Intergovernmental Oceanographic Commission
Reports of Meetings of Experts and Equivalent Bodies

IOC Editorial Board for the International Bathymetric Chart of the Western Indian Ocean

Third Session

Zanzibar, Tanzania,
3-7 October 1994

UNESCO

In this Series, entitled

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

1. Third Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
2. Fourth Meeting of the Central Editorial Board for the Geological/Geophysical Atlases of the Atlantic and Pacific Oceans
3. Fourth Session of the Joint IOC-WMO-CPPS Working Group on the Investigations of 'El Niño' *(Also printed in Spanish)*
4. First Session of the IOC-FAO Guiding Group of Experts on the Programme of Ocean Science in Relation to Living Resources
5. First Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources
6. First Session of the Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
7. First Session of the Joint CCOP(SOPAC)-IOC Working Group on South Pacific Tectonics and Resources
8. First Session of the IODE Group of Experts on Marine Information Management
9. Tenth Session of the Joint CCOP-IOC Working Group on Post-IDOE Studies in East Asian Tectonics and Resources
10. Sixth Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
11. First Session of the IOC Consultative Group on Ocean Mapping *(Also printed in French and Spanish)*
12. Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ships-of-Opportunity Programmes
13. Second Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
14. Third Session of the Group of Experts on Format Development
15. Eleventh Session of the Joint CCOP-IOC Working Group on Post IDOE Studies of South-East Asian Tectonics and Resources
16. Second Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and Overlay Sheets
17. Seventh Session of the IOC-UNEP Group of Experts on Methods, Standards and Intercalibration
18. Second Session of the IOC Group of Experts on Effects of Pollutants
19. Primera Reunión del Comité Editorial de la COI para la Carta Batimétrica Internacional del Mar Caribe y Parte del Océano Pacífico frente a Centroamérica *(Spanish only)*
20. Third Session of the Joint CCOP/SOPAC-IOC Working Group on South Pacific Tectonics and Resources
21. Twelfth Session of the Joint CCOP-IOC Working Group on Post IDOE Studies of South-East Asian Tectonics and Resources
22. Second Session of the IODE Group of Experts on Marine Information Management
23. First Session of the IOC Group of Experts on Marine Geology and Geophysics in the Western Pacific
24. Second Session of the IOC-UN(OETB) Guiding Group of Experts on the Programme of Ocean Science in Relation to Non-Living Resources *(Also printed in French and Spanish)*
25. Third Session of the IOC Group of Experts on Effects of Pollutants
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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
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50. Third Joint IOC-WMO Meeting for Implementation of IGOSS XBT Ship-of-Opportunity Programmes
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55. Fifth Session of the IOC-UNEP-IMO Group of Experts on Effects of Pollutants
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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
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63. Second Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
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65. First Meeting of the Working Group on Oceanographic Co-operation in the ROPME Sea Area
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67. Thirteenth Session of the IOC-IHO Joint Guiding Committee for the General Bathymetric Chart of the Oceans *(Also printed in French)*
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77. ROPME-IOC Meeting of the Steering Committee for the Integrated Project Plan for the Coastal and Marine Environment of the ROPME Sea Area
78. Third Session of the IOC Group of Experts on the Global Sea-level Observing System
79. Third Session of the IOC-IAEA-UNEP Group of Experts on Standards and Reference Materials
80. Fourteenth Session of the Joint IOC-IHO Guiding Committee for the General Bathymetric Chart of the Oceans
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1. OPENING OF THE SESSION

After short speeches of welcome and thanks by Dr. Magnus Ngoile, Director of the Institute of Marine Sciences, Dr. S. Ragoonaden, Chairman of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean (IOCINCWIO), Dr. Werner Bettac Chairman of the International Bathymetric Chart of the Western Indian Ocean (IBCWIO) Editorial Board and Dr. Dimitry Travin on behalf of the Secretary IOC, Dr. Gunnar Kullenberg, the Third Session of the IOC Editorial Board for the IBCWIO was opened at 10.30 on Monday 3rd October 1994, in the conference room of the Bwawani Hotel, by the Minister for Communications and Transport for the Zanzibar Government, the Honourable Mrs. Rufeya J. Mbarouk.

Mrs. Mbarouk stressed the importance that coastal countries and island states place on bathymetric mapping as an aid to the exploitation of living and non-living resources, to the navigation of shipping and the planning and execution of international maritime and oceanographic tasks.

2. ADOPTION OF THE AGENDA

The Provisional Agenda was presented by Dr. Travin, Technical Secretary, IOC. Item seven, "The Digital Cartographical Base for the Coastline and Topographic Information" was removed as it was decided that this would be discussed under a later item. The revised agenda was adopted (see Annex I).

3. CONDUCT OF THE SESSION AND DOCUMENTATION

Mr. Peter Hunter was proposed and unanimously elected to undertake the task of Rapporteur for the session.

Dr. Bettac presented the documentation. He welcomed the Russian Federation as a new country participating in the IBCWIO project.

The Editorial Board felt that it was desirable to have a member from South Africa. Dr. Travin stated that the IOC had invited the Hydrographer of South Africa to send a representative but had received no reply.

The absence of a member from France was noted as well.

A full List of Participants is given in Annex VI.

4. INFORMATION ON CURRENT IOC OCEAN MAPPING ACTIVITIES

Dr. Travin presented a report on IOC Ocean Mapping Activities. He continued by bringing the Editorial Board up to date on recent developments both in the global General Bathymetric Chart of the Oceans (GEBCO) project and the other regional mapping projects.

The GEBCO charts are available from the Canadian Hydrographic Service, the International Hydrographic Bureau and Mr. Desmond Scott, Permanent Secretary GEBCO and the charts of the IBCM from the latter source, and also the Musée de Monaco and the Head Department of Navigation and Oceanography of the Ministry of Defence of the Russian Federation (HDNO).

The representative of the International Hydrographic Organization (IHO) reported that it was possible for particular institutes and organisations to receive copies of the GEBCO maps from the IHO gratis if they write to the International Hydrographic Bureau (IHB).

The GEBCO Digital Atlas is available on a CD-ROM from the British Oceanographic Data Centre, UK.

5. PROGRESS IN THE COLLECTION AND DISTRIBUTION OF DATA FOR THE IBCWIO

As Chief Editor, Dr. Werner Bettac, informed the members of the Editorial Board on achievements in the collection and distribution of bathymetric data for the IBCWIO.

Data had been received from many sources, including South Africa. However, the following datasets still awaited are:

(i) Soundings, in the Mozambique Channel which were collected by the Portuguese Hydrographic Institute. Dr. Bettac had written to the Institute but had received no reply. The IHO and IOC will write to Portugal to try to help obtain these data.

(ii) Russian data throughout the area. These datasets are referred to later in this report.

(iii) Japanese data. There have been many cruises by Japanese ships in the region. Mr. Hunter and the IOC will write to various institutions in Japan to obtain these data. One source may be the Ocean Research Institute at Tokyo University (Dr. Tamaki).

(iv) South African data. Although some data has already been received there may be some more to come. It had been hoped to welcome a participant from the South African Hydrographic Office but none was able to come to the meeting, steps will be taken to remedy this.

Dr. Bettac presented the document entitled Overview of Source Material for IBCWIO to the Editorial Board which summarized all the material (See Annex II).

Other possible data sources were suggested by the Board. The meeting was informed that the French research ship RV MARION DUFRESNE visits the region three or four times during the year.

Dr. Ngoile also reported that during the last IOCINCWIO meeting other French cruises were planned as well as one by the Dutch vessel RV TYRO.

ORSTOM (Institut français de recherche scientifique pour le developpement en cooperation), is to carry out surveys around island states under its Indian Ocean Commission Programme using the ship RV ATALANTE which is equipped with a multi-beam echo-sounder.

In 1995 the World Ocean Circulation Experiment (WOCE) Programme will be carrying out research in the region. Cruises by US ships will take place. It was noted that WOCE has undertaken to submit its current/underway geophysical cruise data to the National Geophysical Data Center (NGDC) at Boulder, USA, for inclusion in the Geophysical Data System (GEODAS).

Mr. Holcombe reported that the data collected by the USNS CHAUVENET off Somalia and submitted originally in analogue form had been digitized. He gave the Chief Editor a copy of the digital dataset.

6. THE STATE OF NATIONAL PARTICIPATION IN THE PROJECT

Editorial Board members were asked to provide a summary of their activities since the last meeting, identifying and obtaining data within their countries.

Captain 2nd Rank Valery Fomchenko (Head, Department of Navigation and Oceanography, Russia) thanked the Editorial Board for the invitation to the meeting. He reported that HDNO is highly appreciative of international co-operation in world ocean exploration and is already taking part in three of the other IOC International Bathymetric Chart projects. He thanked the Editorial Board for the proposal to allow them to participate in the creation of the IBCWIO.

As far as the area covered by the chart is concerned, HDNO have separate soundings along tracks which are compiled on plotting sheets at a scale of 1:500,000. There are 95 such plotting sheets. There are 102 plotting sheets at a scale of 1:250,000 for some coastal areas. As an example Captain Fomchenko presented a copy of sheet 1-04 of the IBCWIO.

HDNO are not able to present the Editorial Board with all the plotting sheets at once, because they need time for their preparation. Besides that, they urgently need to receive the bathymetric information collected during the previous Editorial Board sessions. They will participate in the work already being carried out in the best way possible.

HDNO is interested in bathymetric data exchange with participants of the project. They are ready to exchange such information on a bilateral basis both in analogue and digital form.

HDNO informed the Editorial Board that it is ready to render support to the project, in the same way that it has been assisting the IBCM project for almost 20 years, but pointed out that, currently, HDNO's material and financial resources are limited. This may be an item for discussion in the near future.

Mr. John Obel (Survey of Kenya) reported that no additional sources of data had been found but there might be a possibility of some offshore data being available with oil companies prospecting for oil and minerals. This would be confirmed with the Ministry of Energy and any information found would be sent to the Chief Editor.

The survey of Kenya now has a computer-assisted mapping system and can therefore digitize and process bathymetric data. However, there will be a need to provide relevant software and materials for further work of the IBCWIO. They have French software called "Demeter", they also hope to install "Arc-Info" by the end of the year. They also have presses for printing large-format maps in colour, mainly in Heidelberg, Germany. Assistance with the provision of printing materials would be necessary.

A short training course on bathymetry was carried out by Dr. Bettac, in 1991 at the Survey of Kenya for five cartographers. This will be relevant during the compilation of the charts before printing but further training will be necessary.

Mr. Peter Hunter from the Institute of Oceanographic Sciences, Deacon Laboratory (IOSDL), UK reported that no new data had been collected by the academic and government research agencies in the United Kingdom. All digital data was now lodged with the NGDC. Additional sources of data are from the old digital files of the cruises of the RRS DISCOVERY. Some of these data may already be represented on the analogue plotting sheets of the GEBCO. If time and effort permits, these soundings will be made available in digital form.

He added that the IOSDL has recently changed its computer architecture to networked Unix workstations and PCs with access to a central plotting facility, an A0 colour ink-jet plotter. They would be able to make plots for the project but could not guarantee exclusive use of the plotter.

The UK Hydrographic Office at Taunton has also expressed a desire to help the progress of the project. They too, have a new computing system in place that allows them to make plots in a variety of forms.

Mr. Martin Chodota, (Regional Centre for Service in Surveying, Mapping and Remote Sensing, Kenya (RCSSMRS) reported that the Centre continues to coordinate the efforts to establish hydrographic survey services in the region. A project document for a Regional Hydrographic Survey Unit was prepared jointly by the IHB and the centre. IHB and ECA (Economic Commission for Africa) are looking for a donor.

The Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS) has since developed training facilities in Geographical Information System (GIS) and Digital Mapping Techniques and continues to run general training courses in mapping. It can also run courses in hydrography, but without practical work.

The Centre can contact the Kenyan and Tanzanian Ministries of Energy and petroleum exploration companies for sounding data to be used in this project. It will contact these authorities in liaison with Mr. Obel and Mr. Juma (Environment Liaison Centre (CLE), Zanzibar).

Due to the centre's location, it can coordinate the compilation of the charts by the national survey departments and use its facilities for inter-communication. One cartographer participated in the short course which was conducted by Dr. Bettac.

A project proposal has been prepared, "Monitoring Beach Erosion and Sea Level Rise for use of Environmental Protection in Zanzibar (Using Global Positioning System (GPS))".

The Hydrographer of the Royal Navy (UK) has continued to supply the centre with updated nautical charts of the region.

Mr. Michel Huet (IHO, Monaco) reported that the contribution of the IHO takes place through various activities:

(i) through its Data Centre for Digital Bathymetry, co-located with the NGDC at Boulder, USA, which holds a worldwide collection of bathymetric data. (A document detailing the holdings of the IHO Data Centre for Digital Bathymetry (DCDB) was presented by Mr. Huet (IHO) and Dr. Holcombe (NGDC) and appears as Annex III);

(ii) through participation of its member states' Hydrographic Offices interested in the IBCWIO area. It was noted that France, UK and South Africa are the Volunteering Hydrographic Offices (VHOs) which have responsibility for the maintenance of the IHO bathymetric plotting sheets at scale 1: 1 Million (or digital equivalent) in this area, for GEBCO purposes;

(iii) through provision of a list of undersea feature names covering the IBCWIO area and contained in the IHO-IOC Gazetteer of Undersea Feature Names, which have been approved by the GEBCO Sub-Committee of Undersea Feature Names (SCUFN). This Gazetteer is maintained in a digital form at the IHB.

Dr. Darmalingum Ramaswamy (Ministry of Environment and Land Use, Mauritius) reported that Mauritius still has no hydrographic department and is pleased to learn that the setting up of a hydrographic unit is being planned at the RCSSMRS at Nairobi. Following the setting up of such a unit he believed that Mauritius would be in a position to receive advice and, possibly, technical support for the eventual setting up of a small hydrographic unit in their own survey department.

They have not received any additional bathymetric data and whatever data are available for the region are in the hands of the American, British, French and other neighbouring countries' hydrographic offices.

Following the short training course provided by Dr. Bettac in Mauritius in 1991, two of their cartographers were trained in manual bathymetric plotting.

The survey department recently acquired a PC-based AutoCAD digitizing system. Three of their cartographers have so far been trained in this system. The digitization of large scale topographic maps of the island is well underway. In addition during June/July 1994, they received a workstation under British technical assistance. A member of the UK's Ordnance Survey came to Mauritius to set up the equipment and trained three of their staff over a period of two weeks. The software used is based on that used by the Ordnance Survey to update their large scale digital maps. They have also asked for more AutoCAD equipment and expect to receive it soon.

He believes their Survey Department will be in a position to plot bathymetric data when these are made available and the contour lines may also be digitized, provided that the appropriate software is supplied.

Apart from basic plotting facilities, the Survey Department is not able to produce coloured charts.

Dr. Troy Holcombe (National Geophysical Data Center, USA) reported to the Editorial Board that, NGDC has a continuing interest in the exchange of bathymetric data with the IBCWIO project, it is also able to exchange data with IHO volunteering hydrographic offices through its administration of the IHO Data Centre for Digital Bathymetry. NGDC also encourages bilateral exchange agreements.

In early 1994, NGDC completed and released version 3 of the global trackline geophysical data base GEODAS. A copy of the CD-ROMs containing this data set is being provided to the Chief Editor. Additional bathymetric data assembled since release of version 3 of the GEODAS CD-ROM are also being provided to the Chief Editor.

NGDC have also recently released a CD-ROM containing various global relief data including: a 5 minute-by-5 minute resolution grid of global land elevation and bathymetric data; the World Vector Shoreline; the GEOSAT gravitational-effect-of-topography data set south of latitude 30° south (courtesy of Karen Marks of the NOAA Geosciences Laboratory); the GEBCO and Bulletin of Geographical Names (BGN) Gazetteers; and other relief data sets including several screen images of global relief.

NGDC is also co-operating with Walter Smith of the NOAA Geosciences Laboratory and David Sandwell of Scripps Institution of Oceanography, to release digital and colour-poster imagery of bathymetry of the Southern Oceans predicted from acoustic bathymetry together with gravitational-effect-of-topography data derived from satellite radar altimetry. It was recommended that the compilers of IBCWIO bathymetry employ this information to improve the interpretation of bathymetry where otherwise there exists no data control.

Mr. Antonio Francisco (National Institute for Hydrography and Navigation, Mozambique) reported that they have new 1:250,000 scale nautical charts available which will help construction of contour lines near the coast. In addition there are a number of surveys by Russian ships in the area.

Norway is supporting the establishment of hydrographic operations in Mozambique. Presently, only shallow water surveys are available. Plans are being made for a new ship equipped with a multi-beam swath mapping system.

Dr. Werner Bettac (Germany) reported that within the scope of an investigation for the Bundesamt für Seeschiffahrt und Hydrographie (BSH), a student looked at the problems associated with compiling contours from data derived from different sources. He presented a draft plot of contours created by the CARIS software for one area, sheet 1-07. The Editorial Board discussed the results of these computer derived contours.

7. MATTERS ARISING FROM THE REPORT OF THE PREVIOUS SESSION

PLOTTING FACILITIES

The members of the Editorial Board gave details of the plotting facilities that are available to them. These are detailed in Annex III.

SUPPLY OF DATA AND SELECTION OF THE SHEET COORDINATORS

Dr. Bettac agreed to start the supply of analogue and digital data in January 1995. Some data will be duplicated as the IBCWIO sheets overlap the data compilation sheets, such as the British Admiralty scheme of plotting sheets, and it is also desirable that the Sheet Co-ordinators know what happens in areas adjacent to their own sheets.

The Editorial Board members were asked to inform the Chief Editor of the input facilities for digital data that are available to them, when they returned home. Following receipt of this information steps can be taken to supply the digital data on the most convenient magnetic media.

In cases of the Sheet Co-ordinators being unable to use the digital data in the supplied format, Mr. Hunter offered to provide computer programmes to reformat these data if possible.

SHEET CO-ORDINATORS

Sheet Co-ordinators were selected for the 18 sheets as represented in the original scheme. The list is shown in Annex IV. As the work progresses, the list may need to be revised. The countries marked in the list with an asterisk (The Seychelles, France, Madagascar and South Africa) will be asked if they are willing and able to perform the duties.

Dr. Bettac informed the Board that the sheet limits would need to be revised due to a miscalculation of the height of each sheet. This affects the north-south coverage of the sheets only. He would inform the board of the new sheet limits on his return to Germany and ask for comments. Two or three extra sheets on the southern edge may result.

The Editorial Board recognises the urgent need for bathymetric charts such as the IBCWIO, for the exploitation of the living and non-living resources of the Exclusive Economic Zones (EEZs) of the countries in the region, which will be of advantage to the national economies, for protection of the coastal and marine environments and mitigation of marine hazards. It requests that the national governments give the necessary resources within their states for the work to be carried out.

Support is particularly needed for drawing and plotting materials. It was suggested that approaches could also be made to other organisations for help.

SHEET FORMAT

Dr. Bettac asked the representative of HDNO, Captain Valery Fomchenko if he knew the precise measurements, line weights and point sizes etc., that were used in the production of the IBCM. Captain Fomchenko agreed to ask Dr. Popov, the Chief Editor of the IBCM for a copy of these specifications.

Dr. Bettac said that he would supply each Sheet Co-ordinator with a plot(s), on film, of their sheet(s) showing the grid, coastline and other information.

REVISION OF THE CONTOUR SPECIFICATIONS

Dr. Bettac, the Chief Editor, said that he will review the contour specifications and if necessary enlarge their scope to include the 20, 50 and 100 metre contours for continental shelf areas. The original specifications for the IBCWIO will not be altered. Mr. Huet said that the IHO would supply the Board members with copies of the IOC specifications for International Bathymetric Charts.

WORKPLAN AND METHODS TO BE EMPLOYED

Mr. Huet proposed that the Editorial Board should consider the steps that the project should use to produce the chart products. Dr. Ramasawmy added that a time schedule should also be included.

A plan was derived which appears as Annex V.

Mr. Obel asked that plotting software and sound velocity correction software be provided to the sheet co-ordinators. Mr. Hunter offered to make a survey of the availability of such software within the IBCWIO community and also to recommend other suitable software. Suggestions of suitable software received from Dr. Holcombe and Mr. Hunter included the public-domain software GMT that is used on UNIX workstations. Sound velocity correction software and digital Carter's correction tables are available from the BODC (British Oceanographic Data Centre), UK and NGDC.

8. ANY OTHER BUSINESS

SMALL SCALE IBCWIO BATHYMETRY

In a reply to a question from Mr. Obel, Dr Bettac said that if finances permitted, a small scale chart of the entire IBCWIO would be produced as had been done for the IBCM project in the Mediterranean region.

TRAINING COURSES

There will be a training course for the IBCWIO region during December, 1995, "Application of Bathymetric Charting and the Use of Related Digitized Data". The German ship, RV METEOR will leave Durban on 18th December and sail to Cape Town to arrive on 31 December 1994. There will be an initial week of training in Durban prior to the cruise.

The meeting was informed by the Representative of the IHO that a four-months long hydrographic course will be held in Trieste, Italy, from mid-january 1995. The course is co-sponsored by the IHO and the IMO (International Maritime Organization) and is normally run on a yearly basis. This course is intended to support the development and improvement of hydrographic capabilities in developing countries. All expenses (travel, per diem etc.) will be paid by the Italian government.

Several Editorial Board members expressed interest in this course and thought that it could be of use to the IBCWIO project. Mr. Huet agreed to supply further information to those interested in it.

9. PLACE AND DATE OF THE NEXT SESSION

Following a generous invitation from the Editorial Board members for Mozambique, the next session is planned to take place at the National Institute for Hydrography and Navigation, Maputo, Mozambique during July or August 1996.

10. ELECTION OF THE VICE-CHAIRMAN OF IBCWIO

Dr. Bettac proposed that Mr. Estevao James be elected as the next Vice-chairman of IBCWIO; this was seconded and the motion unanimously carried.

11. APPROVAL OF THE SUMMARY REPORT

The Summary Report was approved.

12. CLOSURE OF THE SESSION

The Session was closed by Mr. Mohammad Salim Sulaiman, Principal Secretary of the Ministry of Water, Energy, Land, Natural Resources and Environment of Zanzibar, at 10.30 on Friday, 7 October, 1994.

ANNEX I

AGENDA

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5. PROGRESS IN THE COLLECTION AND DISTRIBUTION OF DATA FOR THE IBCWIO
6. THE STATE OF NATIONAL PARTICIPATION IN THE PROJECT
7. MATTERS ARISING FROM THE REPORT OF THE PREVIOUS SESSION
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9. PLACE AND DATE OF THE NEXT SESSION
10. ELECTION OF THE VICE-CHAIRMAN OF THE IBCWIO
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ANNEX II

OVERVIEW OF COMPILATION MATERIAL

Overview of source material for IBCWIO						
Chart type	Index No or geogr. coordinates	Origin of sources	Year of evaluation	Scale 1 :	Material of sources	Remarks
Total view of IBCWIO area	30° N - 40° S 25° E - 75° E	SHOM , Brest BSH, Hamburg		10 000.000	Blueprint	Entire IBCWIO area
Fair sheet	31 103	IOSDL, UK	?	25.000	Blueprint	
Fair sheets	27913 - 27915 27918 - 27920 28011, 28012 28016, 28017 31004, 31005 31009, 31010 31101 - 31103 31106 - 31108 31211 - 31217 31218, 31220 31311, 31316 34401, 34402 34405 - 34407 34410 - 34420 34501, 34506	HO Taunton, UK (NGDC-Data)	?	250.000	transparent blueprint folio	Fair shetts printed from NGDC tapes
Plotting sheet	312	HO Taunton, UK	?	1.000 000	transparent	Soundings
Land contourlines	IBCWIO sheets No 1 - 18	BSH Hamburg		1.000 000	Paper	Plotted from World Vector Shorlines
Plotting sheets	158, 159, 188, 219, 220, 249, 250	FS "Meteor"	?	1.000 000	Blueprint	
Fair sheet	12° 10'S - 13° S 47° 30'E - 48° 30'E	FS "Meteor"	1987	250.000	Blueprint	

US Plotting sheets	3201N, 3202S, 3203S	University of California, USA (Dr R Fisher)	?	1 000 000	1 Blueprint and 1 transparent each	
Fair sheets	342, 343, 373, 374, 403, 404	HO South Africa	?	1 000 000	Blueprint	
Special charts	Plat North Maurice, Ile Maurice, Banc Hawkins, Rodrigues Ouest, Ile Rodrigues, Banc Soudan	Shome, France	?	125 000	Paper	Carts des Fonds Marines de la Zee Mauricienne Depth contours and depth figures
"Kismaayo Haber" " Bosaso Haber", "Kismaayo Haber"	06010 06014 06009	NOO, USA	?	50 000	Film	Special charts of Somalia coastline USNS "Chauvenet"
Special chart	8° S - 11° S 51° E - 54° E	Dr Johnson	1977	500 000	Blueprint	"Amirante Passage" 100 m depth intervals
Track sheets	158, 158b, 159, 188, 189, 219, 220, 249, 250 251, 279, 280 - 282 310, 311 - 313, 342 - 345, 373 - 376, 403 -405	HO Taunton	?	?	Film	Scaled down from 1 . 1 000 000 to 1 10 000 000
Fair sheets	34403, 34404, 34408, 34409	HO Taunton	?	250 000		
"Twin sheets"	34403 / 34404, 34408 / 34409	HO Taunton	?	250 000	Transparent	1 corrected by Matthew and 1 uncorrected each
Survey of track sheets	20° N - 35° S 25° E - 75° E	HO Taunton	?	10 000 000	Transparent blueprint	
Track sheets	153*, 158b*, 159*, 188*, 189*, 219, 220, 249, 250*, 251*, 279, 280**, 281, 282*, 310, 311**, 312*, 312**, 313* C 342, 343, 344*, 345, 373, 374, 375*, 376*, 403*, 404, 405*	HO Taunton	?	1.000 000	Blueprints	*additional transparent blueprints **additional films
Sounding sheet	C 158	HO India	?	1.000 000	Paper	
Plotting sheets	158, 159, 188, 189, 219, 220, 249, 250, 251, 279, 280*, 281	IOSDL Wormley, UK, (Laughton)	?	1.000 000	Blueprint	Isolines in fathoms, *additional transparent
Sounding sheet	249	IOSDLWormley, UK	?	1.000.000	Transparent	Scale uncorrect
Fair sheet	37520	HO Taunton	?	250 000	Blueprint	Scale enlarged
Fair sheet	28017, 31103, 31210 - 31220, 31311, 31316, 34401, 34402, 34405 - 34407, 34410 -34420, 34501, 34506	HO Taunton	?	250.000	Transparent	Enlarged from 1 : 1 000 000 to 1: 250 000

ANNEX III

PLOTTING FACILITIES AVAILABLE TO THE IBCWIO COMMUNITY

Survey of Kenya

A0 colour pen plotter
A3 colour pen plotter

HDNO, Russia

A0 black and white pen plotter

IOSDL, UK

A0 colour ink-jet plotter

HO, UK

A0 colour ink-jet plotter

IHB Monaco

No facilities

IMS, Zanzibar, Tanzania

No facilities

NIHN, Mozambique

A0 colour pen plotter
A3 colour pen plotter
A0 scribing plotter

RCSSMRS, Kenya

None yet, but are under consideration

BSH, Germany

Photographic facilities

NGDC, USA

8.5" x 11" colour thermal transfer plotter. [Also there is access to a commercial bureau that has a large format electro-static plotter.]

MELU, Mauritius

A3 colour pen plotter. (AutoCAD software).

ANNEX IV

PROPOSED IBCWIO SHEET CO-ORDINATORS

Sheet 01: United Kingdom

Sheet 02: United Kingdom

Sheet 03: Russia

Sheet 04: Kenya

Sheet 05: Seychelles* (USA)

Sheet 06: Russia

Sheet 07: Tanzania

Sheet 08: Mauritius

Sheet 09: Russia

Sheet 10: Mozambique

Sheet 11: Madagascar* (France or Mauritius)

Sheet 12: Mauritius

Sheet 13: Mozambique

Sheet 14: Madagascar* (Mozambique)

Sheet 15: France*

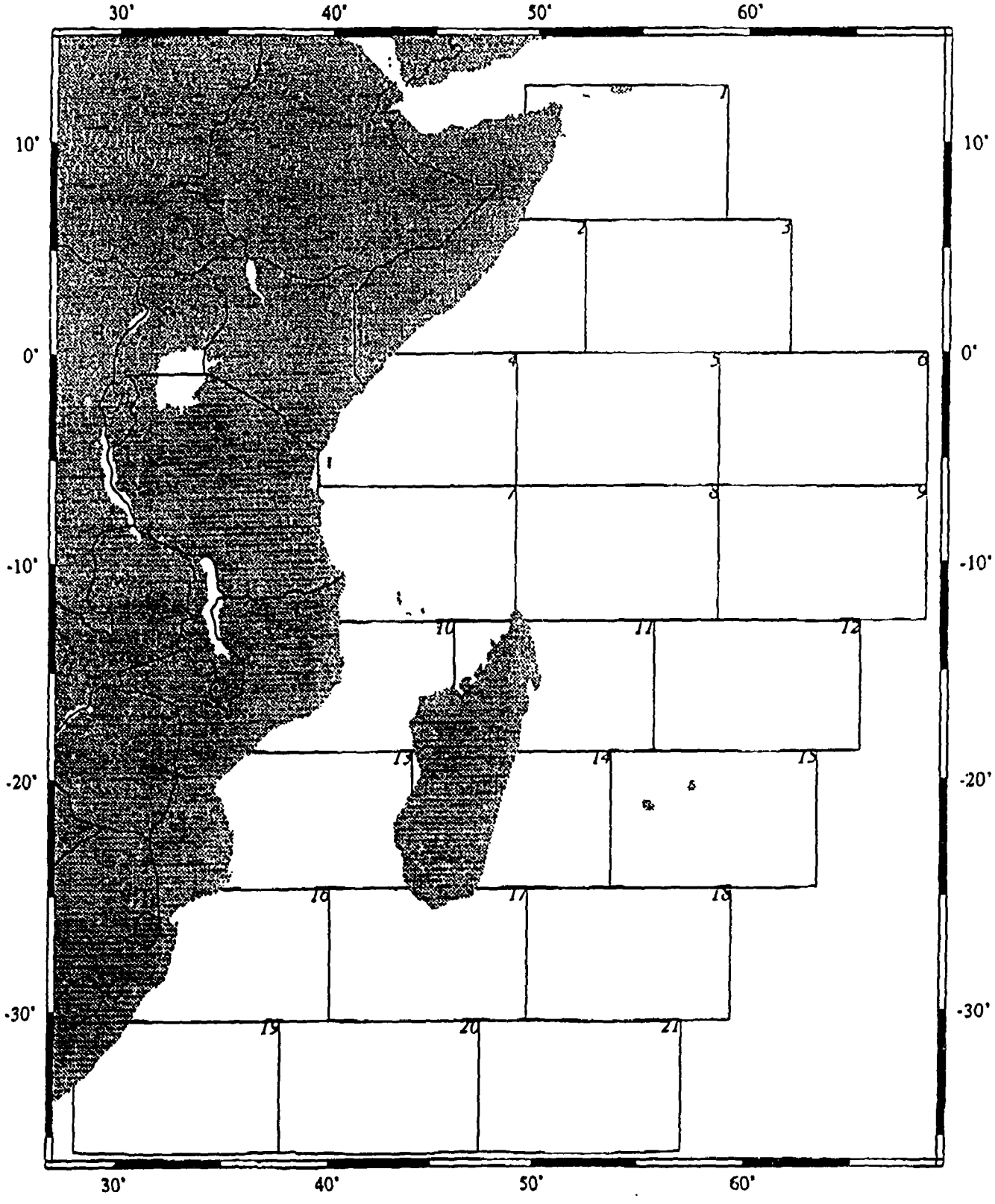
Sheet 16: South Africa* (United Kingdom)

Sheet 17: South Africa* (United Kingdom)

Sheet 18: South Africa* (United Kingdom)

DIAGRAM OF THE IBCWIO AREAS

IOC West Indian Ocean



ANNEX V

WORKPLAN FOR THE IBCWIO

1. DEFINITION OF SHEET CO-ORDINATES (by January 1995)

Accurate determination of the geographical limits for each IBCWIO sheet, according to the specifications, by the Chief Editor and distributed to the Sheet Coordinators.

2. DATA COLLECTION (Initial distribution by July 1995)

Collection by the Chief Editor of all available data for each sheet and distribution of relevant data to each IBCWIO Sheet Coordinator, including soundings, digital and analogue, existing bathymetric contours, relevant literature describing the morphology of the area, geographical names and any other useful information. However in some circumstances, a Sheet Coordinator may receive bathymetric data directly from a source, they should inform the Chief Editor accordingly. Data will continue to be distributed as it received by the Chief Editor.

3. DATA PREPARATION AND EVALUATION (1st sheets by July 1996)

Preparation of data to a common scale by the Sheet Co-ordinator. This scale will preferably be 1:250,000. During this phase a selection process may begin. Sound velocity corrections will be accounted for by digital Carter's tables, to be provided.

Note: Sheet Co-ordinators will need plotting software.

4. DATA COMPILATION (1st sheets by January 1997)

Drawing of contours from bathymetric data at same scale as above.

5. TECHNICAL REVIEW (1st sheets by July 1997)

Review of contour overlay by the Chief Editor. Comments will be sent to the relevant Sheet Coordinator for correction.

Notes:

1. Iterations of steps 3 and 4 may take place
2. New undersea feature names may be proposed as a result of the compilation work.

6. PREPARATION OF 1: 1 MILLION SCALE SHEETS (1st sheets by January 1998)

Photo-reducing and assembling of the 16 contour overlays contained in the concerned sheet.

7. SCIENTIFIC REVIEW (1st sheets by July 1998)

The 1:1 million sheet will be sent for review by the Sheet Coordinator to a Scientific Expert via the Chief Editor. The resulting comments are addressed to the Chief Editor who may then consult with the expert for further clarification.

8. CORRECTION OF CONTOUR OVERLAYS (1st sheets by January 1999)

Collaboration between the Chief Editor and the Sheet Coordinator for revision of the contour overlays.

9. PREPARATION OF A PROOF FOR THE EDITORIAL BOARD (1st sheets by April 1999)

Combination by the Chief Editor of the final contours and other map elements (Land, geographical names, spot depths, legend...etc.), in a (colour) proof of the sheet for review by the Editorial Board.

10. PRINTING AND PUBLISHING OF THE IBCWIO (1st sheets by end of 1999)

Preparation of colour plates and printing and distribution.

ANNEX VI

LIST OF PARTICIPANTS

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82. Second Meeting of the UNEP-IOC-ASPEI Global Task Team on the Implications of Climate Change on Coral Reefs
83. Seventh Session of the JSC Ocean Observing System Development Panel
84. Fourth Session of the IODE Group of Experts on Marine Information Management
85. Sixth Session of the IOC Editorial Board for the International Bathymetric Chart of the Mediterranean and its Geological/Geophysical Series
86. Fourth Session of the Joint IOC-JGOFS Panel on Carbon Dioxide
87. First Session of the IOC Editorial Board for the International Bathymetric Chart of the Western Pacific
88. Eighth Session of the JSC Ocean Observing System Development Panel
89. Ninth Session of the JSC Ocean Observing System Development Panel
90. Sixth Session of the IODE Group of Experts on Technical Aspects of Data Exchange
91. First Session of the IOC-FAO Group of Experts on OSLR for the IOCINCWIO Region
92. Fifth Session of the Joint IOC-JGOFS CO_2 Advisory Panel Meeting
93. Tenth Session of the JSC Ocean Observing System Development Panel (OOSDP)
94. First Session of the Joint CMM-GOOS-IODE Sub-group on Ocean Satellites and Remote Sensing
95. Third Session of the Editorial Board for the International Chart of the Western Indian Ocean