of the IHO WG/OPS.

11. To facilitate the regular advertisement of digital data by IHB, we recommend that data sent by HOs/Agencies/Institutions to IHO DCDB should arrive by (e.g.) 31 October each year for inclusion in the listings in the next annual issue of BP-0004 'Information concerning recent Bathymetric Data'.

12. We have examined previous listings in BP-0004 and suspect that it is not providing a comprehensive account of data collected annually by HOs/Agencies/Institutions. To encourage a greater use of BP-0004 we propose that it should be split into two parts, as follows:

Part 1 Listings (Information provided by HOs, to advertise analogue data only);  
and Part 2 Graphic plots of track inventories and listings (Information provided entirely by IHO DCDB, advertising all new data received from HOs/Agencies/Institutions in the preceding 12 months).

13. We recommend that details of any cruise for which data are found to be in error should be included in BP-0004, Part 2. This should also include identification of data that have been corrected and resubmitted.

14. We recommend that data which have been discredited should be archived in such a way as to prevent their future reappearance. This archive would be used to ensure that future compilations do not include such data.

15 Because all data supplied by IHO DCDB will be in MGD77 format, we recommend that all VHOs should ensure that they are capable of reading that format.

16. We had noted with interest the progress made by certain VHOs in the development of digital data handling. We recommend that HOs without digital capabilities should study the Summary of Replies to the 1990 Questionnaire (available on request from IHB), and use this as a starting point in their own quest for digital capabilities (see Annex D to the report of the IHO WG/OPS)

17. We recommend that the IHO should identify and publish details of those HOs and other institutions which can provide relevant technical assistance. We exhort HOs, which are requested to give help to develop other HO digital capabilities, to give generously of their advice, and also to consider the free supply of software and other material aid.

18. Within the next few years we believe that the accumulation of multibeam data will increase greatly and that this change in data collection will impact significantly on the GEBCO community. We recommend that the subject of multibeam data should be examined separately by the GEBCO Sub-Committee on Digital Bathymetry, with the eventual aim of providing a new Part 5 to the 'Guidelines for the GEBCO' (BP-0007).

ANNEX VI

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ANNEX VII

LIST OF ACRONYMS

ACUF	Advisory Committee on Undersea Features (of BGN)
ASCII	American Standard Code for Information Interchange (Computer Character Code)
AWI	Alfred-Wegener-Institut für Polar- und Meeresforschung (Bremerhaven, Germany)
BGI	Bureau gravimétrique international (Toulouse, France)
BGN	Board on Geographic Names (USA)
BODC	British Oceanographic Data Centre (Bidston Observatory, Birkenhead, UK)
CAD	Computer Aided Design
CAP	Circum-Atlantic Project (of IUGS)
CEC	Commission of European Communities
CEDD	Committee on Exchange of Digital Data (IHO)
CES	Computer Exploration Services (Petroconsultants)
CGMW	Commission for the Geological Map of the World
CGOM	Consultative Group on Ocean Mapping (of IOC)
DCDB	Data Centre for Digital Bathymetry (IHO - at NGDC, Boulder, Colorado, USA)
DCW	Digital Chart of the World (of DMA)
DMA	Defense Mapping Agency (USA)
DMAHTC	Defense Mapping Agency Hydrographic/Topographic Center
DTM	Digital Terrain Model
EB	Editorial Board
EBCDIC	Extended Binary-Coded Decimal Interchange Code (Computer Character Code)

EPSHOM	Etablissement principal du Service hydrographique et océanographique de la marine (Brest, France)
GBE	GEBCO Bathymetric Editor
GDA	GEBCO Digital Atlas
GEBCO	General Bathymetric Chart of the Oceans (IOC/IHO)
HDNO	Head Department of Navigation & Oceanography (USSR Ministry of Defence, Leningrad)
HO	Hydrographic Office
IBCCA	International Bathymetric Chart of the Caribbean Sea and Gulf of Mexico (IOC)
IBCM	International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series (IOC)
IBCWIO	International Bathymetric Chart of the Western Indian Ocean (IOC)
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
IGN	Institut géographique national (Paris, France)
IHB	International Hydrographic Bureau
IHC	International Hydrographic Conference (IHO)
IHO	International Hydrographic Organization
IMS	International Marine Science Newsletter (Unesco)
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
IOSDL	Institute of Oceanographic Sciences, Deacon Laboratory (Wormley, UK)
IUGS	International Union of Geological Sciences
JODC	Japan Oceanographic Data Center (Maritime Safety Agency, Tokyo)
NERC	Natural Environment Research Council (Swindon, UK)
NGDC	National Geophysical Data Center (Boulder, Colorado, USA)

NGS National Geographic Society (USA)

NOAA National Oceanic & Atmospheric Administration (USA)

NOS National Ocean Service (NOAA, USA)

NRL Naval Research Laboratory (USA)

NUTIS NERC Unit for Thematic Information Systems (NERC at  
Reading University, UK)

OPS Oceanic Plotting Sheet (IHO)

PC Personal Computer

R/V Research Vessel

SCDB Sub-Committee on Digital Bathymetry (GEBCO)

SCGN Sub-Committee on Geographical Names and Nomenclature of  
Ocean Bottom Features (GEBCO)

SCLOS Sub-Committee on Technical Problems related to the  
Convention on the Law of the Sea (GEBCO)

SHOM Service hydrographique et océanographique de la marine  
(France)

SIO Scripps Institution of Oceanography (La Jolla, USA)

SOPAC South Pacific Applied Geoscience Commission

TEMA Training, Education and Mutual Assistance in the  
marine sciences (IOC)

USGS United States Geological Survey

USNOO United States Naval Oceanographic Office

VHO Volunteering Hydrographic Office (IHO)

VMS (Code for an IBM operating system)

VNIIOKEANGEOLOGIA Institute of Ocean Geology (Leningrad, USSR)

WG/OPS Working Group on Oceanic Plotting Sheets (IHO)

WVS World Vector Shoreline