INTERNATIONAL HYDROGRAPHIC ORGANIZATION

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (of UNESCO)

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G E B C O

GUIDELINES FOR OCEAN MAPPING

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GEBCO - GUIDELINES FOR OCEAN MAPPING

FOREWORD

The 1st Edition of IHO publication B-7 entitled "Regulation for the General Bathymetric Chart of the Oceans – Standards for Processing of Data" was published in 1970. This 1st Edition was prepared following consultation with the IHO Volunteering Hydrographic Offices (VHOs) that had accepted responsibility for centralizing the oceanic soundings, the "GEBCO Committee" and the "Institut Géographique National" of France.

During their 7th Meeting (Bremerhaven, Germany, 30 May – 1 June 1990) the GEBCO Officers concluded: following the establishment of the Joint IHO-IOC GEBCO Guiding Committee (GGC); the establishment of a new organization responsible for the publication of the GEBCO, then in its 5th Edition; the increasing use of digital methods for storing bathymetric data; the introduction of multibeam sounding systems; and the need to handle geophysical data collected concurrently with bathymetric data; that the March 1970 GEBCO Regulations were no longer applicable or adequate. They further considered that the publication should provide "Guidelines" rather than "Regulation". Consequently in 1991 the IHB published a revised edition of B-7 entitled "Guidelines for the General Bathymetric Chart of the Oceans.

In 2003, the centennial year of GEBCO, further amendments to B-7 were adopted reflecting the continued move from analogue to digital paper records and products.

In 2009 the GGC concluded that, with the ever increasing technological developments in the field of ocean mapping, the evolution of new GEBCO products and the closer integration of regional mapping programmes, it was appropriate to prepare a new edition of B-7 to be titled "Guidelines for Ocean Mapping".

1 INTRODUCTION TO THE GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)

1.1 Ocean Mapping

The preparation of the first world series of oceanic bathymetric charts was started in 1903, and was published one year later as the GEBCO, under the auspices of Prince Albert 1st of Monaco.

As additional data became available over the years, new editions were compiled, first by the Prince's scientific committee and later, after the Prince's death, by the International Hydrographic Bureau. The last sheet of the 4th Edition, which was printed by the Institut Géographique National (IGN) of France, was published in 1973.

With the increasing knowledge of the morphology and of the geological processes on the ocean bed in the 1950s and 1960s, a scientific input into the preparation of the contours was introduced into GEBCO by linking the Intergovernmental Oceanographic Commission (IOC) with the IHO as joint sponsors of the project.

Under the new Joint IOC/IHO Guiding Committee for the GEBCO, a 5th Edition was prepared and completed in 1982. This edition differed in many ways from its predecessors. There were new sheet boundaries, new specifications, sounding control was shown by track lines and dots, and an extensive scientific review process was carried out prior to publication.

In the early 1990s the bathymetric contours, coastline and trackline control information from GEBCO's 5th Edition chart series were digitised. They, along with the GEBCO Gazetteer of Undersea Feature names, formed the basis of the GEBCO Digital Atlas (GDA).

The GDA was first published on CD-ROM in 1994 and in addition to GEBCO's digital data sets, contained a software interface for viewing and accessing the data in a number of formats. An updated version of the GDA was released in 1997.

To coincide with GEBCO's 100th anniversary, the Centenary Edition of the GDA was released in 2003. In addition to new bathymetric contour compilations, this release includes GEBCO's first gridded bathymetric data set, the GEBCO One Minute Grid – a global terrain model at one arc-minute intervals. This grid is largely based on the bathymetric contours contained in the Centenary Edition of the GDA.

In 2008 GEBCO released a global 30 arc-second grid, the GEBCO_08 grid. This gridded bathymetric compilation was largely generated by combining quality-controlled ship soundings with interpolation between sounding points guided by satellite-derived gravity data. Grids developed by other methods have been included where they improve on the existing grid. Land areas are largely based on the SRTM30 data set. The grid is accompanied by a Source Identifier (SID) Grid; this indentifies which cells in the GEBCO_08 Grid are based on soundings or existing grids and which have been interpolated.

The GEBCO_08 Grid, GEBCO_08 SID Grid and GEBCO One Minute Grid are available for free download from the GEBCO web site (www.gebco.net). They also remain available as part of the GEBCO Digital Atlas.

It is intended that new products will be prepared as technology develops and demand is identified.

1.1.1 Regional Mapping

In 2009 a new Sub-Committee was proposed to coordinate, encourage, and provide an interface to the various regional mapping efforts being conducted by IOC and others. In particular, GEBCO aims to increase collaboration with International Bathymetric Chart (IBC) projects and

to promote the development of new regional mapping products in close association with the IHO Regional Hydrographic Commissions. The Sub-Committee on Regional Undersea Mapping (SCRUM) was established in [2012] and in addition to coordinating and supporting regional mapping efforts, functions as an Editorial Board endorsing all regional products to be included in GEBCO products. Together with the Technical Sub-Committee on Ocean Mapping (TSCOM), SCRUM will cooperate with regional digital bathymetric models and charts in order to ensure their compatibility with, and eventual inclusion in, other GEBCO products.

1.1.2 Shallow Water Bathymetry

During its first century GEBCO focussed on the collection and portrayal of ocean bathymetry (depths greater than 200 metres). In the 21st Century there is a requirement to provide comprehensive sea-floor coverage from the deep ocean to the coastline in order to serve a wider scientific and educational community. GEBCO products do not, nor are they intended to, support navigation. A major driver for improving shallow water / coastal bathymetry in GEBCO products has been to facilitate the preparation of models for tsunami propagation, run-up and inundation in coastal areas.

In cooperation with many IHO Member States, GEBCO has obtained bathymetry data harvested from the world wide coverage of Electronic Nautical Charts (ENCs). These data have been used to significantly improve GEBCO's bathymetric grids, especially in shallow water regions. GEBCO has developed an application that allows for the extraction of water depths from Electronic Navigational Charts (ENCs) so that they can be used to improve the GEBCO products.

GEBCO will also seek suitable shallow water bathymetry from other sources where this can improve GEBCO products.

1.2 GEBCO Parent Organizations

GEBCO is a joint project of the International Hydrographic Organization (IHO) and the Intergovernmental Oceanographic Commission (IOC).

1.2.1 The International Hydrographic Organization (IHO)

The IHO is an intergovernmental consultative and technical organization which, in 2011, comprises, 80 Member States. The International Hydrographic Bureau (IHB) is established in Monaco and fulfils the role of the secretariat of the IHO. The IHB will:

Remind, where necessary, the Hydrographic Offices of its Member States that they should do their utmost to encourage their various national organizations to send to the IHO Data Centre for Digital Bathymetry (DCDB), either directly or through the IHB if more appropriate, all the bathymetric data in their possession;

Maintain contact with international organizations – such as the IOC and the "World Data Centres" – so that these bodies regularly supply the DCDB with all the data available to them;

Ensure that these Guidelines are applied by all those participating in the work of centralizing all oceanic soundings and to propose, where required, any amendments to the Guidelines;

Maintain, on the basis of information supplied by IHO Member States, a digital publication (IHO Publication B-4 - "Information Concerning Recent Bathymetric Data";

Oversee, jointly with the IOC, the work of the IHO-IOC Guiding Committee for the GEBCO and its subsidiary bodies; and

Bring to the attention of all those participating in work on the GEBCO any comments it may

wish to make or it may receive concerning GEBCO products.

1.2.3 The Intergovernmental Oceanographic Commission (IOC)

This section awaiting revision

To provide advice and expertise, in consultation with SCOR, IAPSO and CMG, on the scientific input needed for the GEBCO so as to ensure that it remains a respected product of high quality;

To ensure that the "GEBCO Digital Atlas" is developed as an important, highly respected operational database which is kept continually updated from all available new data as and when they become available;

To provide guidance to the GEBCO Bathymetric Editor and the GEBCO Digital Atlas Manager on the requirements of the Commission in relation to Ocean Mapping;

To develop, recommend and co-ordinate large-scale international regional ocean mapping projects which call for concerted action by the Member States, to ensure that the compilations thereof are digitized and incorporated into the "GEBCO Digital Atlas";

To make recommendations to strengthen education and training in ocean mapping, and promote relevant projects in these fields as components of each of the IOC's regional ocean mapping projects;

To supervise, jointly with the IHB, the work of the IOC-IHO Guiding Committee for the GEBCO and its Sub-committees;

To publish the Summary reports of the sessions of the IOC-IHO Joint Guiding Committee and its Sub-committees (in English only);

To work closely with the IHB in developing all the above activities.

1.3 Scientific Advisors to GEBCO

A number of experts who have particular interest in the GEBCO and its products have been designated "Scientific Advisers to the GEBCO". They provide advice, within their particular fields of expertise, to the Guiding Committee for GEBCO on request and in return they are kept fully informed of developments and are invited to attend, and contribute to, meetings of the GEBCO Sub-Committees and Working Groups, and where appropriate the Guiding Committee.

2. THE GENERAL BATHYMETRIC CHART OF THE OCEANS

GEBCO was proposed in 1899 and became a reality in April 1903 when HSH Prince Albert I of Monaco offered to organize and finance the production of a new chart series designated: "The General Bathymetric Chart of the Oceans" (GEBCO), under the Prince's Scientific Cabinet. In 1922 the responsibility for GEBCO was passed to the Director of the Oceanographic Museum of Monaco and in 1929 was transferred to the International Hydrographic Bureau (today the IHO). Since 1973, GEBCO has been a joint Project of the International Hydrographic Organization (IHO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO.

The goals of the IHO-IOC GEBCO Project are to:

1) Develop and constantly improve the authoritative description of global ocean depths;

2) Act as the designated international authority for undersea feature names;

3) Advance the development and application of sea floor mapping technology;

4) Encourage and facilitate scientific cooperation leading to the exchange and preservation of bathymetric data and associated metadata;

5) Foster collaboration among individuals and organizations with established and developing expertise so as to assist local and regional mapping efforts to attain a global standard of quality;

6) Identify oceanic areas that are insufficiently surveyed and recommend to surveying and/or ocean-going organizations and institutions that such areas are mapped;

7) Promote education and training in ocean mapping;

8) Bring together ocean mappers and users of bathymetry thereby leading to products that are more widely used in science and education.

Comment: Do we need to amend this statement to include shallow water bathymetry?

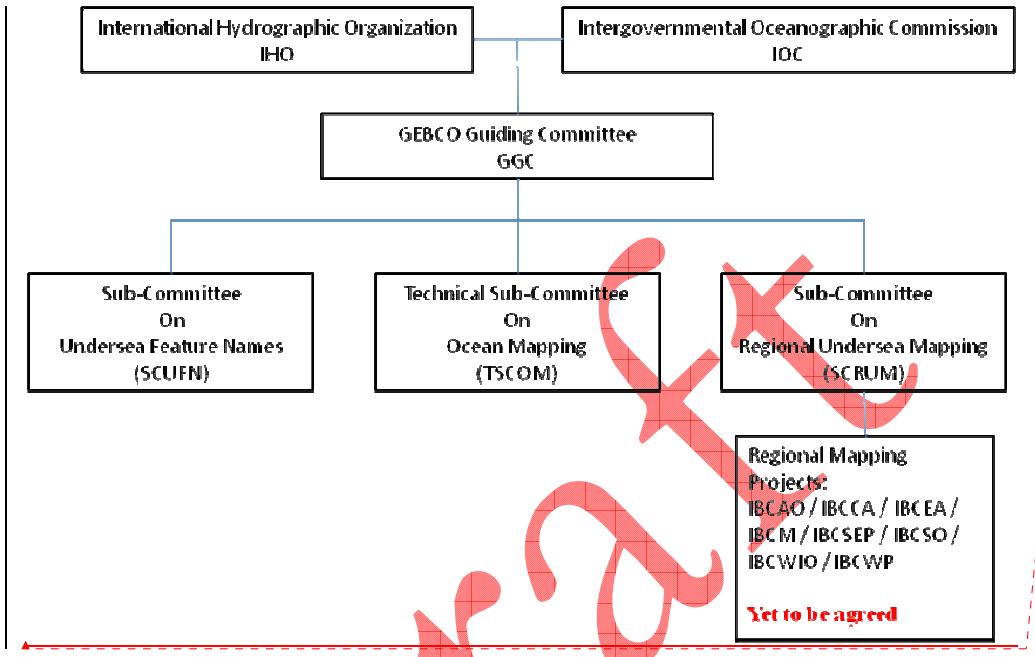
Comment: Is this correct? Question raised by Walter Smith

GEBCO is an IHO and IOC Project that is open to all those interested in mapping the ocean floor. It relies largely on the voluntary efforts of an international collaborating community of hydrographers and other marine scientists with the support of the IHO and the IOC.

GEBCO is led by the Joint IHO-IOC GEBCO Guiding Committee.

2.1 Structure

The structure of GEBCO is set out in the following diagram:



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2.2 The GEBCO Guiding Committee (GGC)

Terms of Reference[1]

The GEBCO Guiding Committee shall:

1. Guide the GEBCO Project, under the general governance of IHO and IOC while recognising and following IHO and IOC policies, where they are concordant.

2. Prepare and disseminate maps, grids, data files and other appropriate depictions of the ocean floor.

3. Identify the needs of the various user communities of the bathymetry of the world's oceans, study the ways and means whereby these needs can be met and, where appropriate, implement actions or propose to IOC and IHO actions, within their purview, which meet these needs.

4. Stimulate the flow of data relevant to the GEBCO Project by actively identifying sources of new data and encouraging and promoting the release of data to appropriate data banks, with the objective of ensuring that maximum available data are provided to the IHO Data Centre for Digital Bathymetry (DCDB).

5. Supervise the development, maintenance and routine updating of GEBCO products. Activities are to include but are not restricted to:

   (1) Study and set out procedures for new compilations of bathymetry.

   (2) Develop standards and methodologies for the production of bathymetric maps and grids and recommend their adoption to the IHO and IOC and to the seafloor mapping community.

   (3) Supervise the development, production and updating of a worldwide grid of digital bathymetric data.

   (4) Supervise the preparation and maintenance, in association with national and international bodies, of an authoritative IHO/IOC GEBCO Gazetteer of Undersea Feature Names (Gazetteer of Geographical Names of Undersea Features).

   (5) Study and implement the best distribution mechanism for the effective use of GEBCO products by all users.

6. Investigate and develop logistical and financial arrangements necessary for the furtherance of the GEBCO Project with the assistance of the IHB and IOC Secretariats.

7. Integrate into its products the geographical names of undersea features that appear in the IHO/IOC GEBCO Gazetteer of Undersea Feature Names.

8. Direct and monitor the work of the GEBCO Sub-Committees and Working Groups; propose to IHO and IOC the creation or termination of Sub-Committees, and create, maintain and terminate Working Groups as deemed necessary.

9. Cooperate with regional International Bathymetric Chart (IBC) projects on the specifications and preparation of regional bathymetric charts, to ensure their

1 *As approved by IHO CL24/2008 06 March 2008 and IOC Executive Council XLI June 2008*

compatibility with, and eventual inclusion in, GEBCO products.

10. Build capacity by encouraging and enabling the training and scientific education of new generations of ocean mapping operational experts (bathymetrists) worldwide.

11. Pursue policies that facilitate the suitability of GEBCO products not only for scientific users but also, where appropriate, for educational and socio-economic purposes in the broadest sense.

12. Take all practical opportunities to advocate the scientific and societal benefits of mapping the seafloor.

13. The GEBCO Guiding Committee shall report to the IHO and IOC annually and should also propose activities to be considered in the IHO's and IOC's work programs, identifying and requesting, where necessary, the required funding support.

Rules of Procedure

1. Membership:

1.1 The Committee shall consist of five members appointed by IHO, five members appointed by the IOC and, ex-officio, the Chairpersons of the Sub-Committees and the Director of the IHO Data Centre for Digital Bathymetry (DCDB). In close consultation, IHO and IOC will ensure that all the appointed members are, as far as possible, from different regions taking care of a balanced geographical representation.

1.2 Appointed Committee Members shall serve for a term of five years, renewable by a majority recommendation of the Committee for one additional five-year term and with the approval of the corresponding parent organization. The Committee Chairperson shall inform the relevant parent organization of any foreseeable vacancy in a timely manner.

1.3 Appointed members of the Guiding Committee represent their parent organization as experts[2] and no substitution shall be allowed.

1.4 Additionally, the Committee may invite other suitably qualified individuals to take part in their meeting, without voting rights.

1.5 Members are expected to attend every meeting of the Committee. Appointed Members who are absent from meetings over two consecutive years will normally be considered to have resigned and new nominations shall be sought.

1.6 Business shall be conducted by correspondence between meetings. E-mail communication will be the normal method. The Committee's Minutes and other relevant documents shall be posted on the GEBCO web site linked to the IHO and IOC web sites.

2. The Chairperson and Vice-Chairperson shall be elected by the Committee from among the members appointed by the IHO and IOC, and normally should be from different parent organizations. The Chairperson and Vice-Chairperson are each elected for a five-year term, but not exceeding their current membership of the Committee. They can be re-elected for one additional five-year term by the Committee. The Chairperson, or in his/her absence, the Vice-Chairperson, shall

2 So far as IOC is concerned, the Guiding Committee is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

conduct the business of the Committee.

3. The IHO and IOC Secretariats representatives, as well as representatives from Member States of IHO and IOC, may participate as observers in Committee meetings without voting rights.

4. Meetings shall be held at least every two years. The venue and date of the meeting will normally be decided at the previous meeting, in order to facilitate participants' travel arrangements.

5. The quorum to hold a meeting shall be 7 Committee Members. An extraordinary meeting can be called by the Chairperson or any Committee Member, with the agreement of the simple majority of all members of the Committee. The working language of the Committee shall be English.

6. The Committee shall strive to make decisions by consensus. If consensus cannot be reached, decisions shall be taken by simple majority vote. The Chairperson shall have the casting vote if there is a tie.

7. The Committee shall appoint a Secretary for a five-year term which can be renewed by the Committee. At the Committee's request secretarial support would be considered to be provided by IHB/IOC Secretariat. The Secretary shall be responsible for ensuring that the necessary GEBCO Project coordination is made in accordance with the decisions of the Committee, and that meeting arrangements, invitations, documentation and agenda are prepared. The Secretary shall act as Rapporteur and prepare the draft Summary Report of the meeting which shall be distributed to the Members of the Committee, preferably within one month of the meeting. Member's comments should be returned within one month of distribution of the draft report. The final Summary Report shall be forwarded to the IHO and IOC. The Secretary shall act as secretary between meetings.

8. The Terms of Reference and Rules of Procedure should be endorsed by the IHO and IOC according to their current procedures. The Committee may propose to IHO and IOC changes to these Terms of Reference and Rules of Procedure with the approval of two thirds of the Committee. Any change shall enter in force after being endorsed by both IHO and IOC.

2.3 GEBCO Sub-Committees

The GGC may, with the approval of the IHO and IOC, establish Sub-Committees to conduct specialist activities under GGC direction.

2.3.1 The Sub-Committee on Undersea Feature Names (SCUFN)

1. Terms of Reference[3]

1.1 The Sub-Committee on Undersea Feature Names reports to the Joint IOC-IHO GEBCO Guiding Committee (GGC) as its designated authority for all matters concerning undersea feature names.

1.2 It is the function of the Sub-Committee to select those names of undersea features in the world ocean appropriate for use on GEBCO graphical and digital products, on the IHO small-scale International chart series, and on the regional IBC series.

3 *As approved by IHO CL24/2008 06 March 2008 and IOC Executive Council XLI June 2008*

1.3 The Sub-Committee shall:

1.3.1 Select undersea feature names from:

a) names provided by national and international organizations concerned with nomenclature;

b) names submitted to the Sub-Committee by individuals, agencies and organizations involved in marine research, hydrography, etc.;

c) names appearing in scientific journals or on appropriate charts and maps;

d) names submitted to the Sub-Committee by the Chairpersons or Chief Editors of IBC projects, in relation to the work on these projects.

All selected names shall adhere to the principles contained in IHO-IOC Publication B-6 "Standardization of Undersea Feature Names" and be supported by valid evidence. Such names shall be reviewed before they are added to the Gazetteer.

1.3.2 Define, where appropriate, the extent of named features.

1.3.3 Provide advice to individuals and appropriate authorities on the selection of undersea feature names in international waters and, on request, in waters under national jurisdiction.

1.3.4 Encourage the establishment of national boards on undersea feature names where such boards do not exist.

1.3.5 Prepare and maintain an international and worldwide IHO-IOC GEBCO Gazetteer of Undersea Feature Names.

1.3.6 Encourage the use of undersea feature names included in the IHO-IOC GEBCO Gazetteer, on any maps, charts, scientific publications and documents by promulgating these names widely.

1.3.7 Prepare and maintain internationally agreed guidelines for the standardization of undersea feature names and encourage their use.

1.3.8 Review and address the need for revised or additional terms and definitions for submarine topographic features.

1.3.9 Maintain close liaison with the UN Group of Experts on Geographical Names, the focal point of which shall be invitations to attend meetings of the Sub-Committee, and with international or national authorities concerned with the naming of undersea features.

1.3.10 Provide, where feasible, historical information regarding the origin of pre-existing published names and historical variant names. This research will include discovery ship and/or organization, information regarding the individual or vessel being commemorated or geographic feature with which the name is associated, origin of variant names if required and source material regarding naming information.

2. Rules of Procedure

2.1 Membership of the Sub-Committee on Undersea Feature Names is covered by

the following rules:

2.1.1 The Sub-Committee shall normally consist of 12 members, preferably 6 members being appointed by IHO and 6 by IOC acting in close consultation.

2.1.2 Appointed Members of the Sub-Committee represent their parent organization as experts[4] and no substitution shall be allowed.

2.1.3 Members of the Sub-Committee shall be appointed for a five-year period, renewable for one additional five-year term by the corresponding parent organization if so recommended by the Sub-Committee through the GGC. The Sub-Committee Chairperson shall inform the relevant parent organization of any foreseeable vacancy in a timely manner.

2.2 The Chairperson and Vice-Chairperson shall be elected by the Sub-Committee subject to endorsement by the GGC. They should normally come from different Parent Organizations.

2.3 The Chairperson and the Vice-Chairperson are elected for a five-year period but not exceeding their current membership of the Sub-Committee. The Chairperson will normally be succeeded by the Vice-Chairperson. The Chairperson and Vice-Chairperson may be re-elected by the Sub-Committee for one additional five-year period. Should the Chairperson step down before the end of his/her term, the Vice-Chairperson shall take over as Chair till the end of the current term.

2.4 The Chairperson, or in his/her absence the Vice-Chairperson, shall conduct the business of the Sub-Committee. Meetings will usually be held every year, ideally before the GGC meeting. In the intervening period the Sub-Committee shall conduct its business by correspondence (preferably electronic mail).

2.5 Members are expected to attend every meeting of the Sub-Committee. Sub-Committee Members who are absent from meetings over two consecutive years will normally be considered to have resigned and new nominations shall be sought from the relevant parent organization.

2.6 Representatives of non-governmental entities / organizations, or individuals that can provide a relevant and constructive contribution to the work of the Sub-Committee may attend meetings with observer status. In the event that a large number of observers seek to attend a meeting, the Chairperson may restrict attendance by inviting them to act through one or more collective representatives.

2.7 Observers from IHO and/or IOC Member States may attend meetings. Attendance shall normally be limited to one observer per Member State.

2.8 Proposals which are to be considered at SCUFN meetings must be submitted 30 days before meetings if in electronic form, or 60 days if in analogue form.

2.9 The quorum necessary to hold a meeting shall be 7 Sub-Committee members. The Sub-Committee should strive to decide by consensus. If a vote is necessary the majority required for acceptance is a simple majority of the total number of members. Only members present may cast a vote. The Chairperson shall have a casting vote in the case of a tie. This option will be used exceptionally if no consensus can be reached and a decision has to be made.

4 So far as IOC is concerned, the Sub-Committee on Undersea Feature Names is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

2.10 The Sub-Committee will not consider undersea feature name proposals that are politically sensitive.

2.11 Recommendations of the Sub-Committee shall be submitted to the GGC for consideration and decision.

2.12 The Chairperson is to submit an annual report to the Chairperson of the GGC.

2.3.2 The Technical Sub-Committee on Ocean Mapping (TSCOM)

Preamble

In May 1977, at GEBCO Guiding Committee (GGC) IV, the Guiding Committee decided to form a small Sub-Committee on Digital Bathymetry (SCDB) to 'investigate… the question: Is there an advantage [in] having digital bathymetric data?' This led to a very positive report being submitted to the Guiding Committee in May 1983, the formation of a larger and more representative Sub-Committee, with revised Terms of Reference, and a recommendation leading to the establishment of the IHO Data Centre for Digital Bathymetry.

Over the years the annual meetings of this Sub-Committee have gained increasing recognition as being of growing importance to the scientific community. From a meeting of five experts in 1984, the group had grown to thirty-six experts from twenty-five groups in thirteen countries by June 1999.

In 2006 recognizing that GEBCO products and cartographic activities were predominantly "digital", the XXIInd meeting of the SCDB, held in Bremerhaven Germany, proposed that, as part of the revision of the GEBCO structure the Sub-Committee be renamed the "Technical Sub-Committee on Ocean Mapping" (TSCOM).

1. Terms of Reference[5]

1.1 The Sub-Committee reports to the Joint IOC-IHO GEBCO Guiding Committee (GGC) as its designated authority for all technical matters relevant to the goals of GEBCO as set out in the Guiding Committee Terms of Reference and Rules of Procedure.

1.2 The Sub-Committee shall:

1.2.1 Maintain and improve GEBCO products and supporting data such as, but not limited to:

a) A global bathymetric grid;

b) The GEBCO Digital Atlas; and

c) Databases of soundings, shorelines, land elevations, remotely sensed and other data, generalized to a useful working scale, as may facilitate update of GEBCO products and maintenance of product quality.

1.2.2 Monitor developments in data availability and relevant technology as may impact GEBCO activities, and recommend to the GC actions that will maintain the excellence of GEBCO products.

1.2.3 Provide advice to individuals and appropriate authorities on the

5 *As approved by IHO CL24/2008 06 March 2008 and IOC Executive Council XLI June 2008*

scientific and technical aspects of bathymetric mapping, as requested.

1.2.4 Encourage and facilitate the location, acquisition and exchange of sounding, shoreline, remotely sensed and other data supporting bathymetric mapping.

1.2.5 Investigate the application of GEBCO products, beyond the cartographic sciences, with the aim of producing products that are easily applied to other ocean sciences.

1.2.6 Establish, nurture, and/or disband working groups, as needed, to carry out specific tasks or product developments that relate to the technical advance of the GEBCO Project.

1.2.7 Work with SCUFN on matters of joint interest, such as, but not limited to, the shapes or outlines of named features and the automatic placement of feature names.

2. Rules of Procedure

2.1 Membership of the Sub-Committee is covered by the following rules:

2.1.1 The Sub-Committee shall normally consist of up to 10 members appointed by the Joint IOC/IHO GEBCO Guiding Committee (GGC). They shall be appointed according to their individual technical expertise and their ability to complement the overall technical breadth of the Sub-Committee as a whole.

2.1.2 Members of the Sub-Committee are experts acting exclusively for the benefit of the Joint IHO-IOC GEBCO Project.[6]

2.1.3 Members of the Sub-Committee shall be appointed for a five-year period, renewable for a further five-year term by majority recommendation of the Sub-Committee and with the approval of the GGC. The Sub-Committee Chairperson shall inform the GGC of any foreseeable vacancy in a timely manner.

2.2 The Chairperson and Vice-Chairperson shall be elected by the Sub-Committee subject to endorsement by the GGC.

2.3 The Chairperson and the Vice-Chairperson are elected for a five-year period but not exceeding their current membership of the Committee. The Chairperson will normally be succeeded by the Vice-Chairperson. The Chairperson and Vice-Chairperson may be re-elected by the Sub-Committee for one additional five-year period.

2.4 The Chairperson, or in his/her absence the Vice-Chairperson, shall conduct the business of the Sub-Committee. Meetings will usually be held every year, ideally before the GGC meeting. In the intervening period the Sub-Committee shall conduct its business by correspondence (preferably electronic mail).

2.5 Individuals who can provide a relevant and constructive contribution to the work of the Sub-Committee may attend meetings as Scientific Advisors with observer status, at the discretion of the Chairperson or Vice-Chairperson.

6 So far as IOC is concerned, the Sub-Committee is classed as a Joint Group of Experts under the IOC guidelines for subsidiary bodies.

2.6 Entities and organisations that can provide a relevant and constructive contribution to the work of the Sub-Committee may be represented at meetings with observer status.

2.7 Members are expected to attend every meeting of the Sub-Committee. Sub-Committee Members who are absent from meetings over two consecutive years will normally be considered to have resigned and new nominations shall be sought.

2.8 Observers from IHO and/or IOC Member States may attend meetings. Attendance shall normally be limited to one observer per Member State.

2.9 The quorum to hold a meeting shall be 6 Sub-Committee Members. The Sub-Committee shall strive to make decisions by consensus. If consensus cannot be reached, decisions shall be taken by simple majority vote. Only members present may cast a vote. The Chairperson shall have the casting vote if there is a tie.

2.10 Recommendations of the Sub-Committee shall be submitted to the GGC for consideration and decision.

2.11 The Chairperson shall submit an annual report to the Chairperson of the GGC.

2.3.3 The Sub-Committee on Regional Undersea Mapping (SCRUM) – Pending IHO & IOC Adoption

Preamble

At a meeting of some GEBCO Guiding Committee (GGC) members (and one IHB representative) in Silver Spring, Maryland, USA on 18-29 May 2009, it was decided that a new Sub-Committee was required to coordinate, encourage, and provide an interface with the various regional mapping efforts being conducted by IOC, IHO and others. In addition, such a Sub-Committee on Regional Undersea Mapping (SCRUM) could function as an Editorial Board endorsing regional products to be included in GEBCO. These Terms of Reference and Rules of Procedure were presented to the full GGC at the annual meeting on 1-2 October 2009 in Brest, France, and the creation of the Sub-Committee was approved on an interim basis. At the following GGC meeting in Lima, Peru, on 18 September 2010, the Committee approved the formation of SCRUM on a permanent basis subject to the approval of IOC and IHO. Authority for the creation of this sub-committee is included in the GGC Terms of Reference, paragraph 8, which states that "The GEBCO Guiding Committee shall direct and monitor the work of the GEBCO Sub-Committees and Working Groups; propose to IHO and IOC the creation or termination of Sub-Committees, and create, maintain and terminate Working Groups as deemed necessary." In accordance with paragraph 9 of the GEBCO Terms of Reference, SCRUM shall cooperate with regional International Bathymetric Chart (IBC) projects on the specifications and preparation of regional digital bathymetric models and charts, to ensure their compatibility with, and eventual inclusion in, GEBCO products.

1. Terms of Reference

1.1 The Sub-Committee reports to the Joint IOC-IHO GEBCO Guiding Committee (GGC) as its designated authority for all technical matters relevant to the goals of GEBCO as set out in the Guiding Committee Terms of Reference and Rules of Procedure.

1.2 The Sub-Committee shall:

1.2.1 Maintain liaison and cooperate with all existing regional mapping efforts chartered by the IOC under the International Bathymetric Chart (IBC) initiative

as well as other relevant regional bathymetric mapping projects.

1.2.2 Act as an Editorial Board by reviewing and validating the resulting regional products before incorporation into the GEBCO global grid.

1.2.3 Foster coordination between the IBC and other relevant regional bathymetric mapping projects and the IHO Data Centre for Digital Bathymetry (IHO DCDB) to capture, for long-term archive, the bathymetric data used by these projects.

1.2.4 Encourage the establishment of new IHO/IOC regional bathymetric mapping projects to fill current gaps in global bathymetry.

1.2.5 Establish, support, and/or disband working groups, as needed, to carry out specific tasks or product developments that advance the GEBCO Project.

1.2.6 Work closely with other GEBCO Sub-Committees on matters of common interest.

2. Rules of Procedure

2.1 Membership of the Sub-Committee is covered by the following rules:

2.1.1 The Sub-Committee shall normally consist of a Chair and Vice-Chair appointed by the Joint IOC/IHO GEBCO Guiding Committee (GGC), and a number of additional members appointed by the Chair, each representing any IBCs and other relevant regional bathymetric mapping projects, particularly where no IBCs exist. Members shall be approved by the GGC based on their ability to represent the activities of each individual project. The Sub-Committee Members List shall be kept updated and posted on the GEBCO website.

2.1.2 The Chair and the Vice-Chair are appointed for a five-year period but not exceeding their current membership of the Committee. The Chair will normally be succeeded by the Vice-Chair. The Chair and Vice-Chair may be re-appointed for one additional five-year period.

2.1.3 Members of the Sub-Committee shall be appointed for a five-year period, renewable for further five-year terms by majority recommendation of the Sub-Committee and with the approval of the GGC. The Sub-Committee Chair shall inform the GGC of any foreseeable vacancy in a timely manner.

2.1.4 Members of the Sub-Committee are experts acting exclusively for the benefit of the Joint IHO-IOC GEBCO Project. 7

2.2 The Chair or, in his/her absence, the Vice-Chair shall conduct the business of the Sub-Committee. Meetings will usually be held every year, ideally before the GGC meeting. In the intervening period the Sub-Committee shall conduct its business by correspondence (preferably electronic mail).

2.3 Individuals who can provide a relevant and constructive contribution to the work of the Sub-Committee may attend meetings as Scientific Advisors with observer status, at the discretion of the Chair or Vice-Chair.

2.4 Entities and organizations that can provide a relevant and constructive contribution to the work of the Sub-Committee may be represented at meetings with observer status.

2.5 Members are expected to attend every meeting of the Sub-Committee. Sub-Committee Members who are absent from meetings for two consecutive years will normally be considered to have resigned and new nominations shall be sought.

2.6 Observers from IHO and/or IOC Member States may attend meetings. Due to logistic constraints, attendance shall normally be limited to one observer per Member State.

2.7 The quorum to hold a meeting shall be not less than 50% of the Sub-Committee Members. The Sub-Committee shall strive to make decisions by consensus. If consensus cannot be reached, decisions shall be taken by simple majority vote. Only members present may cast a vote. The Chair shall have the casting vote if there is a tie.

2.8 Recommendations of the Sub-Committee shall be submitted to the GGC for consideration and decision.

2.9 The Chair shall submit an annual report to the Chair of the GGC.

7 *So far as IOC is concerned, the Sub-Committee is classed as a Joint Group of Experts under the IOC Guidelines for subsidiary bodies.*

2.4 IHO Data Centre for Digital Bathymetry

The US National Oceanic and Atmospheric Administration (NOAA) National Geophysical Data Center (NGDC), operates a worldwide digital data bank of bathymetric soundings, gridded compilations, digital contours and products on behalf of the Member Countries of the International Hydrographic Organization (IHO). The IHO Data Center for Digital Bathymetry (IHO DCDB) was officially established on June 1, 1990.

Services to be provided by the IHO Data Centre for Digital Bathymetry (IHO DCDB)

Services to be provided by the IHO DCDB on behalf of the IHO will include but not be limited to:

(1) Provision of world wide bathymetric soundings, gridded compilations, digital contours and products to the IHO, for use by its Member States to support their national or international projects. The IHO Member States may either submit their requests for data through the International Hydrographic Bureau (IHB) or directly to the IHO DCDB. IHO Member States' Hydrographic Offices (HOs) are encouraged to provide the IHO DCDB with publically releasable digital bathymetric data and metadata collected by their nation's institutions. Alternatively, HOs may submit metadata including the geospatial extent of the data to the IHO DCDB for inclusion in the IHO DCDB on-line search and retrieval interface. Publically releasable digital bathymetric data and metadata is available for free download by any interested person or organization (See also section 3.1).

(2) Maintenance of a quality assessment facility whereby data provided to the IHO DCDB are reviewed and checked for obvious errors (e.g., suspect navigation, unrealistic ship speeds, impossible depths, etc.) and completeness of metadata. The IHO DCDB will not edit data values, but may provide information regarding identified errors back to suppliers of data for possible correction. Member States' Hydrographic Offices may be requested to assist in resolving matters of quality concerning data originated by their nation's organizations.

(3) Maintenance of a comprehensive inventory of all available world wide digital bathymetric data and metadata.

(4) Provision of an on-line interface to the IHO DCDB bathymetric inventory that includes data search, retrieval and submittal functionalities.

(5) Collaboration with various international organizations in the development of infrastructure, exchange formats and standards to expedite bathymetric data sharing.

[References: ***WILL NEED UPDATING***

a) Document IOC-IHO/GEBCO SCDB VII/3, paragraph 97. Summary Report of the 7th Meeting of the GEBCO Sub-Committee on Digital Bathymetry, Bremerhaven, Germany, 28 – 30 May 1990.

b) IHB Circular Letter 23/1990 of 25 June 1990./]

3 Data

Is this where we need something on the "Cook Book"?

3.1 Contributing Bathymetric Data to GEBCO

GEBCO encourages the sharing of source bathymetric data within the international community for the benefit of all. The organization is continually working to improve its gridded data sets with the aim of providing the most authoritative publicly-available global bathymetric grids of the world's oceans. Contributions of single-beam and/or multibeam survey data, individual soundings or existing grids help enhance GEBCO products. GEBCO acknowledges the source of contributed data sets in the documentation which accompanies the GEBCO 08 Grid. GEBCO respects the data policies of contributing organizations and will not pass on source bathymetric data sets (surveys, soundings, grids, etc.) to other organisations without prior permission. Without this express permission, GEBCO will only make grids developed from these source data sets available to the public.

3.1.1 Data for Public Access

Data contributors who would like to make their data publically available, can send them to the International Hydrographic Organization Data Center for Digital Bathymetry (IHO DCDB; http://www.ngdc.noaa.gov/mgg/bathymetry/iho.html) hosted at the US NOAA National Geophysical Data Center (NGDC). Alternatively, if data is currently hosted on-line, data contributors may provide the IHO DCDB with the discovery metadata, spatial footprints and the retrieval URL to allow the public to search for and find the data via an interactive map on the IHO DCDB website. Information is available upon request from the IHO DCDB concerning formats and required accompanying metadata for data submissions. In general, complete metadata is necessary to allow thorough evaluation of contributed data for incorporation into the GEBCO grid.

3.1.2 Data for GEBCO Use Only

Data contributors who do not wish their source data to be made publicly available, can contribute data to GEBCO via GEBCO's data holding centre at the British Oceanographic Data Centre (BODC; http://www.bodc.ac.uk/). BODC will archive the data on behalf of GEBCO on the understanding that it will only be used for updating GEBCO's products and will not be passed on or made publicly available.

3.2 Metadata

Tony Pharaoh asked to prepare something for here.

4. GEBCO PRODUCTS

Over the last few decades GEBCO has evolved from a purely analogue paper product, the GEBCO Chart series (Editions 1 to 5), to a variety of products all based on digital data.

4.1 GEBCO Global Mapping / Data sets

GEBCO makes available a range of digital bathymetric data sets and products. Further information is given below and is available from GEBCO's web site (www.gebco.net)

4.1.1 Gridded bathymetric data sets

GEBCO makes available two global gridded bathymetric data sets: the **GEBCO_08 Grid** and **GEBCO One Minute Grid**. The grids are available to download from the internet and are included as part of the GEBCO Digital Atlas (GDA). Further information can be found on GEBCO's web site (http://www.gebco.net/data_and_products/gridded_bathymetry_data/).

4.1.1.1 GEBCO_08 Grid

The GEBCO_08 Grid is a 30 arc-second grid of global elevations; it is a continuous terrain model for ocean and land. The grid was largely generated by combining quality-controlled ship depth soundings with interpolation between sounding points guided by satellite-derived gravity data. However, in areas where they improve on the existing GEBCO_08 Grid, data sets generated by other methods have been included. The land data are largely taken from the Shuttle Radar Topography Mission (SRTM30) data set.

The grid is accompanied by a **Source Identifier (SID)** Grid. This data set identifies which grid cells in the GEBCO_08 Grid are based on bathymetric soundings or bathymetric depth values from grids and which cells contain predicted depth values.
It is intended that the data set will be continually updated. Further information about version numbering and the data set's update history can be found in the documentation that accompanies the data set and also on GEBCO's web site:
(http://www.gebco.net/data_and_products/gridded_bathymetry_data/).

4.1.1.2 GEBCO One Minute Grid

The GEBCO One Minute Grid is a global bathymetric grid with one arc-minute spacing. It is largely based on the most recent version of the bathymetric contours contained within the Centenary Edition of the GEBCO Digital Atlas. Additional control contours and sounding point data were used in many regions, particularly shallow water areas and semi-enclosed seas, to constrain the gridding process.

It is a continuous digital terrain model for ocean and land, with land elevations derived from the Global Land One-km Base Elevation (GLOBE) database. The data set was originally published in 2003. Version 2.00 was released in November 2008 and includes version 2.23 of the International Bathymetric Chart of the Arctic Ocean (IBCAO) and improved bathymetry in some shallow water areas. It is not intended to make further updates to this data set.

4.1.2 IHO-IOC GEBCO Gazetteer of Undersea Feature Names

The undersea feature names shown on GEBCO's products and on Regional International Bathymetric Charts (IBC), and international (INT) nautical charts are selected by the GEBCO Sub-Committee on Undersea Feature Names (SCUFN).

SCUFN maintains and makes available the names information in the form of a digital gazetteer. The gazetteer includes information on the geographic location of the features and in some cases background information on the naming of the feature.

The gazetteer can be downloaded from GEBCO's web site:
http://www.gebco.net/data_and_products/undersea_feature_names/.

4.1.3 GEBCO's bathymetric contour data set

GEBCO makes available a global set of digital bathymetric contours. The bathymetric contours were originally based on the GEBCO 1:10 million scale 5th Edition chart series. However, as new bathymetric compilations have become available the data set has been updated.

The data set includes bathymetric contour compilations for the Arctic Ocean (from the International Bathymetric Chart of the Arctic Ocean (IBCAO)), the Indian Ocean, the northeast and central-eastern Atlantic (including data from the International Bathymetric Chart of the Central Eastern Atlantic (IBCEA)), the Caribbean Sea and the Gulf of Mexico (from the International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA)), the Weddell Sea and the waters around New Zealand.

The data set includes contours starting at a depth of 200m and then at 500m and 500m intervals thereafter. Contours at intermediate depths are included in some areas. Further information about the contour data set can be found on the internet:
http://www.bodc.ac.uk/projects/international/gebco/gebco_digital_atlas/gda_development/
The bathymetric contours are included as part of the GEBCO Digital Atlas (GDA).

4.1.4 GEBCO Digital Atlas (GDA)

The GEBCO Digital Atlas is an assemblage of GEBCO's digital data sets, i.e. bathymetric grids, bathymetric contours, trackline control; coastline and undersea feature names data set. It is accompanied by a software interface for viewing and accessing the data and includes documentation to accompany the data sets and a help manual on how to use the software.
The GDA is distributed on a two-volume DVD and CDROM set.
Further information can be found on GEBCO's web site:
http://www.gebco.net/data_and_products/gebco_digital_atlas/

4.1.5 Software products – GEBCO Grid Display Software

GEBCO Grid Display Software is made available to view and access data from GEBCO's gridded bathymetric data sets. It provides the means for displaying the data and accessing the data in netCDF and simple ASCII formats.

The software has been developed to run on a PC running Microsoft Windows 95 or later. It is controlled by a series of drop-down menus and toolbar buttons.
Further information can be found on GEBCO's web site:
http://www.gebco.net/data_and_products/grid_display_software/

4.1.6 GEBCO world map

The GEBCO world map shows the bathymetry of the world's ocean floor in the form of a shaded relief colour map. It is based on the bathymetry shown in GEBCO's gridded bathymetric data sets. Further information can be found on GEBCO's web site:
http://www.gebco.net/data_and_products/gebco_world_map/

4.1.7 GEBCO's web services

Web services distribute information, for example imagery or data, across the internet in such a way that users can control exactly how and when the information is processed and reproduced in their own applications. Information about the web services that GEBCO makes available can be found on our web site: http://www.gebco.net/data_and_products/gebco_web_services/

4.2 GEBCO Bathymetric Editor – Terms of Reference

This section passed to Colin Jacobs for input

4.3 GEBCO Data Products Manager

4.3.1 Main purpose: Manage, maintain and make available GEBCO's digital bathymetric products and provide user-support.

4.3.2 Definition of products: grids (bathymetric and metadata grids); bathymetric contour and trackline control data sets and data assemblage products such as the GEBCO Digital Atlas (GDA).

4.3.3 Duties of the GEBCO Data Products Manager:

1. Receive submitted data sets for updating GEBCO's digital bathymetric products and archive the data for grid re-generation purposes and store the accompanying metadata.

2. In collaboration with the GEBCO Bathymetric Editor, review the submitted data, including carrying out quality control checks on the data sets and if necessary, enter into a dialog with the data provider about any data quality issues and seek an external review if necessary.

3. Update GEBCO's digital bathymetric products with the submitted data sets or provide the data for others within the GEBCO community to carry out the update work.

4. Archive updated versions of GEBCO's digital products and produce revised metadata and documentation to accompany the data sets and products.

5. Make the digital data sets and products available to users via the internet or on digital media (such as DVD).

6. Investigate and develop additional means and technologies for producing products and making the data and metadata available for example, Web Services and imagery.

7. Provide support to users of GEBCO's digital bathymetric products, including answering enquiries concerning the data sets and products and compiling licensing agreements for use of the data products outside normal 'terms of use' conditions.

8. Provide statistics to the GEBCO community on user access to GEBCO's products.

9. Participate in the work of GEBCO's Committees and Working Groups.

Reference here to GGC decision required once accepted.

4.4 GEBCO Regional Mapping / Data Sets

This section passed to Dr Martin Jakobsson for input

4.5 GEBCO Globe

In 2008 following some enquiries as to the existence of a "globe" portraying GEBCO bathymetry, the Chairman of the GGC invited Mr Robert Anderson to investigate possible suppliers. Two potential suppliers were identified: DongXin Globe of Shenzhen, China; and Greaves & Thomas of Ryde, United Kingdom. Following extensive discussions with the companies aimed at improving the portrayal of the bathymetry, prototype globes were prepared and presented to the GGC at its XXVIth meeting in Brest, France. Following further development the GGC at its XXVIIth meeting in Lima, Peru approved the release of GEBCO funds for the production of a 62cm globe by DongXin Globe. This was displayed at the American Geophysical Union meeting in San Francisco in December 2010, together with 32cm, 14cm, and 10.6cm versions provided by the company. DongXin Globe required a minimum order of 1000 units for the smaller globes whereas Greaves & Thomas were prepared to supply much smaller quantities of their 12in globe albeit at a higher unit cost.

Final samples of the DongXin 62cm globe and the Greaves & Thomas 12in globe were presented to the XXVIIIth GGC in San Diego where it was decided to …. The GGC authorised ….

5 GEBCO Outreach

5.1. General

The object of GEBCO Outreach is to inform those who are not expert in this field at to exactly what GEBCO is and what GEBCO does. In particular, GEBCO Outreach has the task of increasing general awareness of GEBCO's work and goals.

To achieve this GEBCO Outreach is focused mainly on educational topics. It is crucial that the general public understand how important the seas and oceans are to our everyday lives and the key role that the shape of the ocean floor plays in this. It is equally important that any research project on the marine environment is based on an accurate description of ocean floor bathymetry.
Special attention needs to be paid to engaging children and teenagers, who are increasingly interested in the environment and ensuring that they understand how important the marine element is to the environment as a whole.

5.2. Tasks

GEBCO's Outreach task is to find the best ways to increase public awareness of GEBCO's work and products and the role that the shape of the ocean floor plays in life on planet Earth, taking advantage of all cost-effective technologies available.

Currently the most cost effective resource is the Internet. GEBCO Outreach must focus on the World Wide Web and all its potential uses. It is therefore vital that the GEBCO website (www.GEBCO.net) is continuously maintained and expanded to provide even more general information and news in order to stimulate people's interest. It is also important to involve other organizations and interested parties, so that they advertise GEBCO's data and products in their own websites. Another important element is the creation of specific packages for used by "marine" oriented institutions, such as museums and aquariums. The development of products to be distributed either freely or sold at exhibitions, fairs and events, along with the production of educational packages to be used in schools and made available to children through the World Wide Web is also important

5.3. Participation

All GEBCO members are both welcome and strongly encouraged to contribute, with their specific experience and creativity, to the work of GEBCO Outreach.

ANNEX A – ACRONYMS

ACUF	-	Advisory Committee on Undersea Features
AGU	-	American Geophysical Union
ASCII	-	American Standard Code for Information Interchange.
BGI	-	Bureau Gravimétrique International (France).
BODC	-	British Oceanographic Data Centre
CCOM	-	Centre for Coastal and Ocean Mapping.
CD-ROM	-	Compact Disc - Read Only Memory.
CGMW	-	Commission for the Geological Map of the World.
CMG	-	Commission for Marine Geology (IUGS).
CSPCWG	-	Chart Standardization and Paper Chart Working Group (IHO)
DCDB	-	Data Centre for Digital Bathymetry (IHO).
DTM	-	Digital Terrain Model.
EBCDIC	-	Extended Binary - Coded Decimal Interchange Code.
ECDIS	-	Electronic Chart Display and Information System
ED	-	Existence Doubtful.
ENC	-	Electronic Navigational Chart
GEBCO	-	General Bathymetric Chart of the Oceans (IOC-IHO).
GDA	-	GEBCO Digital Atlas.
GIS	-	Geographic Information System
HO	-	Hydrographic Office (IHO).
HTF	-	Australian Hydrographic Data Transfer Format.
IALA-IASM	-	International Association of Marine Aids to Navigation and Lighthouse authorities / Association international de Signalisation Maritime.
IAPSO	-	International Association for the Physical Sciences of the Oceans.
IBC	-	International Bathymetric Chart (IOC).

IBCAO	-	International Bathymetric Chart of the Arctic Ocean (IOC).
IBCCA	-	International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IOC).
IBCEA	-	International Bathymetric Chart of the Central Eastern Atlantic (IOC).
IBCM	-	International Bathymetric Chart of the Mediterranean and its Geological Geophysical Series (IOC).
IBCSEP	-	International Bathymetric Chart of the South Eastern Pacific (IOC).
IBCWIO	-	International Bathymetric Chart of the Western Indian Ocean (IOC).
IBCWP	-	International Bathymetric Chart of the Western Pacific (IOC).
ICA	-	International Cartographic Association.
IGN	-	Institut Géographique National (France).
IHB	-	International Hydrographic Bureau (IHO Secretariat).
IHO	-	International Hydrographic Organization.
IMO	-	International Maritime Organization
INT Chart	-	International Chart.
IOC	-	Intergovernmental Oceanographic Commission (of UNESCO).
IODE	-	International Oceanographic Data and Information Exchange (IOC).
IRCC	-	Inter-Regional Coordination Committee (IHO)
LDEO	-	Lamont-Doherty Earth Observatory
netCDF	-	Network Common Data Form
NGDC	-	National Geophysical Data Center (USA).
NOCS	-	National Oceanography Centre – Southampton (UK)
OPS	-	Oceanic Plotting Sheet.
PA	-	Position Approximate.
PD	-	Position Doubtful.
PMEL	-	Pacific Marine Environmental Laboratory
POL	-	Proudman Oceanographic Laboratory

RHC	-	Regional Hydrographic Commission (IHO)
SCDB	-	Sub-Committee on Digital Bathymetry (Now TSCOM).
SCOR	-	Scientific Committee on Oceanic Research (IUGG).
SCRUM	-	Sub-Committee on Regional Undersea Mapping (GEBCO)
SCUFN	-	Sub-Committee for Undersea Feature Names (GEBCO).
SID	-	Source Identifier
S-57	-	IHO Transfer Standard for Digital Hydrographic Data
S-100	-	IHO Universal Hydrographic Data Model
ToR/RoP	-	Terms of Reference / Rules of Procedure
TSCOM	-	Technical Sub-Committee on Ocean Mapping (GEBCO) (Formerly SCDB)
UNESCO	-	United Nations Educational, Scientific and Cultural Organization.
WCATWC	-	West coast and Alaska Tsunami Warning Centre
WGS	-	World Geodetic System.
WVS	-	World Vector Shoreline (USA).