

Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

**IOC Editorial Board
for the International Bathymetric
Chart of the Caribbean Sea
and the Gulf of Mexico**

Fourth Meeting

Havana, Cuba, 24-26 March 1992

UNESCO

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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-CCPS 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 Ship-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 IOC-IAEA-UNEP 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-CCPS 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*)
68. International Meeting of Scientific and Technical Experts on Climate Change and Oceans
69. UNEP-IOC-WMO-IUCN Meeting of Experts on a Long-Term Global Monitoring System
70. Fourth Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
71. ROPME-IOC Meeting of the Steering Committee on Oceanographic Co-operation in the ROPME Sea Area
72. Grupo Mixto de Trabajo COI-OMM-CCPS sobre las Investigaciones relativas a 'El Niño' (*Spanish only*)
73. Fourth Session of the IOC Editorial Board for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (*Also printed in Spanish*)

IOC/EB-IBCCA-IV/3
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1. OPENING OF THE MEETING

1 The Fourth Meeting of the Editorial Board of the IOC for the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA) was opened by its Chairman, Dr. Nestor Duch Gary, on March 24 1992, at 9:30 am., on the premises of the Cuban Hydrographic Institute of Havana, Cuba.

2 The Chairman expressed that he was particularly pleased to address the participants in the opening of the Fourth Meeting of the Editorial Board and likewise he was pleased to be in the beautiful city of Havana and to have received the hospitality of the host country. He also expressed his satisfaction in observing the development of the project which at this point has reached a stage which envisions its complete implementation as an irreversible fact.

3 He recalled the late Cuban colleague, Capitán de Fragata Dr. Gilberto Samaniego, who died last year, and considering his determined and cordial participation regarding the development of this Project, he suggested that on the first map sheet to be published by Cuba, the name of Dr. Samaniego should appear together with that of the current scientist in charge. This gesture was proposed in order to preserve his memory in the IBCCA Project.

4 He also stated Cuba's proposal of appointing Dr. Angel Garcia Alvarez, Capitán de Fragata, as Representative of the Board from this moment on, all the participants having agreed on this point.

5 Dr. Duch Gary called on Dr. Angel Garcia Alvarez, Capitán de Fragata, to be the Rapporteur, what was found to be desirable and acceptable by the participants.

6 Dr. Vladimir Sekachev, IOC Senior Assistant Secretary for Ocean Mapping, addressed the participants and welcomed them on behalf of the Secretary of IOC, Dr. Gunnar Kullenberg. He thanked the Government and the Cuban colleagues for hosting this Meeting and for arranging excellent conditions for the work and rest of the participants.

7 Finally, he stressed that the meeting will further promote the development of the IBCCA Project and will shorten the term in which a complete, reliable, comprehensive and high-precision Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico will be published.

8 Captain Pedro Perera Ruiz welcomed the participants on behalf of Cuba and the Cuban Hydrographic Institute, stressing the support that the host country has always granted to the IBCCA. He not only emphasized the exchange of experiences and methodology among the participants as one of the most important results obtained but he also stressed the achievement of greater knowledge of each country achieved by means of the expertise of the specialists towards a common objective: IBCCA.

2. ADOPTION OF THE AGENDA

9 The Chairman submitted the proposed agenda (IOC/EB-IBCCA-IV/1 prov.) previously sent to the participants to the meeting for its consideration. Having made some modifications to the original proposal, the agenda was adopted as attached in Annex I.

3. ADMINISTRATIVE ARRANGEMENTS. DOCUMENTATION

10 Dr. Sekachev recalled that the working documents were previously mailed to the members of the Board, except the report of the Chief Editor on the results of the mission to the Member States of the EB-IBCCA which would be examined on the corresponding item of the agenda.

11 He confirmed that invitations to participate in the Meeting had

been sent to all the members of the Editorial Board according to the list that the Secretariat of IOC had as well as the three observers attending the meeting from Ecuador, Colombia and Venezuela.

12 However, some changes were made with regard to the members of the Editorial Board, which unfortunately were made known to the IOC Secretariat only after invitations were sent and replies were received. He informed the participants about the substitutions of some of the members of the Editorial Board and welcomed the new members participating in this meeting. On behalf of the IOC he also acknowledged the contribution made by the former members of the Editorial Board towards IBCCA.

13 He explained that taking into account the decisions reached in previous meetings, it had been decided to invite the Netherlands to participate in the EB-IBCCA as per prior consultation with the Chief Editor. The Netherlands agreed to participate in the Project but were unable to send a representative to participate in the meeting held in Havana. They promised to consider the possibility of becoming responsible for sheets 1-10, 1-16 and sending their proposals and studies. He also expressed that upon receiving the documents, these would be sent to the members of the Editorial Board and its Chairman.

4. RESULTS OF THE MISSION OF THE CHIEF EDITOR OF THE EDITORIAL BOARD TO THE MEMBER STATES

14 The Chairman of the Editorial Board reminded that, upon consultation of the Consultative Group of Ocean Mapping (CGOM) and by agreement reached by the Secretariat of the IOC, he implemented a visit in 1991 to the member states participating in the IBCCA Project and said that this visit was partially implemented by him and completely carried out by Dr. José Luis Frias Salazar, Representative of Mexico. The Report of this mission was sent to the IOC. The Chairman called on Dr. José Luis Frias Salazar to offer information of this mission to the members of the Board (Annex III).

15 Rear-Admiral Alfredo Civetta noted that there have been changes in the sheets appointed and that these changes have not been reported to the IHO which has published the schemes with the distribution of the sheets. Therefore, all changes should be reported in order to update the published schemes.

16 The decision of changing the compilation of sheets of 1:250 000 to 1:500 000 brought about several interventions on behalf of the members of the Board, and finally the agreement reached was to adopt the generality of the work whereby said work will be compiled in the scale of 1:500 000 except in those cases where the density of the information or the characteristics of the undersea relief is advised to be carried out on a scale of 1:250 000.

17 Taking into consideration the suggestion made by Rear-Admiral Civetta that the future trend will be to increase the volume of the information of the marine areas and that the scientific community has adopted the scale of 1:250 000 considering it the most timely, the aforementioned agreement will be considered as a measure of practical and provisional nature and will vary according to the available data.

18 Capitán de Fragata, Dr. Angel Garcia, noted that the scale changes would require adoption of new figures in the distribution of sheets which would be worked out by Dr. José Luis Frias who would prepare a proposal towards this respect in order to have it ready prior to the closing of the Fourth Meeting of the Editorial Board. The proposal was accepted.

5. THE STATE OF COLLECTION AND DISTRIBUTION OF DATA FOR THE IBCCA PROJECT

19 The Chairman called on Dr. Frias Salazar to inform the participants about the state of collection and distribution of data for the IBCCA.

- 20 Dr. Frias Salazar reported that they have received:
- (i) 19 magnetic tapes with digital information (Bathymetry), sent by the NGDC, USA;
 - (ii) 2 tapes and 9 three and a half inches diskettes with digitized coastlines (WVS), sent by the NGDC, USA;
 - (iii) 2 sheets of bathymetry sent by the Hydrographic Department (H.D.) of the United Kingdom;
 - (iv) 1 three and a half inch diskette from H.D. with digital information (bathymetry) sent by ICH of Cuba.
- 21 Varying information on sounding, coastlines and graphic information in diskettes, sheets and charts have been sent to Colombia, Costa Rica, Cuba, USA, Mexico and Venezuela.
- 22 He stated that there is an unbalance concerning the volume of information in existence in the different areas. There are areas where compilation has been impossible due to the lack of data. Request to different countries and institutions that might have the data of these areas have been made but no replies have so far been received.
- 23 Dr. Holcombe suggested that for those areas where the information was insufficient, the data utilized would be those contained in the GEBCO plotting sheets on the scale of 1:1 000 000. The recommendation was accepted and the Chief Editor called on the members of the Board to offer information on the areas faced with these problems in order to request information from GEBCO.
- 24 The Chairman stated that from the very beginning it was agreed that reciprocal exchanges be made with the NGDC of USA, whereby he requested that any available information should reach them, stating that Cuba has always satisfactorily fulfilled their tasks and through his person all information from Cuba has been sent to the NGDC.
- 25 Rear-Admiral Alfredo Civetta also stated that a GEBCO Digital Data Center in the United Kingdom named GEBCO Digital Atlas had been formed and that data could be requested from the Center. The IHB could offer assistance in these contacts.
- 26 Dr. Sekachev explained that the contours, track control and geographical names of undersea features had been digitized in the "GEBCO Digital Atlas". This is at present available on magnetic tape in international format GF3; later this year the GEBCO Digital Atlas will become available on "floppy" discs for use on PCs and CD-ROM.
6. **PROGRESS IN THE COMPILATION OF THE "PLOTING SHEETS" FOR THE IBCCA**
- 27 The Chairman of the Editorial Board called on the members to offer information with respect to the state of work of the compilation of sheets in their areas of responsibility.
- 28 Capitán de Fragata Oscar Mendoza Rodriguez reported that sheets 14 and 15 assigned to Venezuela within the Project have been processed in a 30% from 312-3 which includes areas of Colombia and Venezuela. As agreed, Colombia will contribute with the topography of its areas to the Chief Editor.
- 29 From sheets 151-12, 151-13, 151-17 and 151-18 the bathymetric information has not been included.
- 30 Sheets 212-3, 212-4 and 212-8 were manually compiled but at present they are being subjected to automated processing.
- 31 All the information from the coasts of Venezuela are digital on

a scale of 1:300 000 according to the information available in that country.

32 Taking into account the complications regarding the staff and the plans pertaining to the Dirección de Hidrografía y Navegación, the charts have been prepared in the traditional manner mentioned above but the charts are being transferred to the digital domain.

33 Venezuela expects to have the compilation of sheets 14 and 15 to be sent to the Chief Editor by 1993.

34 Capitán de Fragata Oscar Mendoza showed the originals of the charts DHN-604, approaches to Christopher Columbus Port, Macuro, on a scale of 1:150 000 and DHN-605 - Christopher Columbus Port, Macuro, on a scale of 1:500 000 which have been carried out using the automated system. This has been implemented due to the V Centennial of Christopher Columbus' arrival to the Venezuelan coasts.

35 These originals will be shown by the Dirección de Hidrografía y Navegación of Venezuela in the exhibit of Nautical Charts on the XIVth International Hydrographic Conference.

36 The Chairman of the Editorial Board expressed his warm congratulations to the representative of Venezuela in the IBCCA Project for the quality and quantity of the work carried out. He noted that the contributions of Venezuela towards the Project are acknowledged and that there is still much to learn from them in this respect.

37 Rear-Admiral Alfredo Civetta reported on the work which is being implemented within the framework of the XIVth International Hydrographic Conference for the V Centennial of the Discovery of America and called on the participants to report to the IHO actions aimed at greeting the historical date.

38 Capitán de Fragata, Dr. Angel Garcia, noted that Cuba, which was in charge of sheets 07 and 08 of the Project, had granted top priority to the works of sheet 07 beginning with the compilation of the plotting sheets nearest to the Cuban coasts where the Cuban Hydrographic Institute had located its greatest volume of work.

39 He also explained that in the month of January they had begun to work with the automated system and that the compilation of the plotting sheets corresponding to sheet 07 had been practically concluded taking into account the already known problems of insufficient information with regards to some of the plotting sheets.

40 Work on sheet 08 has already started and should be ready to be delivered to the Chief Editor in August 1992.

41 Dr. Duch Gary acknowledged with satisfaction that the work carried out by Cuba within this Project has notably advanced. The progress made by Cuba and Venezuela in the Project indicates that in the very near future the Chief Editor will have much work to do which he expects to be able to fulfill in time.

42 Dr. José Luis Frias informed that Mexico had been working in the last few years mainly in the compilation of sheets 05 and 06. Sheet 06 has almost been compiled in its totality on a scale of 1:250 000 and it will be submitted to the consideration of some of the experts of Mexico. The change of scale will allow the work for sheets 1-05 and 1-11 to proceed faster when compared to the work already done for sheet 1-06 taking into account the scale 1:250 000.

43 New information coming from the surveys in the areas located within the Mexican continental platform on the Gulf of Mexico have been incorporated into the compilations of sheets 1-05 and 1-06.

44 For the land information, the General Directorate of Geography considers the topographic coverage on a scale of 1:250 000 and a land digital base, both pertaining to the whole country. The only topographic information missing is that corresponding to Guatemala and Belice within the responsibility area of sheets 1-05 and 1-06.

45 Mexico expects to begin the publication of the sheet 1-06 in the month of August 1992.

46 The Chairman recognized the progress made by Mexico in the works of the Project and expressed his acknowledgement for the work implemented by Dr. Frias Salazar and his small working team and the dedication and seriousness devoted to this project in IBCCA.

47 Dr. Troy Holcombe of the USA reported that the work with chart 04 was concluded and was checked by several of his colleagues and at present is in the hands of the Chief Editor. When compiling this sheet it was observed that sufficient data existed to compile on a scale of 1:250 000 near the Bahamas. In areas far away from the coast with insufficient information, compilation was made on a scale of 1: 1 000 000.

48 As a result of a new bathymetry in the areas surrounding the central western islands of the Bahamas, a number of undersea features requiring new names were found. It is being proposed to name some of the aforementioned undersea features after participants in the First Voyage of the Discovery of America by Christopher Columbus in 1492. This proposal will be submitted to the GEBCO Sub-Committee.

49 In the area of the Chart 03, work has begun. Bathymetry has been compiled on a scale of 1:250 000 and the bathymetric contours of these charts where new information makes improvement impossible has been already digitized. These compilations will be improved.

50 The USA has high-resolution digital data bases in relation to the coast-lines and land topography. He also stated that data exchange was fundamental for the development of future work.

51 The Chairman of the Editorial Board recognized the efforts of the USA in supplying useful and necessary information for the Project and their efforts in this respect. He particularly stressed the global contribution made by the National Geophysical Data Center (NGDC) of Boulder, Colorado, USA, which supplied some of the necessary data for this project.

52 Prof. José Luis Diaz Andrade of Costa Rica reported that he had attained commitments with institutions of his country to be able to use the hardware and with the aid of Mexico, to be able to use the software, which allowed him to express that in the month of May they would start working with the 28 sheets on a scale of 1:250 000 and expected by the end of the current year to be able to show progress on their work.

53 The Chairman of the Board expressed his satisfaction in knowing that the basic difficulties for the development of the work of Costa Rica in the Project had been resolved and was pleased to include in the editorial program a sheet compiled by Costa Rica.

54 The Chairman thanked the members of the Editorial Board for the information offered, stating that the reports had been satisfactory.

55 Rear-Admiral Civetta stated that IHO had the BP-003 publication with updated information about new bathymetry for different areas. Information should be sent to IHO from each member of this Board to keep this publication updated.

56 Regarding the new geographical names, the Chairman pointed out the need to send names proposals to the GEBCO Sub-Committee on Geographical Names for their approval in accordance with the BP-006 publication of IHO in the

Spanish language.

6A. PRESENTATION OF THE COLOR PROOFS OF SHEETS 1-09

57 The Chairman of the Editorial Board called on Dr. José Luis Frias Salazar to present the first printed proof of sheet 1-09 of the IBCCA project.

58 Dr. Frias Salazar reported that in order to modify the publication of the printed proof, observations made by Dr. Troy Holcombe, scientific coordinator of sheet 1-09 were taken into account as well as observations made by Mr. Desmond P.D. Scott and the Summary Report of the Ninth Meeting of the GEBCO subcommittee on Geographic Names carried out in July 1991.

59 Some of the modifications are the following:

- (i) 72 names were eliminated from the Chart leaving only 141.
- (ii) the position of names which appear on the chart were corrected.
- (iii) Names of relevant elements were included.
- (iv) Generic names of various elements were modified.
- (v) Names of cities were added.
- (vi) Modifications to the scribbled films of bathymetry were made.
- (vii) The line of the Tropic of Cancer was included.

60 On the marginal strip the IHO logo was inserted and the list of data sources was included.

61 The participants had the opportunity of examining the proof presented.

62 Rear-Admiral Alfredo Civetta congratulated the Board for this beautiful product and Dr. Duch Gary for the coordination and direction of the work.

63 The Chairman of the Editorial Board stated that this was a definite color proof. After its revision, it will be sent for final printing.

7. PROGRESS IN THE PREPARATION OF THE DIGITAL CARTOGRAPHICAL BASE FOR THE COAST LINE AND TOPOGRAPHICAL INFORMATION

64 The Chairman of the Editorial Board called on the members to report on the situation of their respective countries to carry out this work, which is very important for the digital information of the IBCCA Project.

65 Capitán de Navío Fernando Aranda Griman, expressed that they have acquired the equipment which allows them to obtain the digital chart information, as was shown in the proofs of two charts previously presented by Venezuela in this meeting. No problems are encountered in the digitalization of the coast-line.

66 Capitán de Fragata Dr. Angel Garcia pointed out that the ICH now has the technical capacity for this work, the only potential difficulty arising from the topographic information from other countries which are located in the areas of the sheets for which Cuba is responsible. Said countries are Haiti, Dominican Republic, Jamaica, Honduras and Bahamas.

67 Dr. Duch Gary proposed the preparation of the information on the basis of SPOT stereoscopic images. Mexico can carry out these tests to facilitate them to Cuba. Geographical Names could be taken from a top-quality Atlas.

68 Dr. Frias Salazar expressed that Mexico has a digital cartographic data base and has no difficulties in the handling of digital data.

69 Dr. Troy Holcombe stated that the United States of America has a high-detailed digital coast-line and digital land topography for the majority

of its areas of responsibility, but if these should prove insufficient one could return to the paper information and later turn it to digital information.

70 Prof. José Maria Andrade explained that Costa Rica has a digital database taken from the chart at the scale of 1:500 000, digital information of his country is at the scale of 1:200 000 but for other countries entering into the areas of responsibility of Costa Rica in IBCCA, only the scale of 1:500 000 can be attained.

71 Dr. Duch Gary pointed out that as Chairman of the Editorial Board he will continue to seek information from the Cartographic institutions of those countries where no information is available.

7A. **DIGITALIZATION OF BATHYMETRIC INFORMATION. CREATION OF A DIGITAL DATA BANK**

72 The Chairman stated that concerning the tasks handled by the different members of the Board and the progress made in the Project, it was convenient to listen to the views of the participants.

73 Capitán de Navío Aranda Griman stated that in the Cartography Committee which met last year in Quito, Ecuador, the Venezuelan delegation proposed the creation of a Center for Oceanographic Data within the Venezuelan Hydrographic Division, which was accepted and finally adopted.

74 Capitán de Fragata Angel Garcia pointed out the existence of 3 items that have a conceptual unity:

- (i) The compilation and automated cartographic publishing.
- (ii) Digitalization of the Bathymetric Charts.
- (iii) Creation of a Database.

75 In relation with the spirit of assistance and cooperation shown in the Project, Cuba is willing to work vigorously in this direction. The software developed for the production of charts was also shown to the members of the Board and Cuba's willingness to aid and prepare them in this task was also stressed.

76 Capitán Angel Garcia expressed that Cuba is willing to place its storing capacity and the existing processing in their Center of Oceanographic Data Center, though modest it is sufficient for the objectives.

77 He also proposed the creation of a Regional Data Bank for the IBCCA Project. Cuba is willing to assume the responsibility for the development of the required software, both independently or in cooperation with other countries of the area and also offered the technical capacities of ICH to digitize the cartographic information drafted by manual methods.

78 A wide participation of the members of the Board was observed in the discussion of this item of the agenda. The delegates expressed different views concerning the proposals presented by Venezuela and Cuba.

79 The Chairman thanked for the generous offer granted by the Cuban representative.

80 After listening to the different views it was agreed that Cuba would submit the "Project for the creation of the IBCCA Database", to the Chairman of the Editorial Board, which would be circulated among the members of the Board, so they can express their opinions. As a result of the detailed analysis of the Project, and the opinions expressed, a final decision should be taken in this respect as soon as possible.

8. SITUATION CONCERNING THE PREPARATION OF THE GEOLOGICAL GEOPHYSICAL CHART SERIES OF THE IBCCA

81 In discussing this point of the agenda, Dr. Duch Gary expressed that his institution lacks the technical capacity to accomplish these works and thus will contact the institute of Ocean Sciences and Limnology from the UNAM that might be able to assume the responsibility with the sheet and invite them to represent Mexico.

82 Capitán de Navío Aranda Griman stated the need for his institution to contact Venezuelan universities and oil companies in order to implement this work.

83 Capitán de Fragata Angel Garcia pointed out that the ICH has the coordinating and organizing possibility to fulfill these works in Cuba.

84 Dr. Troy Holcombe conveyed the criteria of US experts with whom he had contacts on this item prior to this meeting. American specialists are willing to participate in the works of this project. He suggested to begin with the magnetic and gravimetric charts.

85 Prof. José Maria Diaz Andrade of Costa Rica expressed that it would be necessary to contact other institutions to assess the possibility of implementing these works and recommended to explore the willingness for the participation of countries of the area, not represented at this meeting.

86 Eng. Omar Hernandez of Cuba stated that even though the task is difficult, it is not impossible, and for said purpose, both national and international work should be accomplished and start with the geophysical charts and organize a working session for specialists of the countries involved in the Project.

87 Rear-Admiral Alfredo Civetta suggested to use the expertise which has been accumulated in the Mediterranean Project in the preparation of the geophysical charts. The IHB is willing to supply models for the geophysical charts of the Mediterranean to those countries requiring them.

88 Finally, it was agreed to:

- (i) Contact specialists of any country willing to participate in the Project and to later on convey this information to the members of the Board.
- (ii) Elaborate a series of geophysical charts stressing the magnetic ones.
- (iii) Organize a seminar in one of our countries to define and agree as how to accomplish this task.

9. MATTERS ARISING FROM THE REPORTS OF THE PREVIOUS MEETINGS

89 Lic. Frias Salazar called on the members of the Board to make commentaries and additions to the second edition of the English-Spanish version of the publication "Standardization of the Distinctive Names of the Undersea Relief" but no commentaries have been received so far.

90 Dr. Sekachev recalled that the draft of this publication was sent to Lic. Duch Gary in 1990 with the relevant indications.

91 Due to the short period of time for the revised edition of the aforementioned publication, it was agreed that the members of the Board should send their opinions, additions and commentaries regarding this publication within 15 days. Said updated publication will be immediately sent to the IOC by the Chairman.

92 Capitán de Navío Aranda Griman referred to the statement of Dr. Viktor Sedov in the Third Meeting held in Caracas in relation to the "capacity of the IOC in supporting seminars and meetings of experts..." (Doc. IOC/EB-

IBCCA-III/3 para 74) and asked Dr. Sekachev if IOC could support the implementation of the experts' meeting to analyse the preparation of the geological/geophysical chart series traced in the IBCCA which was agreed upon in debating item 8 of the agenda of this Meeting.

93 Dr. Sekachev pointed out that the IOC funds already have a specific destination and do not, in the present situation, contemplate other expenses.

94 Rear-Admiral Alfredo Civetta referred to the experience of the IBCM Project where some of the overlay sheets of the geophysical charts have been produced and which IOC has financially supported.

95 Dr. Sekachev explained that currently IOC lacks the funds for such goals but in any case, this can be analysed. If IOC should receive the request, a way of obtaining some funds will be considered.

96 The Board agreed that each member will send the list of the specialists and possible institutions of their countries in a brief period of time to the Chairman in order to work on the geological/geophysical chart series.

97 Capitán de Fragata Oscar Mendoza proposed, on behalf of the President of the Editorial Board to establish a means of monitoring the delivery of communications and jobs to improve organization, suggesting a similar system which the IHB has for registering and controlling this work. This proposal was unanimously adopted.

10. PLACE AND DATE OF THE NEXT MEETING

98 The Chairman called on the participants for suggestions in relation to the place and date of the next meeting of the Editorial Board of the IBCCA.

99 Prof. José Andrade pointed out that it would be an honor for his country to host the next meeting of the Board, that it would not only be an honor but also a benefit in the sense of being able to show what they have done and are doing for the IBCCA Project. But since he needs to consult at governmental levels on the issue, he requests a period of three months to provide a definite answer.

100 Dr. Holcombe proposed the NGDC in Boulder, USA, as an alternate host country but requested a certain period of time to make the required arrangements and receive approval from his country.

101 Finally, it was agreed that Costa Rica would be the host country and the USA, the alternate host, granting a three-months period so that both countries can convey the results of their consultations to the Chairman of the Editorial Board and convey the final decision to the Secretary IOC.

102 Prof. Diaz Andrade proposed to hold the next meeting in the month of August 1994, which was found to be desirable and acceptable by all the participants.

11. ELECTION OF THE CHAIRMAN AND THE VICE-CHAIRMAN

103 In accordance with the procedures of the IOC, the participants proceeded to elect the Chairman and the Vice-Chairman of the Editorial Board for the intersessional period.

104 Capitán de Fragata Angel Garcia expressed: "The members of this Editorial Board acknowledge the efficient work carried out by our Chairman, Lic. Nestor Duch Gary. From the beginning of the Project, once again Mexico showed its spirit of cooperation and cohesive capacity. The on-going efforts of the Mexicans have been decisive for the development of this Project. At the same time, we have felt proud to have had in these six years such an

experienced President as Lic. Nestor Duch Gary, who has been able to conduct the work successfully and with his respectful style has created the required conditions for our work. Colleagues, our national heroes, José Martí, taught us that to honor someone was to honor yourself. For me it is an honor to propose the re-election of Lic. Duch Gary as Chairman of the Editorial Board".

105 The proposal was unanimously accepted.

106 Capitán de Navío Aranda Griman proposed Capitán de Fragata Angel Garcia as Vice-Chairman, also unanimously accepted.

107 Dr. Duch Gary expressed his gratitude for the confidence granted to him which compels him to continue his efforts in this project. He also noted that the project should continue in order to obtain better results. He stressed that he was pleased to work together with Dr. Garcia of whom he was sure to receive the required assistance.

12. **ADOPTION OF THE SUMMARY REPORT**

108 The Summary Report was considered and approved.

13. **CLOSURE**

109 Dr. Duch Gary closed the Fourth Meeting of the Editorial Board of the IBCCA on 26 March 1992. He expressed that the Board thanked the ICH and its President, Capitán de Navío Pedro Perera Ruiz, and all the working team who made the Fourth Meeting of the Editorial Board of the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico a successful event.

ANNEX I

AGENDA

1. **OPENING**
2. **ADOPTION OF THE AGENDA**
3. **ADMINISTRATIVE ARRANGEMENTS. DOCUMENTATION**
4. **RESULTS OF THE MISSION OF THE CHIEF EDITOR OF THE EDITORIAL BOARD TO THE MEMBER STATES**
5. **SITUATION OF THE COLLECTION AND DISTRIBUTION OF DATA FOR THE IBCCA PROJECT**
6. **PROGRESS IN THE COMPILATION OF THE "PLOTING SHEETS" FOR THE IBCCA**
- 6A. **PRESENTATION OF THE COLOR PROOFS OF SHEET 1-09**
7. **PROGRESS IN THE PREPARATION OF THE DIGITAL CARTOGRAPHICAL BASE FOR THE COAST LINE AND TOPOGRAPHICAL INFORMATION**
- 7A. **DIGITIZED BATHYMETRIC INFORMATION. CREATION OF A DIGITAL DATA BANK**
8. **SITUATION CONCERNING THE PREPARATION OF THE GEOLOGICAL/GEOPHYSICAL CHART SERIES BASED IN THE IBCCA**
9. **MATTERS ARISING FROM THE REPORTS OF THE PREVIOUS MEETINGS**
10. **PLACE AND DATE OF THE NEXT MEETING**
11. **ELECTION OF THE CHAIRMAN AND THE VICE-CHAIRMAN**
12. **ADOPTION OF THE SUMMARY REPORT**
13. **CLOSURE**

ANNEX II

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ANNEX III

RESULTS OF THE MISSION OF THE CHIEF EDITOR
OF THE EDITORIAL BOARD TO THE MEMBER STATES

Following the recommendations of the Consultative Group of the Ocean Mapping CGOM and by agreement of the General Secretariat of the IOC, the President of the Editorial Board of IBCCA implemented a consulting itinerant visit to the institutions of the participants, facilities, and members of the Board who are working in the IBCCA Project, in this manner not holding the intersessional meetings which were being carried out by the Group of Officials of IBCCA, geared at having a greater approach with the compilers of the Chart and a better information on the activities carried out by each member of the Project.

Three visits were implemented to this effect:

1. A visit to the City of Havana with the participation of the host country, Venezuela and Mexico (1-2 July 1991).
 2. A visit to Boulder Colorado, USA (8-9 July 1991).
 3. A visit to San José de Costa Rica, extended to Cartagena, Colombia, (25-29 November 1991).
1. On 1 and 2 July 1991 a review meeting was held in the City of Havana with the participation of Cuba and Venezuela. In this meeting the following items were stressed.
- (i) It was observed that in working with the microcomputers, faster results were obtained in the graphification of data, achieving greater efficiency and quality if compared to the manual operations (With regards to the list of computers).
 - (ii) It was noted that in many cases the data received from the NGDC proved to be insufficient for the compilation on a scale of 1:250 000 which has obliged to search for a greater number of data in additional sources. There are still many areas without an acceptable coverage.
 - (iii) It was also indicated that it was better to handle digitized archives on the coastline instead of the graphifications previously sent by the Chief Editor, since some changes and missing spaces had been detected which need to be updated.
 - (iv) With regards to the compilation scale, the participants proposed to change the scale 1:250 000 for the 1:500 000 scale, due to the following reasons:
 - (a) There are a great number of plotting sheets on the scale of 1:250 000 which have not been compiled due to the lack of data and information in certain areas of the Caribbean Sea, the Pacific Ocean and the Gulf of Mexico within the project, all of which hampers the integration of the work and delays the progress of the compilation aimed at the publication of the sheets 1:100 000 of IBCCA.
 - (b) According to the established standards for the mapping compilation it is acceptable to compile twice the scale of publication without losing the validity in the content of the Chart.
 - (c) The scale 1:500 000 is within the established standards by the IHO Bureau.

- (d) The works of compilation will be considerably reduced in over a fourth part (or six times less).
- (e) The costs of mapping elaboration and production will be considerably reduced as well as the period for preparation and publication.
- (f) In the case of Colombia, work had been carried out with the scale of 1:500 000 in which case this advance would be retaken. In the case of the USA the compilations have been practically integrated in the scale of 1:1 000 000. With the change of compilation scale 1:500 000 there will be greater possibilities that the missing compilations to this scale would be supplied.

However, regarding this item, the participants agreed that the President of the Editorial Board of IBCCA would consult the CGOM and the Secretariat of the IOC in order to learn about their views and establish the feasibility of the changes suggested.

- (v) The first printed test was submitted regarding sheet 1-09 of IBCCA and observations were made in relation to the quality of its publication. Commentaries concerning the Chart presented in Monaco in the month of October 1990 caused a positive effect amongst the participants of the CGOM.
- (vi) Difficulties were stated in order to obtain the topographic information of those countries whose territories are located in the areas of responsibility of the countries participating in the IBCCA Project. Regarding this item, the Chief Editor was in charge of contacting the respective institutions of those countries and obtaining the information to be delivered to those who requested said data. (This information has been requested from Guatemala, Honduras, El Salvador, Nicaragua, Panama and Belice). Haiti and the Dominican Republic are still pending.
- (vii) Finally, the participants expressed their hope that in June 1992 at least one sheet for each of the participating countries would be elaborated.

2. On July 9 and 10 the National Geophysical Data Center NGDC, USA was visited where initially Dr. Troy Holcombe was informed of the aspects treated in the previous visit to Havana; Dr. Holcombe seconded the agreements reached showing the procedures followed in the compilations for which the USA was responsible. Likewise, coordination managements were carried out by NGDC with the compilers of the different sheets in their country.

Verifications were made concerning the achievement reached by the USA in the compilations of sheet 1-04. The results obtained by the Group of Experts regarding the names and forms of undersea relief from GEBCO for the acceptance of the list of names proposed to sheet 1-09 are still pending.

After implementing a visit to the NGDC facilities, the Chief Editor of IBCCA expressed his satisfaction to Dr. Holcombe for his participation in IBCCA and assessed the positive form which NGDC offers to the Project.

3. Due to different reasons which enabled the visit of Lic. Nestor Duch Gary, Chairman of the Board, to Costa Rica and finally on November 25 and 26, Lic. José Luis Frias Salazar, member of the Editorial Board of Mexico, was to implement the visit proposed to Costa Rica and on November 28 and 29 to the City of Cartagena, Colombia, in order to conclude the programme originally stated.

In both countries there was a rapprochement with the representatives of those countries in the Editorial Board of IBCCA and they were informed of the results obtained in the visits implemented to Havana and to Boulder. In both cases in each country, the participants accepted said agreements in virtue of the coincidence of opinion with the results found in the development of their own works.

However, in Costa Rica an unfortunate delay was noted with regards to the compilations, due to the lack of computers which facilitates the procedures for the availability of the bathymetric data in graphed sheets.

Prof. Diaz Andrade explained that it has been impossible to obtain a plotter to graph the information and that the National Geographic Institute, which will be in charge of the compilation of the sheets, responsibility of Costa Rica, lacks this equipment.

In this regard, support was requested from some other institution of their country in a brief period of time, otherwise, the Chief Editor could graph the information of Costa Rica which could later on be sent to him.

On the other hand, in the City of Cartagena, the Hydrographic and Oceanographic Research Center (CIOH) was visited wherein the progress made in the compilations of that country was observed with good results, since the methods and procedures for sounding data graphs are based on automated systems, this has allowed an efficient and top quality work. Plotting sheets 15112, 15117 and 18103 were shown with the already processed data.

Capitán de Fragata, Jorge Urbano Rosas, Director of CIOH, pointed out that he would integrate the Editorial Board, substituting Capitán Sigifredo Velandia, former director of said center. Likewise, he expressed his concern in enhancing the work of Colombia in the Board and stressed the importance of the IBCCA Project for his country.

ANNEX IV

LIST OF ACRONYMS AND ABBREVIATIONS

IHB	International Hydrographic Bureau
CGOM	Consultative Group on Ocean Mapping
IOC	Intergovernmental Oceanographic Commission
GEBCO	General Bathymetric Chart of the Oceans
HD-UK	Hydrographic Department - United Kingdom
IBCCA	International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
IBCM	International Bathymetric Chart of the Mediterranean and Overlay Sheets
CHI	Cuban Hydrographic Institute
INEGI	National Institute for statistics, Geography and Informatics
NGDC	National Geophysical Data Center
IHO	International Hydrographic Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization

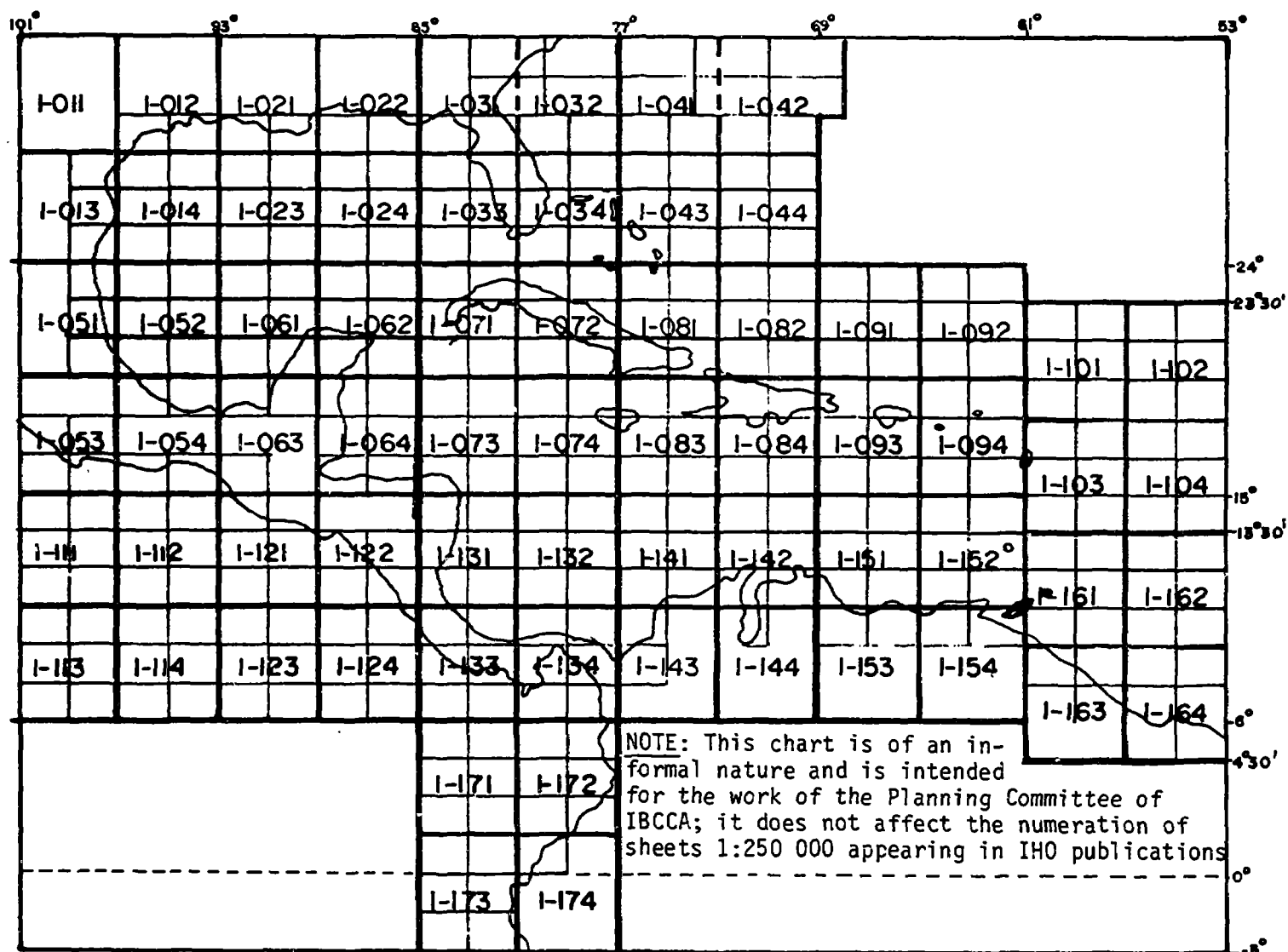


DIAGRAM OF DISTRIBUTION OF COMPILATIONS TO THE SCALE 1:500 000 FOR THE IBCCA

ANNEX V

ANNEX VI

SYNTHESES OF THE AGREEMENTS ADOPTED AT THE FOURTH MEETING
OF THE EDITORIAL BOARD OF THE IBCCA PROJECT

1. It was agreed that on the first sheet to be published by Cuba, the name of Dr. Gilberto Samaniego should appear together with that of the current scientist in charge.
2. The general compilation work in the sheets of 1:250 000 to 1:500 000 brought about several interventions on behalf of the members of the Board, and finally agreed to adopt the egenerality of the work whereby said work will be compiled in the scale of 1:500 000 except in those cases where the density of the information of the characteristics of the undersea relief is advised to be carried out on a scale of 1:250 000.
3. Cuba would submit to the Chairman of the Editorial Board the "Project for the creation of a Data Base of the IBCCA", which will be circulated among the members of the Board, so they can express their opinions. As a result of a detailed analysis of the Project, and the opinions expressed, a final decision should be taken in this respect as soon as possible.
4. Regarding the preparation of geophysical and geological chart series, the following was agreed:
 - (i) to contact specialists of any country willing to participate in the Project and later on convey this information to the rest of the members of the board;
 - (ii) to elaborate a series of geophyaical charts stressing the magnetic ones;
 - (iii) to organize a seminar in one of the countries of the region to define and agree as how to accomplish this task.
5. The members of the Board will submit to the consideration of the President their opinions, additions and commentaries on the publication of "Standardization of the Distinctive Names of the Undersea Relief" in a trem of 15 days, which will be integrated and the revised document will be immediately sent to the IOC by the Chairman.
6. Every member of the Board to send in a brief term to the President a list of the specialists and possible institutions of their countries to work in the geological/geophysical chart series.
7. The Chairman of the Editorial Board will monitor the delivery of communications and tasks to be implemented in order to improve our work. A similar system for monitoring and registering was suggested as the one which the IHB operates.
8. That Costa Rica will be the host country for the next Meeting of the Editorial Board and the USA would be the alternate host country. A period of three months was granted to the representatives of both countries to arrange matters concerning this item, by which time they should convey the results to the Chairman of the Editorial Board in order to communicate the final decision to the IOC.
9. The date for the next meeting will be tentatively the month of August 1994.
10. Lic. Nestor Duch Gary was ratified as Chairman of the Editorial Board.
11. Capitán de Fragata, Dr. Angel García Alvarez of Cuba was elected as Vice-Chairman.

ANNEX VII

CHRONOGRAM OF DELIVERY AND PUBLICATION OF THE IBCCA SHEETS

COUNTRY	PRODUCT TO BE DELIVERED	DELIVERY DATE	PUBLICATION DATE
Venezuela	Sheet 14 Sheet 15	March 93 End of 93	
Costa Rica	Sheet 12 Sheet 13 (corresponding part)	April 93 June 93	
USA	Sheet 09		In April, the 1992 edition will be completed
Mexico	Sheet 06 Sheet 05	August 92 June 93	
Cuba	Sheet 07 Sheet 08	End of 92 End of 92	
Colombia	The Chairman of the Editorial Board will be to this point.		

ANNEX VIII

**REPORT PRESENTED BY COLOMBIA TO THE FOURTH SESSION
OF THE EDITORIAL BOARD**

INTRODUCTION

The Colombian representatives to the IOC Editorial Board for the Fourth Session of IBCCA, Capitán de Fragata Jorge Urbano Rosas and Teniente de Fragata Juan Manuel Soltau, greeted the representatives of all participating countries on behalf of the Government of Colombia, and particularly of the Dirección General Marítima y Portuaria (DIMAR) and the Centro de Investigaciones Oceanográficas e Hidrográficas (CIOH), both belonging to the Colombian Navy. These bodies are responsible for investigating and developing marine resources in their country.

The bathymetric chart has been considered by Colombia a priority project in view of its importance at national and international levels. Well-known Colombian geologists, hydrographers and cartographers are involved in this project. This can be demonstrated through the progress reached during the last years, highlighted in this report. Activities have been carried out in four different items (in accordance with the proposed agenda), as follows: the work accomplished to date; the projection to the immediate and medium-term future; the proposal for establishment of geophysical/geological charts based upon IBCCA; and the date and place of the next session of the Editorial Board.

Capitán Urbano thanked Dr. Nestor Duch Gary, Dr. Troy Holcombe and Lic. José Luis Frias Salazar, for their valuable collaboration which helped developing the project since last Session in 1990.

PROGRESS IN COMPILATION OF IBCCA SHEETS

After the 1990 Session, work started on new bases, being adjusted to IBCCA specifications, which led to a new stage in their conception: the existing scale was changed into a new 1:250.000, and sheets were adapted to the new distribution approved for Colombia in December 1990. Sheets which provided a major information and more recent surveys were emphasized, in order that once in hands of the Editor, possible deficiencies detected might help simplifying establishment of sheets with lower information content.

Sheets Nos. 21114-21119: Information is ready. Toponymic part is being carried out.

Sheets Nos. 15012-15013-15017-15018: Ready to be overlaid. This work was 60% developed with information compiled from cruises performed during 1988 and 1989.

Sheets Nos. 21103-21104-21108-21109: The analisis of data provided by proved that information is limited for the time being. It will be decided later whether it is sufficient or not.

Sheets Nos. 21120-24205-24210-24215: Completed. Under inking and overlay process.

Sheets Nos. 24 (202-203-204-207-208-209): Data processing analysis not yet started. Comparative sheets with other data sources are available.

Sheets Nos. 24 (212-213-214): Data processing analysis not yet started. Comparative sheets with other data sources are available.

Sheets Nos. 24 (217-218-219): Data processing analysis not yet started.

Comparative sheets with other data sources are available.

Sheets Nos. 15112-15117: Completed as far as definition of bathymetric lines and toponymy is concerned. This process is being studied in the Geographic Institute Agustin Codazzi. They will be delivered together with their corresponding overlays to the main Editor, in the course of the Session.

Sheet No. 18103: Completed as regards maritime portion. Topographic information will be requested from the Republic of Venezuela.

Sheets Nos. 15111-15116-18102: Thoroughly completed. Overlays under process in order to be sent to the Editor.

Sheets Nos. 15014-15019-21105-15015-15020: Information available is being worked out. A cruise on ARC "Providencia" is foreseen for December 1991 in order to collect more data in the areas where information available is insufficient.

Sheets Nos. 18106-18101-18111: Ready with information up to 1989 cruises. Under inking and overlay process.

Sheets Nos. 27 (204-205-209-210): The Ecuadorian Institute in charge of the topographic part was requested to provide information available in this area, and possible data from surveys by the Institute of Hydrography of this country will be requested, in order to get references likely to be compared with the information already available.

EVOLUTION OF THE IBCCA PROJECT

The evolution and development of the work performed by Colombia in the framework of the programme of the IOC Editorial Board for the Bathymetric Chart of the Caribbean and Gulf of Mexico is shown in graph number 1, from its beginning up to now, and taking into consideration the responsibility assigned on 44 sheets.

STATE OF PREPARATION OF THE GEOLOGICAL/GEOPHYSICAL SERIES BASED UPON IBCCA

In accordance with the conclusions and tasks instructed regarding this item during 1990, the following conclusions could be formulated:

- (i) The CIOH has neither specialized geologists to develop this work, nor necessary equipments to follow-up the project individually; but staff, premises and even ships are available to conduct joint work.
- (ii) In consultation with other investigation centres of the country, such as INGEOMINAS, the Universidad Nacional and Universidad Jorge Tadeo Lozano, there is an excellent attitude of collaboration with staff to put forward these tasks.

From item 1 and 2, it can be concluded that:

- (a) The CIOH will be able to take up the responsibility of the project in representation of Colombia, inviting geologists from the Universidad Nacional and other entities previously mentioned.
- (b) A mission of one or two specialists is needed to train staff of the Institute in the field of analysis and interpretation of seismic data.
- (c) To determine the distribution of surface sea-bottom sediments, an adequate equipment is needed to work at 4,000 m.
- (d) To define structure, geometry and arrangement of layers

constituting the marine substrata, geophysical equipment is needed, (with air or water pressure canon), and an echosonder of 3,5 khz. Other more sophisticated equipment already in the market but for which there is not enough knowledge, would be welcome.

- (e) Training and/or assistance by a technician in electronics is needed for maintenance and operation of geophysical equipment.
 - (f) It would be advisable to determine the order of priority in the production of these charts, to decide in which areas there is a need to train staff accordingly with the production requested, since there is neither experience in production of magnetic, gravimetric, nor in seismic charts.
 - (g) Economic projections would make feasible starting the project in 1995.
 - (h) The information already existing in this regard is not available in Colombia, where only sedimentologic information for the Atlantic and Pacific coasts (until 10 miles offshore) is available. Through a co-operative agreement with French scientists, it was possible to produce a set of charts of the country within the above distance (see figures Nos. 4, 5, 6, 7 and 8 in existing publications).
- (iii) Due to the above-mentioned reasons, the project will remain under high consideration of entities attending this Session. This emphasizes the good will of Colombia to develop this project; however, it should be pointed out that its achievement will depend on the international technical assistance available to this end.
- (iv) List of experts available:

Amparo MOLINA	CIOH	Geology
Consuelo MOLINA	CIOH	Geology
Cristian BRIDGES	U. Jorge Tadeo Lozano	Geology
Luis BRICENO	U. Nacional	Geophysics
Rosalbina PEREZ	INGEOMINAS-Bogota	Geophysics

EVOLUTION

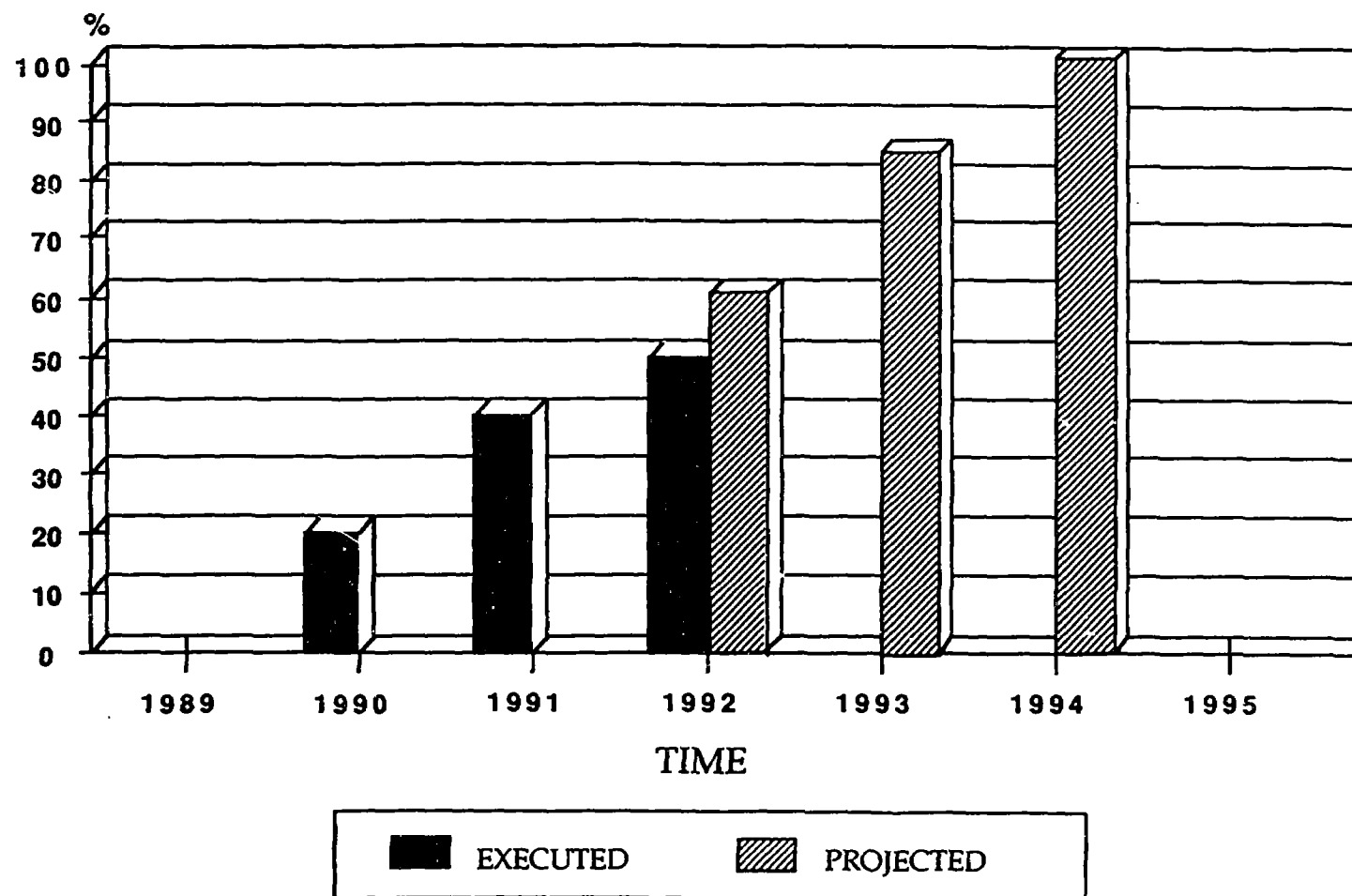


FIG. 1