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

## **Twelfth Session**

Boulder, Colorado, U.S.A., 16-17 May 1989

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 IGC 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

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

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

## **Twelfth Session**

Boulder, Colorado, U.S.A., 16-17 May 1989

IOC-IHO/GEBCO-XII/3  
Paris, 8 September 1989  
English and French only

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1. **OPENING OF THE SESSION**

1 The Twelfth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans (GEBCO) was held at the U.S. National Geophysical Data Center (NGDC), Boulder, Colorado. Sir Anthony Laughton, Chairman GEBCO, opened the session at 09:30 on Monday, 15 May 1989.

2 Dr. Michael A. Chinnery, Director, U.S. National Geophysical Data Center, welcomed the participants and wished the Guiding Committee well in its deliberations. Dr. V.G. Sedov, Senior Technical Assistant Secretary, IOC, also spoke on behalf of the Secretary IOC.

3 A List of Participants is given in Annex VI. Apologies for absence were received from:

Committee Members: Ing.-en-Chef Jean Laporte  
Lic. Félix H. Mouzo

Scientific Advisers to the GEBCO:

Dr. Georges Balmino  
Mr. Gerald N. Ewing  
Dr. G. Leonard Johnson  
Dr. Roger C. Searle

Representatives: M. Olivier Dottin, CGMW  
Prof. Michel Louis, IGN  
Dr. Julia Marton-Lefevre, ICSU

2. **ADOPTION OF THE AGENDA**

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

3. **CONDUCT OF THE SESSION - DOCUMENTATION**

5 Administrative arrangements for the Session were announced and the Permanent Secretary introduced the available documentation - see Annex II.

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

6 It was reported that the following changes have taken place since the Eleventh Session of the Guiding Committee in April 1987:

**GEBCO Guiding Committee**

- Rear Admiral V.K. Singh, Chief Hydrographer to the Government of India, had replaced Rear Admiral A. Gerald Moraes.

- Ingénieur-en-Chef Jean Laporte, Service Hydrographique et Océanographique de la Marine, France, had replaced Ingénieur-Général André Roubertou, Vice-Chairman GEBCO, who had retired.
- Cdr. D. Francisco Nuche Benito, Instituto Hidrográfico, Cadiz, Spain, had recently resigned leaving one position vacant on the Committee.
- Mr. David Monahan was elected Vice-Chairman GEBCO, by acclamation.

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

- Ingénieur en Chef Jean Laporte had replaced Ingénieur-Général André Roubertou.
- Rear Admiral Alfredo Civetta had replaced Vice Admiral O.A.A. Affonso.
- It was noted that M. Antoine Ferrero-Regis, Secretary of the Sub-Committee, would be retiring shortly. It was suggested that the IHB be invited to investigate whether he could continue as Secretary of the Sub-Committee.

**Sub-Committee on Digital Bathymetry**

- Mr. Shin Tani accepted an invitation to join the Sub-Committee, subject to necessary formal arrangements with the Hydrographic Department of the Maritime Safety Agency of Japan.

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

**5.1 SUMMARY REPORT OF THE ELEVENTH SESSION OF THE JOINT IOC-IHO GUIDING COMMITTEE FOR THE GEBCO (DOC. IOC-IHO/GEBCO-XI/3)**

**5.1.1 Quality Control - paragraph 37 of the report.**

7           The representative of the IHB stated that he had nothing further to add to the concern expressed at the eleventh session. It was noted that quality control was a difficult problem as it affected both position and depth.

8           It was agreed that such problems might arise with the operation of the IHO Centre for Digital Bathymetry (see item 9 below), and it should therefore be considered when the regulations for the new centre are being prepared. It should also be dealt with in the revised edition of the GEBCO Regulations (item 14 below).



5.2        **SHORT SUMMARY RECORD OF DISCUSSION OF THE SIXTH MEETING  
OF THE GEBCO OFFICERS (DOC. IOC-IHO/GEBCO OFFICERS-VI/3)**

5.2.1     **IUGS Circum-Atlantic Project (CAP) - see paragraphs 9-11 of the  
report**

9           It was noted that M. Olivier Dottin, Secretary-General, Commission for the Geological Map of the World (CGMW), had accepted an invitation to represent GEBCO interests on the CAP Steering Committee. He had reported that, as the GEBCO contours were now becoming available in digitized form, the CAP Steering Committee had modified its previous position and was considering use of the GEBCO contours in preference to DBDB5 as its base bathymetry.

10          Dr. Michael S. Loughridge, who represented GEBCO interests on the CAP Western North Atlantic Working Group, emphasized that the CAP was much less oriented to maps than the Circum-Pacific Project. It was more concerned with the development of digital data bases and products that might be derived from them in the light of developing technology.

11          Dr. Gleb B. Udintsev was invited to represent GEBCO interests on the CAP Eastern North Atlantic Working Group (Chairman: Professor Salle).

12          Dr. Meirion T. Jones reported that he was now in direct touch with Dr. Terence Edgar, Chairman of the CAP Steering Committee, and had supplied him with a copy of an unedited tape of the North Atlantic contours (sheets 5.01, 5.04 and 5.08) for evaluation.

13          It was decided that, as editing of this tape was now complete, clean copies should be made available, free-of-charge, to both the Eastern and Western North Atlantic Working Groups.

14          This led to a general discussion on the release of tapes during which it was stressed that such actions should not result in any further distribution to other organizations or individuals for the time being, without authorisation from the Permanent Secretary GEBCO.

15          Dr. Gleb B. Udintsev, who will be attending the forthcoming meeting of the CAP Steering Committee (Paris, 23-24 May 1989), was asked to inform that Committee that the GEBCO Guiding Committee was enthusiastic in wishing to contribute to, and learn from, the activities of the CAP, as it recognized that many of their objectives are similar. The Guiding Committee looked forward to close working arrangements and would like to share ideas and technologies.

5.2.2     **Letters to Editors of Major Marine Science Journals - see  
paragraphs 19 and 20 of the report**

16          "Naming names", an article by Robert S. White which had appeared in the Geophysical Journal of the Royal Astronomical Society ((1988) 95, 433), was tabled. It was also reported that an article would be appearing shortly in Marine Geophysical Researches.

17           The Guiding Committee agreed that the Chairman's letter had widely alerted the marine science community to the need to regularize the naming of undersea features.

18           Dr. Fisher drew attention to the fact that the Journal of Geophysical Research, a major publication much involved in presenting the results of marine geological/geophysical research, had not responded to the Guiding Committee's approach and had subsequently published a revised guide to authors without making any reference to these proposals. It was decided to investigate this further.

5.2.3.       **Progress with a Review of the GEBCO 1:1 Million Series Plotting Sheets (IHC-XIII Adopted Proposal PRO 10) - see paragraph 21 of the report**

19           The representative of the IHB introduced GEBCO Letters nos. 15, dated 18 May 1988, and 18, dated 12 January 1989. He pointed out that all VHOs can supply data in traditional paper plotting sheets and that at present only 6, with 4 more starting in 1989 (and a further 4 in the near future) out of 22 are able to provide data in digital form. There was a steady improvement but it would be some years before the 1:1 million plotting sheets could be phased out.

20           It was noted that a Working Group had been established to review the need to maintain the 1:1 million plotting sheets. The Group will consist of representatives of eight VHOs and will work mainly by correspondence. A request had been made that the Guiding Committee be represented on the Working Group.

21           The terms of reference of the Working Group will be to investigate how a change towards digital data handling should proceed and the problems involved, and to discuss progress in the changeover by VHOs - see also the report of the sixth meeting of the Sub-Committee on Digital Bathymetry (item 8 below).

6.           **THIRD SESSION OF THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM), BREMERHAVEN, 7-9 DECEMBER 1988**

22           Mr. Desmond P.D. Scott, Chairman CGOM, introduced the Summary Report of the Third Session of the IOC Consultative Group on Ocean Mapping (CGOM), ref: Doc. IOC/CGOM-III/3, referring in particular to item 6 "Copyright of Digitized Contours of the GEBCO and IOC's Regional International Bathymetric Chart Series."

23           He reported that, in view of some difficulties that had been encountered with a commercial firm regarding their digitizing of the contours of the International Bathymetric Chart of the Mediterranean and subsequent sale without proper credit being given to IOC or the IBCM, he had discussed the position regarding copyright of magnetic tapes containing digitized data with the Unesco Copyright Division, and had reached a satisfactory conclusion with them. Subsequently, Dr. Meirion Jones had edited the IBCM tape prepared by that firm, and reformatted it into

international GF3 format. This edited tape had now been placed on sale by BODC on behalf of IOC, and would be used as a block input to the "GEBCO Digital Atlas" (see item 8.2).

- 24 The Guiding Committee agreed that the Mediterranean issue described above was not its concern, but was illustrative of the type of problem that could be encountered in the commercial distribution of data.
- 25 A letter was tabled from M. Michel Louis, Deputy Director IGN, (dated 28 April 1989) in which he put forward proposals for selling GEBCO digitized data tapes at fl,500 (about \$2,500) per sheet to scientific users and f5,000 (about \$8,000) to commercial users. This compared with prices proposed by BODC (acting on behalf of the Guiding Committee) of about \$200 (\$100 for data centre costs including p&p, and \$100 for a "symbolic" royalty) per tape to scientific users and \$2,000 to commercial users. At present two tapes are available, one for the Antarctic (5 sheets) and one for the North Atlantic and Arctic (4 sheets). The Guiding Committee considered the prices proposed by IGN to be quite unrealistic in view of potential users' resources. Note: The make-up of these tapes may be changed as more of the GEBCO (5th Edition) gets digitized since it may be cheaper and easier to provide the whole GEBCO on one tape rather than individual sheets.
- 26 It was recalled that permission had been given to BGI to digitize the GEBCO contours for its own purposes, and that IGN had assisted by carrying out the preliminary raster scanning and also by seconding a technician to BGI to help with the digitizing. However, it was pointed out that the work carried out by IGN and BGI is only one "value added" step in the overall process which results in clean digitized data tape. For example, there is the very large effort and expenditure incurred by many individuals and scientific institutions, as well as the Canadian Hydrographic Service, in preparing the GEBCO (5th Edition).
- 27 After the scanning and digitization process carried out by IGN/BGI (with the agreement of the copyright holder - the Canadian Hydrographic Service), there is a second "value added" process carried out by the British Oceanographic Data Centre which consists of editing the tape in conjunction with the reviewers and scientific co-ordinators. It should be noted that IGN/BGI do not have the data resources to clean up the digitized tapes and consequently do not have a marketable product without the Quality Control input provided by BODC.
- 28 Hence, production of the digitized tapes has resulted from finance and effort put in by a number of contributors: individual scientific co-ordinators, the Canadian Hydrographic Service, IHB, IGN/BGI, and the BODC. Any policy on charging for the enhanced product would have to be agreed by the above contributors and reflect the input made by each. A substantial charge could be made to commercial users who would be going on to resell.
- 29 It was noted that the tapes as they stand are only of use for replicating maps. For grid and modelling applications a great deal of further work has to be done.

- 30           The Permanent Secretary and Chairman SCDB were asked to draft a letter to IGN for the Chairman's signature.

7.           **REPORT OF THE SUB-COMMITTEE ON GEOGRAPHICAL NAMES AND NOMENCLATURE OF OCEAN BOTTOM FEATURES**

- 31           The Chairman of the Sub-Committee, Dr. R.L. Fisher, presented the Summary Report of the Eighth Meeting of the Sub-Committee (doc. IOC-IHO/GEBCO SCGN-VIII/3), which had been held at the IHB, Monaco, 10-12 May 1989.

- 32           The Sub-Committee had proposed revisions to its own Terms of Reference (Annex II to the above Summary Report) and submitted them to the Guiding Committee for its approval. Approval was forthcoming after a few further amendments had been made - see Annex III. This final version will be included in the revised edition of the GEBCO Regulations (item 14 below).

- 33           The Summary Report was approved with the exception of the new name proposed for the feature which presently appears as the "America-Antarctic Ridge" on sheet 5.16. Neither that name nor the name which had been proposed by the Sub-Committee for this feature were considered appropriate. After deliberation, the members of the Sub-Committee present proposed that it be renamed "North Weddell Ridge", a name which was accepted by the Guiding Committee. The Summary Report of the Sub-Committee will be amended accordingly (subject to the agreement of its members not present at the Guiding Committee session).

- 34           The Chairman and his Sub-Committee, were thanked for their active work both at their recent meeting and in the intersessional period.

7.1          **STANDARDIZATION OF UNDERSEA FEATURE NAMES**

- 35           The Guiding Committee noted that the revised English/French version of the publication of "Standardization of Undersea Feature Names" had been incorporated into the GEBCO Gazetteer (see item 7.2 below) as Part II of that publication. This will now be issued separately as a free publication (IHO BP-0006) to replace the existing edition.

- 36           Steps had been taken to revise the English/Russian and English/Spanish versions of IHO publication BP-0006. For the latter version, Dr. Fisher suggested that Dr. Jorge Rey Salgado from the Centro Oceanográfico de Malaga-Fuengirola, Spain, be approached to prepare this revision. It was also suggested that a request for assistance be placed before the Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA) at its next meeting.

- 37           Arrangements have been made for the English/Chinese, English/German and English/Japanese versions, now in preparation, to be based on the revised version.

- 38           IHB has now issued revised (as Part II of the GEBCO Gazetteer pages 2-5 to 2-8) "Undersea Feature Name Proposal" forms in English, French,

Spanish, Portuguese, Italian, Greek and Arabic. Further versions in Chinese, German, Japanese, Russian and Turkish are in preparation.

7.2 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

39 The Guiding Committee noted with pleasure the new GEBCO Gazetteer of Geographical Names of Undersea Features (IHO publication BP-0008) which had been published in 1988, and recommended that it be given as wide distribution as possible amongst appropriate individuals and institutions. The representative of the IHB accepted this recommendation and informed the Committee that demand for the Gazetteer had exceeded expectations and the publication was now out of print. A new printing run would be made shortly and this opportunity would be taken to amend a number of spelling errors in the names listed therein. Approved new and amended names would be promulgated in supplements to be published between main issues.

40 In addition, supplements will be published containing the lists of names used in the IOC Regional International Bathymetric Chart Series.

41 The request for an English/Russian version of the Gazetteer was noted, and that IHB had agreed to print this version if it were to be provided in camera-ready copy and the cost were to be shared by IOC.

42 A suggestion was made that besides the present alphabetical list, further listings by geographical co-ordinate blocks be included (as in the BGN/ACUF Gazetteer of Undersea Feature Names). The representative of the IHB noted that this would increase the size of the volume significantly but agreed to consider the suggestion if it were put forward by a Member State.

43 It was agreed (see paragraph 61 below) that the Gazetteer (and supplements) should be digitized in support of the GEBCO digitization programme and as part of the "GEBCO Digital Atlas" (see item 8.2). The representative of the IHB was asked to send copies of the word processor file disk to Dr. Michael Loughridge, Dr. Meirion Jones and Dr. Robin Falconer to check the feasibility of conversion to an accessible digital data base.

8. REPORT OF THE SUB-COMMITTEE ON DIGITAL BATHYMETRY

44 The Chairman of the Sub-Committee, Dr. Meirion T. Jones, made a verbal report on the deliberations of his Sub-Committee which had met at the NGDC, Boulder, Colorado, 10-12 May 1989.

45 The Sixth Meeting of the Sub-Committee had been most productive. It had followed four themes:

- (i) a review of current activities in this field;
- (ii) digitization of the GEBCO (5th Edition) - see item 8.1;
- (iii) a look ahead to consider how to exploit the 5th Edition, leading on to the 6th Edition; and

(iv) management of digital soundings.

46 Reports had been made by:

- a) The IHO Committee on Exchange of Digital Data (CEDD) (both the Sub-Committee and CEDD were satisfied that there was no overlap in their activities) (Pryor)
- b) Naval Hydrographic Department, India (Singh)
- c) Naval Hydrographic Department, United Kingdom (Gooding)
- d) Lamont-Doherty Geophysical Observatory of Columbia University (Brenner)
- e) United States Naval Oceanographic Office (Marchant)
- f) U.S. Naval Research Laboratory (Cherkis)
- g) Head Department of Navigation and Oceanography, Leningrad (Popov)
- h) British Oceanographic Data Centre (Jones)
- i) U.S. National Geophysical Data Center (Loughridge)
- j) Japan Oceanographic Data Center (Tani)
- k) Canadian Hydrographic Service (Monahan)
- l) U.S. National Ocean Service (Pryor)
- m) Alfred-Wegener-Institut (Shenke)

47 The Representative of the Head Department of Navigation and Oceanography, Leningrad, had reported that digitization of sheet 5.02, including names, land topography, lakes, rivers, etc., was almost complete and would become available within two months. He had been asked to provide digitized track control for the IBCM, for inclusion as an additional file for the existing magnetic tape.

48 Mr. Norman Cherkis (NRL) had presented his South Atlantic compilations (see item 13 below), and had reported that he was now involved in a major new compilation of the Norwegian - Greenland Sea.

49 It had been noted that in general the IOC's regional International Bathymetric Chart projects were concentrating on the production of traditional printed maps. The Sub-Committee considered that the Editorial Boards for regional projects should be encouraged to develop digital maps as these will be as important products for the users in these regions.

50 The Sub-Committee had been pleased to welcome Mr. Shin Tani from the Japan Oceanographic Data Center to its meeting and recommended that he become a full member (see paragraph 6 above).

51 An invitation which had been received by the Sub-Committee to hold its seventh meeting at the Alfred-Wegener-Institut für Polar- und Meeresforschung, Bremerhaven, FRG, had been accepted.

52 The Chairman, and his Sub-Committee, were thanked for their active work both during their recent meeting and the intersessional period.

8.1 DIGITIZATION OF THE GEBCO (5TH EDITION) - CONTOURS, SHIP TRACKS, GEOGRAPHICAL NAMES, LAND TOPOGRAPHY, ETC.

53 The Chairman of the Sub-Committee on Digital Bathymetry introduced two papers:

- (i) Report of BGI to the GEBCO Sub-Committee on Digital Bathymetry, dated 25 April 1989, and
- (ii) Report on BODC activities in support of GEBCO April 1988-May 1989 (doc. IOC-IHO/GEBCO-XII/10).

54 Whilst thanking the BGI for its work over the past year which had resulted in completion of digitization of the North Atlantic and Arctic sheets, the Guiding Committee expressed considerable concern that due to manpower problems, the GEBCO digitization programme had once again been stopped, and that BGI had stated that not only would it be unable to restart the digitization before the end of 1989, but it was uncertain when (or even if) it would be completed.

55 The Chairman drew attention to a remark in M. Michel Louis' letter dated 28 April 1989, "We are looking for a less expensive solution to terminate this project on digitization and correction, and we hope to resume this work before the end of the year". This was slightly more optimistic than the BGI report, and it was decided to enquire of M. Louis what he had in mind when he wrote this letter.

56 Mr. Tani gave a short presentation to the Guiding Committee on work being carried out in support of GEBCO by the Japanese Hydrographic Department. He reported that the JODC was already digitizing the 1:1 million plotting sheets for the area 0° - 48° N. by 120° E. - 180°, and that certain sheets were being continuously updated as new data became available. This activity covers some 60-70% of GEBCO sheet 5.06. JODC would be willing to digitize the remainder of the sheet but does not hold copies of the plotting sheets for the Indian Ocean part of the sheet.

57 In view of the above and after much discussion it was decided to reallocate responsibilities as follows:

HDNO Leningrad	Complete 5.02 (North-west Pacific) Ship Tracks 5.01, 5.04, and 5.08 (North Atlantic) Contours and Ship Tracks 5.10 (Australian/New Zealand waters)
IGN/BGI	5.05 but not the overlap area east of 90° E. (North Indian Ocean) 5.06, only the overlap area 90°-100° E. (Bay of Bengal) 5.09 (South Indian Ocean)

JODC                      5.06 but not the Indian Ocean area 90°-100°E. (Western Pacific)

58      This programme would provide full coverage of the Indian Ocean and Western Pacific.

59              Dr. Fisher suggested that the northern part of sheet 5.13 should be redigitized at the same time as 5.09 as greatly improved contouring was now available for this area. However, the Guiding Committee decided that, as sheet 5.13 had already been digitized, this would come under the purview of the GEBCO Reviewer for the area (Dr. H.-W. Schenke) and if he recommended that it be redigitized as a block correction to the database, this would be considered by the Guiding Committee for early implementation.

60              Dr. Jones reported that CCOP-SOPAC had digitized their bathymetric sheet covering the area 40° S. to 5° N. by 140° E. to 155° W. This digitization might be useful for comparison with the existing GEBCO sheet and possible inclusion in the "GEBCO Digital Atlas" (see item 8.2). Any decision was deferred until BODC has received a copy and evaluated it in consultation with the West Pacific Reviewer.

61              The Guiding Committee discussed at some length the desirability and feasibility of digitizing undersea feature names for automatic printing on to charts. The experience of other organizations had shown that the development of satisfactory name placement technology was extremely difficult and it was therefore decided that there was no justification for GEBCO to enter this field. It was agreed that digitization of undersea feature names should be confined in the first instance to digitization of the GEBCO Gazetteer (see para 43 above), with the possible addition of a hierarchical code.

## 8.2              ESTABLISHMENT AND CONTINUED MAINTENANCE OF THE GEBCO WORLD DIGITAL DATABASE

62              The Guiding Committee were of the opinion that the time had now come to establish a World Digital Bathymetric Contour Database, for which the name "The Digital GEBCO" had been proposed. (After the meeting, the Chairman of the Sub-Committee on Digital Bathymetry suggested an alternative name the "GEBCO Digital Atlas". The suggestion was accepted by the Chairman of the Guiding Committee and this name has been used throughout this report).

63              In theory, this database will consist initially of the digital contours of the GEBCO (5th Edition), together with ship tracks in a separate file for quality control purposes. However, in fact, there are already some areas where the contours on the original 5th Edition, as published, will never be digitized, e.g.

(i)              the Mediterranean and Black Seas, the digitized contours from these enclosed seas will be taken from the International Bathymetric Chart of the Mediterranean (IBCM);

(ii)             a large part of sheet 5.06 (Western Pacific) - the Japan Oceanographic Data Center (JODC) has digitized the contours on the



1:1 million plotting sheets covering this region, and in some cases these plotting sheets have been updated with new material so are already an improvement on the material used in the compilation of sheet 5.06 (see paragraph 56 above);

- (iii) sheet 5.12 (South Atlantic) - this sheet is due to be replaced by a revised version (within the 5th Edition) and it will be the contours from this revised edition that will be digitized - see item 13 below.

64           The Zero contour (coastline) will be maintained in a separate file (see item 8.3 below).

65           There will also be a file of Geographical Names of Undersea Features (see paragraphs 43 and 61 above) but digitized Land Topography will be taken from other sources as and when required.

66           The Guiding Committee agreed that the structure that will be needed for the routine operation and marketing of the "GEBCO Digital Atlas" should consist of four separate but closely linked components, and that, if a GEBCO (6th Edition) printed map series is to be published by 1995 (the present tentatively agreed target date), the "GEBCO Digital Atlas" structure needs to be established at an early date.

67           **The GEBCO Overseer.** The Guiding Committee has already identified the need for a GEBCO Overseer (ref: doc. IOC-IHO/GEBCO-XI/3, paragraph 67). It was decided that this would have to be a full time salaried post (with generous support for communications and travel) and he would have to be located "in an appropriate research institute having close links with the IHO Centre for Digital Bathymetry". His task could also most likely subsume the present appointment of Permanent Secretary GEBCO.

68           **The Network of Reviewers.** This network has already been partly established and a Job Description was approved by the Guiding Committee (see item 12 below).

69           **Compilers of revised blocks of contours.** The compilers will be equivalent to the Sheet Co-ordinators of the 5th Edition but they will be responsible for compiling blocks of contours (instead of working to sheet limits) in areas where the Reviewers have identified sufficient new data to justify this. Compilers will be persons already interested and working actively in the areas for which they will take responsibility; they may be the same persons as the Reviewers but not necessarily so.

70           **The Database.** The Database will be a live entity subject to continual updating and improvement. It will be maintained in an appropriate Data Centre which will splice in new blocks of data as and when they become available, both from the Compilers (para. 69 above) and from other sources, e.g. the IOC Regional International Bathymetric Chart Series.

71           Separate additional funding will need to be identified for the above purposes, in particular for the GEBCO Overseer (para. 67 above) and

maintenance of the Database (para 70 above). A new approach to a Member State (of IOC and IHO) for support for the establishment of the above structure within a national operational facility was discussed and the Chairman was asked to make an initial move and take all necessary subsequent action. He and the Permanent Secretary were requested to prepare a paper detailing the whole project, with appropriate financial estimates.

- 72 It was envisaged that initially the "GEBCO Digital Atlas" will include digitized bathymetric contours, coastlines, trackline control and undersea feature names, but that at some later stage some other products, such as Digital Terrain Models (see para. 84 below), may be added.

### 8.3 WORLD COASTLINE FOR THE GEBCO (6TH EDITION)

- 73 Following an investigation instigated by the IOC Consultative Group on Ocean Mapping at its Third Session (ref: doc. IOC/CGOM-III/3, para. 67), an offer had been received from the U.S. Defense Mapping Agency (ref: letter from James E. Ayres, Scientific Advisor for Hydrography, dated 2 February 1989) of the World Vector Shoreline (WVS) at a scale of 1:250,000, based on WGS-84, which was scheduled for completion by July 1989. It was understood that DMA would be willing to release the WVS through the IHB "for GEBCO use".

- 74 The Representative of the IHB was asked to clarify the conditions of release with Captain Ayres, as the perceived need for the coastline as a component of the "GEBCO Digital Atlas" will of necessity result in its further release to third parties.

### 9. IHO CENTRE FOR DIGITAL BATHYMETRY

- 75 The Guiding Committee had before it "A Proposal for Creating an IHO Center for Digital Bathymetry", from the U.S. National Geophysical Data Center, dated May 1988, together with two IHO Circular Letters (Nos 41/1988 and 14/1989), being respectively a covering letter circulating the "Proposal" to IHO Member States and brief extracts from the responses received from 30 Member States (one additional response had been received later).

- 76 It was stressed that though the need for such a Centre had been identified (and the first draft document had been prepared) by the GEBCO Sub-Committee on Digital Bathymetry, the item was now before the Guiding Committee for discussion and guidance only. All negotiations concerning establishment of the Centre would be undertaken directly between IHB and the NGDC.

- 77 Dr. M. Loughridge recalled that the purpose and justification for the offer lay with a desire to stimulate an in-flow of as large a proportion of existing digital bathymetric (and other geophysical) data as possible into a central archive. In exchange, the NGDC would provide a service to the user community so that these data could become available for incorporation into both nautical and bathymetric chart series. He agreed that the criterion that data exchange should be "equivalent in type and amount" could be relaxed by regarding the total input from all IHO Member

States as justifying free release to any IHO Member State Hydrographic Office, in order to stimulate a two-way flow of data, but he stressed that charging for material supplied was a matter of principle required of him by the U.S. government and that this could only be gainsayed by free exchange of reasonable amounts of data.

78           The Brazilian member of the Guiding Committee pointed out that free exchange of data in the form of traditional paper plotting sheets was a part of the IHO agreement on release of nautical charts by Member States for reproduction by other Member States. He suggested that digital data supplied by the new Centre for the compilation of nautical charts should also come under this agreement, as developing countries could not afford to purchase the data they would need for this purpose nor would they necessarily have sufficient equivalent data for exchange.

79           It was agreed that, in such cases, if requests were made through the IHB and certified by them as reasonable, then exchange could be made free-of-charge.

80           On the matter of Quality Control of data, Dr. Loughridge made it clear that only very simple automated checks, e.g. ship speed, could be made by the Centre. The onus for Quality Control will rest firmly with the originators of the data and the VHOs. He also stressed that the Centre would have no facilities for handling analogue data, either in receipt or supply, and that such material would remain the responsibility of the IHO as the World Data Centre for Bathymetry. It was suggested that instructions for digitizing sounding sheets might be incorporated into the GEBCO Regulations (see item 14 below).

81           The Guiding Committee suggested that the present draft agreement might be slightly modified to take into account the various points noted above, or a fact sheet might be produced explaining these points. The Representative of the IHB was requested to liaise with the U.S. National Ocean Service and National Geophysical Data Center in order to finalize the draft agreement before approval by the IHO Member States. Dr. Loughridge was thanked most sincerely for his offer, and for his obvious des're to compromise and come up with optimum working arrangements for the Centre, which the Guiding Committee perceived as a vital component of the dataflow structure so essential for the production of both nautical and bathymetric charts.

#### 10.       REPORT OF THE TASK TEAM ON DIGITAL TERRAIN MODELS (DTMs)

82           Dr. Meirion T. Jones, Chairman, GEBCO Sub-Committee on Digital Bathymetry, who had been appointed Convener of the Task Team when it was established by the GEBCO Officers (ref: Doc. IOC-IHO/GEBCO Officers-VI/3, para. 43), presented the interim report of the Task Team (doc. IOC-IHO/GEBCO TT-DTM/3) - the final report of the Task Team may be found as Annex VIII to the Summary Report of the sixth meeting of the Sub-Committee on Digital Bathymetry (ref: doc. IOC-IHO/GEBCO SCDB-VI/3).

83           He drew attention to the list of eight more obvious uses of

digital bathymetric maps (section 4 of the report) and predicted that this list was certain to increase in length as experience in the use of DTMs grows and both scientists and hydrographers become more familiar with them.

84 He recalled that the decision to investigate the potential of DTMs for bathymetric mapping had been taken by the GEBCO Officers (ref: doc. IOC-IHO/GEBCO Officers-VI/3), paras. 41-44), as it had been realised that there was a genuine possibility that user needs might in the future be better met by DTM products than by adhering to traditional vector contouring. For this reason the development of the "GEBCO Digital Atlas" must be kept flexible, so that DTM compilation can be handled therein if the needs arise (see para. 72 above).

85 The Task Team had proposed that a Pilot Scheme be established to experiment with the development of a gridded model of the GEBCO bathymetry, using sheet 5.16 as a test area. This would permit an estimate to be made of the human resources that would be required to allow full exploitation of this new technique. Certain actions had already been initiated (see item 6 of the Task Team Summary Report - Annex VIII to doc. IOC-IHO/GEBCO SCDB-VI/3).

86 The Guiding Committee accepted the Preliminary Recommendations of the Task Team (item 7 of the report). It was agreed that every encouragement should be given to persons investigating DTMs, including the forging of close links by means of visits and exchanges. It was also agreed that every effort should be made to identify "other interested groups or organisations" and that they should be invited to participate in the Pilot Scheme.

87 The Task Team was disbanded and thanked for its work. The Sub-Committee on Digital Bathymetry was requested to assume responsibility for the follow-up of this important development.

#### 11. WORLD DIGITAL DATABASE FOR ENVIRONMENTAL SCIENCE (WDDes)

88 The Guiding Committee had already considered (paragraph 6 above) the Summary Report of the Third Session of the IOC Consultative Group on Ocean Mapping (doc. IOC/CGOM-III/3) but now took note of items 6, 7 and 8 therein concerning "Copyright", "DTMs" and the "WDDes". The Permanent Secretary introduced a letter dated 2 May 1989 from Mr. David Bickmore, Chairman of the ICA Commission on WDDes, in which he had commented on the various points raised in the CGOM report. In addition Mr. David Clark (WDC'A MGG, Boulder), a member of the above Commission, had briefed the Sub-Committee on Digital Bathymetry at its meeting the previous week on the present status of the WDDes.

89 It was noted with some surprise that in a separate letter Mr. Ron Linton, Chairman of the ICA Commission on Marine Cartography, had informed the Chairman of the Sub-Committee on Digital Bathymetry that he had recently been appointed Technical Manager of WDDes at Pergamon Press, whilst at the same time, Mr. David Bickmore, though still Chairman of the ICA Commission on WDDes, had stated in his letter that he had withdrawn from his own

connection with Pergamon Press in January 1989 "because of inadequate project management and nothing resembling written agreements for essential stages of the work".

90           It was apparent to the Guiding Committee that no firm decision had yet been reached regarding the administrative structure for the WDDes, and consequently the Guiding Committee decided that presently its best policy was to press ahead with its own digitization work and development of the "GEBCO Digital Atlas", taking into account the various technical points raised by Mr. Bickmore in his review of the magnetic tape of sheet 5.14 (ref: doc. IOC/CGOM-III/3, paras. 64-67).

91           The GEBCO Guiding Committee stood by its earlier decision to co-operate closely with the ICA on this project, with a view to the eventual release of the "GEBCO Digital Atlas" for incorporation into the WDDes, provided an agreement can be reached which is satisfactory to both parties. However, until a clear plan for the WDDes is forthcoming, the Guiding Committee could not see its way to making any recommendations as to how this could be achieved, or initiating planning arrangements.

92           The Guiding Committee were given to understand that the ICA intends to issue a formal invitation for a co-operative commercial project; it decided therefore not to take any positive action until this is received, with full supporting documentation. The Guiding Committee will also need to know to what extent various other bodies, such as the International Council of Scientific Unions (ICSU) with responsibility for an "editorial board to underwrite reasonable degrees of editorial and technical performance", the International Geographical Union (an ICSU body which may be a co-sponsor), and the Royal Geographical Society with its considerable cartographic experience, are involved in the project.

93           Another imponderable, which needs further clarification, is the relationship of WDDes to the International Geosphere/Biosphere Programme (IGBP) which is being strongly supported by ICSU. It was felt that the IGBP had not yet faced up to the importance of the oceans in its work, and that when it does so it will find that the GEBCO will be an invaluable tool for its research activities.

94           In reaching this decision, the Guiding Committee noted two further points:

- (i)       that the target date for completion of the WDDes is given as August 1991 which appears increasingly unrealistic; and
- (ii)      that the DMA Digital Chart of the World, which also consists of digitization of the ONC chart series, will be a completely separate effort.

95           The Permanent Secretary was instructed to reply to Mr. Bickmore and to assure him that the Guiding Committee had every intention of being positive in its decision making and planning for future collaboration with the WDDes, but at the same time it considered that the time was not yet opportune for either:

- (i) a joint seminar between the ICA Commission and GEBCO on DTMs; or
- (ii) a small London-based meeting to explore the reliability categories for bathymetry.

96 In regard to the former, Dr. H.-W. Schenke, Alfred-Wegener-Institut, Bremerhaven, confirmed that he could be pleased to discuss DTM development with the ICA Commission, if approached.

## 12. GEBCO NETWORK OF REVIEWERS

97 The Chairman presented a "Job Description for GEBCO Reviewers" which had been prepared at the request of the GEBCO Officers (ref: doc. IOC-IHO/GEBCO Officers-VI/3, para. 49). This was approved with a number of minor amendments (see Annex IV). The Guiding Committee decided that the "Job Description" should be included in the GEBCO Regulations (see item 14 below), with a preamble to be prepared by the Permanent Secretary.

98 The preliminary List of Reviewers, prepared by the GEBCO Officers (doc. IOC-IHO/GEBCO Officers-VI/3, para. 46), was given further consideration and revised list (see Annex V) was approved.

99 The main Reviewers listed will be responsible for relatively large regions but they will be expected to forge links (some of which will be recommended by the Guiding Committee) with scientists working in smaller areas within these regions.

## 13. REVISED EDITION OF GEBCO SHEET 5.12 (SOUTH ATLANTIC)

100 Mr. Norman Cherkis presented a compilation plot on a scale of 1:4 million of his South Atlantic sheet which was nearing completion. It was sponsored by the U.S. Naval Research Laboratory and the Laboratório de Geologia Marinha (LAGEMAR) of the Universidade Federal Fluminense of Brazil. The sheet will be published by the Geological Society of America (GSA). Provided appropriate credits were shown, there would be no objection to its being used as a basis for a revised edition of GEBCO sheet 5.12.

101 The sheet, which will cover the South Atlantic from 3°S. to 40°S., was in uncorrected metres at 1500 m/s, with contours at 200 metre intervals. The scale of the final printed sheet will be between 1:8M and 1:9M, depending on the maximum length of tube allowed by U.S. postal regulations.

102 Dr. Gleb Udintsev offered the material from the Angola-Brazil Geotraverse, a strip 10° in width (10°-20°S.) across the full width of the South Atlantic (excluding Brazilian waters), on a scale of 1:500,000, which had been surveyed over the last few years by the Ministry of Geology of the USSR, and which was being incorporated into the International Geological/Geophysical Atlas of the Atlantic Ocean. He stated that the material would be on display at the 28th International Geological Congress in Washington DC in July, and a copy will be made available to Mr. Norman

Cherkis.

- 103           It was clear that there would be a number of difficulties to be overcome in converting the sheet to GEBCO limits and standards but, after discussion, it was agreed that:

**Limits**

- (i) Dr. Carl Brenner would compile the strip 40°-46°40'S. to connect up with sheet 5.16, including the present overlap (to 50°S. to cover the whole of the Argentine Basin).
- (ii) Mr. Norman Cherkis would compile the strip 0°-3°S. to connect up with sheet 5.08.
- (iii) Dr. Gleb Udintsev would compile the western part of the overlap strip 0°-7°N. (Gulf of Guinea to remain unchanged) - this material would be transferred through the WDC'B'/WDC'A' channel to Mr. David Monahan. However, it was decided that it could only be incorporated if it does not delay production of the revised sheet, otherwise the northern limit of the sheet will be at the equator.

**Standards**

- (iv) the contours in the rugged Mid-Atlantic Ridge region could be accepted without adjustment as the shift due to corrected (rather than uncorrected) soundings would not be apparent on the GEBCO scale (1:10 million).
- (v) by the same reasoning, insertion of the 500 metre contour in this region would not raise any problems.
- (vi) on the other hand, in abyssal plain areas (with a maximum of 87 metres depth adjustment in the south-western part of the sheet) the shift might well be significant. Dr. Carl Brenner agreed to recontour the northern part of the Argentine Abyssal Plain; the Angola Basin was already covered by the Angola-Brazil Geotraverse (para. 102 above); and Brazilian scientists would be invited to prepare a revised plot of the area within the Brazilian EEZ.
- (vii) Dr. Robin Falconer agreed to undertake the necessary interpolations elsewhere on the sheet, in particular the 500 metre contour, under contract but with certain provisos to be negotiated.

- 104           The final compilation will be reviewed by the Chairman, with Dr. Roger Searle and Mr. Peter Hunter, in consultation with Mr. David Monahan, as soon as it is ready.

- 105           So far as possible the contours and ship tracks will be digitized during compilation, but details will need to be worked out as the work progresses.

14. REVISION OF THE GEBCO REGULATIONS

106 The Representative of the IHB tabled a second revision of the GEBCO Regulations, 2nd Edition, which followed the guidelines agreed by the GEBCO Officers (ref: doc. IOC-IHO/GEBCO Officers-VI/3, item 9). This was welcomed by the Guiding Committee which accepted the new layout and invited IHB to publish the document at an early date, with certain agreed modifications, as follows:

Part I

- (i) The revised Job Description for GEBCO Reviewers (Annex IV) should replace the present page 1-8, with a short preamble to be drafted by the Permanent Secretary (see para. 97 above).
- (ii) There is no need to include the "Specifications for the GEBCO (5th Edition)" in the volume (i.e. remove pages 1-9 to 1-14).
- (iii) The agreed Terms of Reference of the various bodies should be distinguished by quotation marks, and by quoted authorisations, from the preamble introducing them.

Part II

107 This section should be finalised by IHB as it deals with the IHB-VHO relationship, and regulations for maintenance of the Bathymetric Plotting Sheets. It was noted that the Catalogue of Bathymetric Plotting Sheets was in course of revision and that the new edition would incorporate the 1:250,000 Plotting Sheet blocks for the International Bathymetric Chart of the Mediterranean (IBCM). It would be published as soon as responsibility for the Black Sea sheets had been agreed.

Part III and IV

- (i) It was noted that the versions of these two parts printed in this revision were earlier drafts and that comments received from Member States had not yet been incorporated. Dr. Meirion Jones agreed to finalise both parts when he had received a copy of the final agreement on the establishment of the IHO Centre for Digital Bathymetry (item 9 above) and feedback from members of the Sub-Committee on Digital Bathymetry.
- (ii) The forms incorporated therein need improved page layout (to be provided by Dr. Meirion Jones), so that they can be extracted from the volume for photocopying as and when required.

108 The Representative of the IHB requested that comments on the revised edition be sent to him by end-June 1989.

15. SALES AND PUBLICITY

109 Mr. David Monahan informed the Guiding Committee that sales of



GEBCO Sheets and Boxed Sets had continued at a satisfactory rate. Sales in the year 1988/89 had amounted to 1,435 flat sheets and 18 boxed sets.

- 110 He reported that the sales prices from the Hydrographic Chart Distribution Office, Ottawa, had, from April 1989, been increased to:

Flat sheets \$Can 7.00;  
Boxed Sets \$Can 105.00 (in Canada);  
\$Can 120.00 (ex-Canada).

- 111 Dr. Meirion Jones was thanked for the excellent display material which he had prepared at the request of the GEBCO Officers (ref: doc. IOC-IHO/GEBCO Officers-VI/3, para. 61). One set had been placed on display at the Joint Oceanographic Assembly, Acapulco, Mexico, 23-31 August 1988, and was at the time of GEBCO-XII mounted at the NGDC, Boulder, where it could be viewed by participants in the session. This set was scheduled for display at the 28th International Geological Congress, Washington DC, 9-14 July 1989.

- 112 Dr. M. Loughridge was asked and agreed to arrange despatch of the display to arrive at the appropriate time and Mr. D. Pryor, who would be attending the Congress, agreed to arrange for it to be mounted (and subsequently taken down and despatched back to the NGDC). It was noted that the IOC booth was described as an American style pipe and drape booth, so some kind of hardback display stands will be needed on to which the panels will have to be fixed. It was confirmed that minor expenses needed for setting up the stand would be covered by IOC.

- 113 The second set had been displayed at the Sixth Biennial International Symposium of the Hydrographic Society, Amsterdam, 15-17 November 1988, and would next be on display at the fifteenth session of the IOC Assembly, Unesco House, Paris, 4-20 July 1989.

- 114 Dr. Viktor Sedov reported that an agreement had been reached with the Director of the Musée Océanographique at Monaco for the display to be mounted in the Museum later in the year, provided bilingual English/French versions of the descriptive panels could be made available. The proposal for a semi-permanent display in the Museum was welcomed by the Guiding Committee but it was considered that the existing display might not be suitable for non-specialist members of the general public and that it might be preferable to have a wall display of the GEBCO and the IBCM, if space permits. It was decided that the concept of a rewarding exhibition for display in the Museum should be given further consideration before arrangements were finalised.

- 115 It was also decided that a special new colour brochure in a number of languages would be needed with any display mounted in the Museum. Mr. David Monahan was asked to check whether the Canadian Hydrographic Service would be prepared to print such a brochure.

16. CHAIRMAN'S REPORT FOR INCLUSION IN THE 1988 ANNUAL REPORT TO THE IHB AND TO THE IOC ASSEMBLY (IOC-XV)

116 The Guiding Committee had before it the Chairman's Report for inclusion in the 1988 Annual Report of the IHB (doc. IOC-IHO/GEBCO-XII/9). The Permanent Secretary explained that this report would be modified in the light of the deliberations of the Guiding Committee at the current session, and then form part of the report of the Consultative Group on Ocean Mapping (CGOM) to the IOC Assembly. The document before the session was noted and the procedure outlined was approved.

17. DATES AND PLACES FOR THE SEVENTH MEETING OF THE GEBCO OFFICERS AND THE THIRTEENTH SESSION OF THE GEBCO GUIDING COMMITTEE

117 The following dates and places were tentatively agreed, subject to the agreement of the host institutes, and for confirmation nearer the dates of the meetings:

GEBCO Officers-VII & GEBCO SCDB-VII	Bremerhaven, FRG	May 1990*
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GEBCO SCGN-IX GEBCO-XIII & SCDB-VIII	IHB, Monaco HDNO, Leningrad	Early-June 1991
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18. APPROVAL OF THE SUMMARY REPORT OF THE SESSION

118 Items 1 to 8.1 were approved during the session. The remainder of the report was approved subsequently by correspondence.

19. CLOSURE OF THE SESSION

119 The Chairman closed the session at 17:00 on Wednesday 17 May and in so doing thanked Dr. Michael Loughridge and the staff of the NGDC for their hospitality and administrative support.

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\*R/V Polarstern arrives Bremerhaven 8 May - the SCDB meeting should be scheduled after this date.

ANNEX I

AGENDA

1. OPENING OF THE SESSION
2. ADOPTION OF THE AGENDA
3. CONDUCT OF THE SESSION; DOCUMENTATION, ETC.
4. COMPOSITION OF THE GUIDING COMMITTEE AND ITS SUB-COMMITTEES
5. MATTERS ARISING FROM REPORTS OF PREVIOUS MEETINGS
  - 5.1 Summary Report of the Eleventh Session of the Joint IOC-IHO Guiding Committee for the GEBCO (doc. IOC-IHO/GEBCO-XI/3)
  - 5.2 Short Summary Report of Discussion of the Sixth Meeting of the GEBCO Officers (doc. IOC-IHO/GEBCO Officers-VI/3)
6. THIRD SESSION OF THE IOC CONSULTATIVE GROUP ON OCEAN MAPPING (CGOM), BREMERHAVEN, 7-9 DECEMBER 1988 (doc. IOC/CGOM-III/3)
7. REPORT OF THE SUB-COMMITTEE ON GEOGRAPHICAL NAMES AND NOMENCLATURE OF OCEAN BOTTOM FEATURES
  - 7.1 Standardization of Undersea Feature Names
  - 7.2 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
8. REPORT OF THE SUB-COMMITTEE ON DIGITAL BATHYMETRY
  - 8.1 Digitization of the GEBCO (5th Edition) - Contours, Ship Tracks, Geographical Names, Land Topography, etc.
  - 8.2 Establishment and continued maintenance of the GEBCO World Bathymetric Database
  - 8.3 World Coastline for the GEBCO (6th Edition)
9. IHO CENTRE FOR DIGITAL BATHYMETRY
10. REPORT OF THE TASK TEAM ON DIGITAL TERRAIN MODELS (DTMs)
11. WORLD DIGITAL DATABASE FOR ENVIRONMENTAL SCIENCE (WDDes)
12. GEBCO NETWORK OF REVIEWERS
13. REVISED EDITION OF GEBCO SHEET 5.12 (SOUTH ATLANTIC)
14. REVISION OF THE GEBCO REGULATIONS

15. SALES AND PUBLICITY
16. CHAIRMAN'S REPORTS FOR INCLUSION IN THE 1988 ANNUAL REPORT OF THE IHB AND TO IOC ASSEMBLY (IOC-XV)
17. DATES AND PLACES FOR THE SEVENTH MEETING OF THE GEBCO OFFICERS AND THE THIRTEENTH SESSION OF THE GEBCO GUIDING COMMITTEE
18. APPROVAL OF THE SUMMARY REPORT OF THE SESSION
19. CLOSURE OF THE SESSION

ANNEX II

**LIST OF DOCUMENTS\***

IOC-IHO/GEBCO-XII/1 prov.	Provisional Agenda
IOC-IHO/GEBCO-XII/2	Annotated Provisional Agenda
IOC-IHO/GEBCO-XII/3	Summary Report of the Session
IOC-IHO/GEBCO-XII/4	List of Documents
IOC-IHO/GEBCO-XII/5	Reports from M. Olivier Dottin on the Circum-Atlantic Project
IOC-IHO/GEBCO-XII/6	Letter from U.S. Defense Mapping Agency on "digitized world shoreline data"
IOC-IHO/GEBCO-XII/7	Job Description for GEBCO Reviewers
IOC-IHO/GEBCO-XII/8	Revised draft of "Regulations for the GEBCO: Standards for Processing of Data"
IOC-IHO/GEBCO-XII/9	Chairman's Report for inclusion in the 1988 Annual Report of IHB
IOC-IHO/GEBCO-XII/10	Report on British Oceanographic Data Centre Activities in support of GEBCO (April 1988-May 1989)
IOC-IHO/GEBCO-XII/11	Report of BGI to the GEBCO Sub-Committee on Digital Bathymetry
IOC-IHO/GEBCO-XI/3	Summary Report of the Eleventh Session of the GEBCO Guiding Committee, Paris, 28-30 April 1987
IOC-IHO/GEBCO Officers-VI/3	Short Summary Record of Discussion of the Sixth Meeting of the GEBCO Officers, Wormley, U.K., 14-15 April 1988
IOC/CGOM-III/3	Summary Report of the Third Session of the IOC Consultative Group on Ocean Mapping, Bremerhaven, 7-9 December 1988
IOC-IHO/GEBCO SCGN-VII/3	Summary Report of the Seventh Meeting of the GEBCO Sub-Committee on Geographical Names and Nomenclature of Ocean Bottom Features, IHB, Monaco, 25-27 April 1987
IOC-IHO/GEBCO SCDB-V/3	Summary Report of the Fifth Meeting of the GEBCO Sub-Committee on Digital Bathymetry, Wormley, U.K., 12-13 April 1988

IOC-IHO/GEBCO TT-DTM/3                      Interim Report of the GEBCO Task Team on  
Digital Terrain Models

IHO Circular Letter 41/1988 dated 28 September 1988  
IHO Circular Letter 14/1989 dated 16 February 1989  
"A proposal for Creating an IHO Centre for Digital Bathymetry"

IHO GEBCO LETTER No 15 dated 18 May 1988  
IHO GEBCO LETTER No 18 dated 12 January 1989  
"Availability of Oceanic Bathymetric Data".

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\*This is for reference only. No stocks of Working Documents are maintained.

ANNEX III

**TERMS OF REFERENCE OF THE SUB-COMMITTEE ON GEOGRAPHICAL NAMES  
AND NOMENCLATURE OF OCEAN BOTTOM FEATURES**

The Sub-Committee on Geographical Names and Nomenclature of Ocean Bottom Features shall:

1. Continue to monitor and modify as appropriate the names of undersea features that now appear or are proposed for inclusion on GEBCO sheets and/or marine charts, documents and scientific publications in the world oceans.
2. Initiate and identify names that are appropriate to designate significant topographic features of the seafloor in pertinent areas.
3. Update guidelines for the selection of proper and generic names for seafloor topographic features at various scales which may or may not reflect the action of tectonic or sedimentary processes.
4. Review and assess the need for revised or additional definitions for submarine topographic features within regions in general to seaward of the continental shelf.
5. Give these definitions wide distribution among agencies, institutions and individuals in order to promote adoption on an international basis.
6. Consult, with aid from staff and bibliographic resources of the International Hydrographic Bureau (IHB) or other experts, assorted materials to assemble and maintain a compendium or gazetteer of names that have been given traditionally and historically to the identifiable undersea topographic features to seaward of the continental shelf, or those that are from time to time proposed by agencies or individuals engaged in marine exploration and research. In performing such a task, the Sub-Committee should take into account the policy decisions of the United Nations Conference on Geographical Names, as well as the resolutions of the International Hydrographic Organization (IHO) on this subject, and consider the proceedings and decisions of formally-constituted national or regional panels.
7. Urge such agencies or individuals to submit historically or scientifically appropriate names, with the prescribed documentation\*, to the IHB or to the IOC Secretariat for review and decision by the Sub-Committee prior to use and dissemination in scientific literature or on published charts.

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\* Proposal form as in publication "Standardization of Undersea Feature Names" (IHO publication BP-0006), and Part II of the "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" (IHO publication BP-0008).

8. Invite, as appropriate, contribution of expertise from historians, marine scientists or other qualified sources with regard to specific decisions.

May 1989



ANNEX IV

**GEBCO REVIEWERS - JOB DESCRIPTION**

(Reference: Document IOC-IHO/GEBCO Officers-VI/3, paragraph 49)

Each GEBCO Reviewer is required to:

1. Maintain a continuing review of all new bathymetric data that has become available within his area of responsibility since compilation of the relevant GEBCO (5th Edition) sheets;
2. Advise the GEBCO Guiding Committee when sufficient new data have been collected to justify a block revision to any significant part of the database, within his area of responsibility.

To achieve these aims, reviewers should:

- a) actively search for new data sources and establish a continuing relationship with the International Hydrographic Organization (IHO) as the World Data Centre for Bathymetry (and/or direct with appropriate IHO Volunteering Hydrographic Offices (VHOs)), and with the IHO Centre for Digital Bathymetry (when established\*);
- b) bring to the attention of the IHO World Data Centre for Bathymetry or the IHO Centre for Digital Bathymetry (as appropriate) the existence of any datasets which have not already reached them;
- c) ensure, when making any recommendations to the Guiding Committee, that they have an adequate inventory of new data to present in support of their proposals;
- d) be prepared to attend and present their proposals in person to the Guiding Committee;
- e) maintain close liaison with IOC's Regional Ocean Mapping bodies (and their Editorial Boards), and with IHO's Regional Hydrographic Commissions, within their areas of responsibility.

In support of the above aims:

- (i) Volunteering Hydrographic Offices (VHOs) will be asked to provide Reviewers with free updates of 1:1 million and 1:250,000 Plotting Sheets, on request;
- (ii) The IHO Centre for Digital Bathymetry will provide, on request, information on all datasets in their possession (with necessary documentation) for Reviewers' areas of responsibility.  
Note: All correspondence with the Centre should clearly identify the writer as a GEBCO Reviewer.

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\*These two words to be deleted when they become redundant.

ANNEX V

LIST OF GEBCO REVIEWERS

Antarctic (sheets 5.13 to 5.16 & 5.18 - south of 46°40'S.	Hans-Werner Schenke	Accepted
North Atlantic (Sheets 5.01, 5.04 & 5.08) but excluding the Caribbean Sea & Gulf of Mexico	Peter Hunter David Monahan	Accepted Accepted for Canada (Udintsev to inform Perm. Sec. of links with USSR for area equator to 15°N.).
Caribbean Sea & Gulf of Mexico	Troy Holcombe	Accepted
Arctic (sheet 5.17)	David Monahan Yuri Kiselev (proposed)	Accepted To be confirmed by Udintsev
South Atlantic	Norman Cherkis	Accepted (to link with Brazilians- also with Carl Brenner & R.L. Fisher).
Indian Ocean	Robert L. Fisher	To perform functions of Reviewer in advising the Guiding Committee when action should be taken in this region.
Western Pacific	Kensaku Tamaki (proposed)	Approach to be made through Dr. Yoshio Iwabuchi
	James V. Eade (proposed)	A/Dir CCOP/SOPAC. To be approached by Falconer (link to Udintsev for Sea of Okhotsk area).

ANNEX VI

LIST OF PARTICIPANTS

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