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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)

INFORMATION DOCUMENT

**GEBCO GUIDING COMMITTEE BIENNIAL REPORT TO THE IOC ASSEMBLY
FOR THE PERIOD 2015–2017**

Summary

The General Bathymetric Chart of the Oceans is an IHO and IOC Project, which is guided by the Joint IHO-IOC Guiding Committee for GEBCO, made up of representatives from both IHO and IOC and is supported by the Technical Sub-Committee on Ocean Mapping (TSCOM), the Sub-Committee on Undersea Feature Names (SCUFN), the Sub-Committee on Regional Undersea Mapping (SCRUM), and the Nippon Foundation/GEBCO Training Project Management Committee (PMC). Additional ad hoc working groups are convened as necessary. Through the work of its organs, GEBCO produces and makes available a range of bathymetric data sets and products, including gridded bathymetric data sets, the GEBCO Digital Atlas, the GEBCO World Map, the GEBCO *Gazetteer of Undersea Feature Names* and the *GEBCO Cook Book*. GEBCO maintains a comprehensive website at: <http://www.gebco.net>. The progress of the GEBCO Project is reported below.

This document covers the GEBCO activities for the period 2015–2017.

Introduction

The GEBCO is an IHO and IOC Project, which is guided by the Joint IHO-IOC Guiding Committee for GEBCO, made up of representatives from both IHO and IOC and is supported by the Technical Sub-Committee on Ocean Mapping (TSCOM), the Sub-Committee on Undersea Feature Names (SCUFN), the Sub-Committee on Regional Undersea Mapping (SCRUM), and the Nippon Foundation/GEBCO Training Project Management Committee (PMC). Additional ad hoc working groups are convened as necessary. Through the work of its organs, GEBCO produces and makes available a range of bathymetric data sets and products, including gridded bathymetric data sets, the GEBCO Digital Atlas, the GEBCO World Map, the GEBCO *Gazetteer of Undersea Feature Names* and the *GEBCO Cook Book*. GEBCO maintains a comprehensive website at: <http://www.gebco.net>. The progress of the GEBCO Project is reported below.

During the period cover by this report, a continuing and growing interest in the health and status of the oceans by many governments, international and philanthropic organizations and by the public more generally has been noted - culminating in the adoption of a UN Sustainable Development Goal (Goal 14) on the oceans in September 2016 as part of the UN Post 2015 Development Agenda and subsequent discussions at the 2015 Paris Climate Conference (COP21) under the UN Framework Convention on Climate Change (UNFCCC) in December 2015. However, the long-running GEBCO Project was rarely mentioned or recognised by the participants in any of the related activities.

A series of meetings and workshops were held in Monaco from 15 to 17 June 2016 as part of the Forum for Future Ocean Floor Mapping organized by the GEBCO Guiding Committee (GGC), under the joint auspices of the International Hydrographic Organization (IHO) and the Intergovernmental Oceanographic Organization (IOC) of UNESCO and supported by The Nippon Foundation of Japan.

The Forum was preceeded by a Polar Mapping Workshop held at the IHB on 12 and 13 June 2016, at which around 40 ocean mappers, scientists, cartographers and hydrographic surveyors gathered to discuss ways to progress new editions of the International Bathymetric Chart of the Southern Ocean (IBCSO) and the International Bathymetric Chart of the Arctic (IBCA), what additional data has been gathered but is not reflected in the maps and how to obtain this additional and very useful data. The chairs of the Arctic Regional Hydrographic Commission (ARHC), Mr Denis Hains, Hydrographer-General of Canada, and the Hydrographic Commission on Antarctica (HCA), Mr Robert Ward, President of the IHB Directing Committee, gave presentations on the current state of charting and the problems that the lack of bathymetric data for the regions is causing.

The polar mapping workshop was followed by a day of briefings for graduates of the Nippon Foundation Ocean Mapping course at the University of New Hampshire, USA. Approximately 45 alumni students were welcomed to the IHB by President Robert Ward, before receiving briefings on the Forum and their role in it. Mr Yohei Sasakawa, Chairman of the Nippon Foundation, joined the alumni for part of their meeting.

The Forum opened at the Musée océanographique de Monaco with approximately 200 delegates from a wide community of participants, including hydrographers, oceanographers, cartographers, and representative from governments, international organizations, industry, science and academia. The Forum was honoured by the presence of His Serene Highness Prince Albert II of Monaco, who opened the Forum and inaugurated the associated GEBCO and Nippon Foundation posters display. During his address Mr Yohei Sasakawa challenged the delegates to complete mapping the ocean floor by 2030. Opening addresses were delivered by President Ward and Dr Thorkild Aarup, representing the Executive Secretary of the IOC. These addresses were followed by thought-provoking presentations by Dr Robert Ballard, Professor Larry Mayer, Mr David Heydon, Ms Kristina Gjerde, Ms Jyotike Virmani and Mr Bjorn Valving. Mr Simon Winchester, notable author and raconteur, closed the first day with his observations on the history and significance of the oceans to mankind.

The second day of the Forum consisted of four panel sessions which addressed:

- The Use of bathymetry: the deep ocean perspective,
- The Use of bathymetry: the coastal perspective,
- New tools and techniques in ocean mapping, and
- Mapping the world ocean floor.

These panel sessions generated active participation with all aspects of the four themes being explored through wide-ranging comments and discussion. These sessions led into a third day, that consisted of four focus group sessions, which explored the issues raised on the second day and discussions on how to take the key items forward to develop a roadmap for the next 10-15 years of GEBCO activity and to provide input to the Forum communiqué.

Meetings of relevant GEBCO bodies

GEBCO Guiding Committee

The 32nd meeting of the GEBCO Guiding Committee (GGC) was held in Kuala Lumpur, Malaysia from 8 to 9 October 2015 and the 33rd meeting of the GGC was held in Valparaíso, Chile, from 13 to 14 October 2016. Both meetings were chair by Mr Shin Tani.

The GGC received brief reports from its sub-committees and endorsed the work which they had undertaken. The GGC also received reports from key personnel performing functions on behalf of GEBCO as well as reports from its parent bodies IHO and IOC, on activities since the previous meetings. Detailed reports were received covering education and outreach activities and the results of a year-long focused study.

At its 32nd meeting, the GGC devoted significant time to considering its future direction and associated ten-year plan. It was agreed that the goals and vision should be guided by four main underpinning themes: human capacity, science and technology, outreach and education, and resources (human and financial). There was a clear understanding that data quality and coverage was the underpinning foundation on which the many uses and products would be developed and that the GEBCO Project should be focused on obtaining and making bathymetric data available, and that it was for others to develop products and services from that data. The GGC was briefed on the plans and preparations for a GEBCO-Nippon Foundation sponsored forum, *Forum for Future Ocean Floor Mapping (F-FOFM)*, a three-day international event bringing together ocean experts with the goal of accelerating the ability of GEBCO to accurately portray the shape of the world's ocean floor.

A desire was expressed to seek ways in which the naming process used by the Sub-Committee on Undersea Feature Names (SCUFN) could be made more efficient, one of which was to re-assess the way in which the GGC provided its endorsement of names approved by SCUFN. It was agreed in future this would be done by correspondence.

The GGC discussed outreach and ways to raise the profile of the GEBCO project amongst the different stakeholder and user communities - including IHO and IOC Member States, the maritime and scientific community and the public. It was noted that different strategies would be required for each of these groups. The GGC also reviewed its current financial situation in relation to proposed planned projects; the Committee recognised that the sub-committees would need to present more detailed proposals for consideration at future GGC meetings.

The current Secretary advised the GGC that his term of office would finish at the end of 2015. The GGC accepted the offer of the IHB to provide secretarial assistance and Mr David Wyatt was appointed to the position of GEBCO Secretary from 1 January 2016.

At its 33rd meeting, the Chair of the Sub-Committee on Undersea Feature Names (SCUFN) highlighted difficulties that had been experienced with regard to some submissions considered at the recent SCUFN29 meeting in Boulder, Colorado, 19-23 September 2016. He presented some proposed revision to the SCUFN Terms of Reference (ToRs) and Rules of Procedure (RoPs), which were aimed at clarifying the procedures for future meetings so as to enable SCUFN to better consider proposals that occur in the sea area between national territorial waters and the Area Beyond National Jurisdiction. It was proposed that the texts, once adjusted, should be included in the report of the 29th meeting of SCUFN and subsequently considered for endorsement by the GGC by correspondence.

The GGC devoted considerable time to discussions on the proposed Seabed 2030 Project, including its structure, governance, oversight and reporting. The Seabed 2030 Project Establishment Team presented a draft Roadmap and Business Plan and requested GGC endorsement to continue the development of the project, including a submission to the Nippon Foundation for funding support.

The GGC also reviewed its current financial situation in relation to proposed planned projects; the Committee addressed the budget submissions from its subordinate bodies and approved revised allocations to ensure a contingency balance of 9,000€ was maintained for 2017 to cover emergent items. The draft consolidated GEBCO Work Plan and budget will be reported to the 9th meeting of the IHO Inter-Regional Coordination Committee (IRCC) and the 29th session of the IOC Assembly, for consideration and endorsement, see report of 33rd meeting of the GGC (GGS33/12).

It was agreed that the 34th meeting of the Committee would take place, together with meetings of TSCOM, SCRUM and the GEBCO Science Day, in Pusan, Republic of Korea, during the week 13 to 17 November 2017.

Technical Sub-Committee on Ocean Mapping (TSCOM) and Sub-Committee on Regional Undersea Mapping (SCRUM)

The GEBCO Technical Sub-Committee on Ocean Mapping (TSCOM) and the Sub-Committee on Regional Undersea Mapping (SCRUM) held a joint meetings from 6 to 7 October 2015 and from 10 to 11 October 2016. Both meetings were co-chaired by Dr Karen Marks (USA), (Chair of TSCOM), and Professor Martin Jakobsson (Sweden), (Chair of SCRUM).

The TSCOM is responsible for producing and maintaining the GEBCO global digital grids which are used by ocean scientists, academia, map producers and many other communities. The meeting reviewed new contributions of bathymetric data that had been received in coastal and shallow water.

At its 2015 meeting, it was decided that a new (higher resolution) GEBCO grid should be produced in 2016. The current 30 arc-second grid should be upgraded to a 15 arc-second grid.

The meeting agreed that bathymetric data for coastal and shallow water areas should be improved, and proposed that national hydrographic authorities should be invited to provide data from whatever sources they were prepared to make available. It was agreed that Crowd Sourced Bathymetry (CSB) would also be an important source of shallow water data. The meeting discussed various outreach activities such as outreach for high school and college students, using the *IHO-IOC GEBCO Cook Book* (B-11 of IHO/Manuals and Guides, 63 of IOC) as an educational resource. It was also proposed to make scanned versions of the five editions of GEBCO printed map available in digital format for download, and as an online tile map service. It was reported that information about the *GEBCO Cook Book* had been included in the Earth Observing System (EOS) news brief and in an article in the *Hydro International* periodical. Update reports were provided on the following regional mapping projects: Indian Ocean Bathymetric Compilation (IOBC), North Atlantic Seabed Mapping Project, International Bathymetric Chart of the Arctic Ocean (IBCAO), International Bathymetric Chart of the Southern Ocean (IBCSO) and Baltic compilations.

At its 2016 meeting it was agreed that a new GEBCO 30 arc-second global grid will commence production in 2017. The new grid will be based on the existing GEBCO_2014 grid and will include new data contributions from New Zealand Regional Bathymetry grids, the Global Multi-Resolution Topography Data Synthesis (GMRT) grid and ENC sounding recently provided by IHO Member States (which include Argentina, Colombia, Brazil, Ukraine, and Uruguay). Bathymetry compilations for the Aleutian Islands, Cook Inlet, central Gulf of Alaska and Norton Sound will also be included as well as new trackline bathymetry from the IHO Data Centre for Digital Bathymetry (DCDB). Figure 1 illustrates new bathymetric data that is available for inclusion in the new GEBCO Global grid.

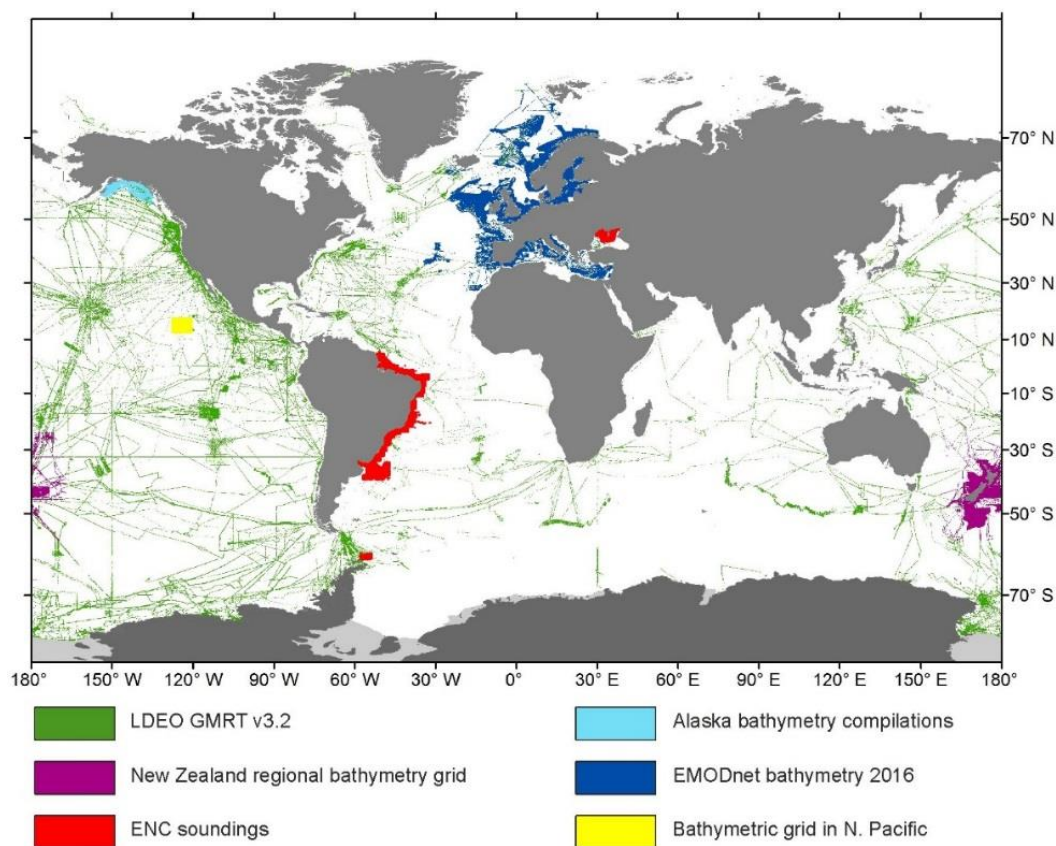


Figure 1 New sources of bathymetric data.

Reports were provided on a number of topics that included the “Future of the Ocean Forum, the EMODnet Project, the development of a Digital Elevation Model based on High Seas Data, Remodelling of the GEBCO Undersea Feature Database, the Indian Ocean bathymetric grid, the Canadian regional mapping programmes, and the status of the International Bathymetric Chart of Arctic Ocean.

At the conclusion of the SCRUM meeting Professor Martin Jakobsson stood-down as Chairman and was replaced by Dr Vicki Farrini.

Sub-Committee on Undersea Feature Names (SCUFN)

SCUFN is tasked with selecting the names of undersea features to appear in the products of the GEBCO project and on international nautical charts. These names, widely used in scientific publications also, are made available in the GEBCO Gazetteer of Undersea Features Names (www.gebco.net > Data and products > Undersea feature names > view and download).

The 28th meeting of the SCUFN was hosted at the Diretoria de Hidrografia e Navegação (DHN), in Niterói, Brazil, from 12 to 16 October 2015. The meeting, chaired by Dr Hans Werner Schenke (Germany-IOC) from the Alfred Wegener Institute for Polar and Marine Research, was attended by 20 participants, including nine of the 12 SCUFN members (four IOC and five IHO representatives),

together with 10 observers. After the election of Dr Yasuhiko Ohara (Japan-IHO) as Vice-Chair, the Sub Committee considered proposals for 72 undersea feature names, submitted by various bodies and supporting organizations: Brazil (12), China (20), Japan (28), Republic of Korea (3), Malaysia (6), Russian Federation (1), Sweden (1) and USA (1). The Sub Committee decided also to trial a fast-track procedure when reviewing the proposals made by New Zealand related to 56 names that already appear on nautical charts.

The success of the meeting was assisted by work done through contracted support managed by the IHO Secretariat during the inter-sessional period. The contractor addressed a number of issues identified in 2014:

- the improvement of the consistency of the GEBCO Gazetteer database and the effective implementation of SCUFN decisions;
- the monitoring of the number of PENDING names;
- the evaluation of the on-line tools;
- the preparation of an experimental fast-track evaluation procedure to review the proposals made by New Zealand related to 56 names that already appear on nautical charts;
- the preparation of the collection of amendments / clarifications that would need to be included in the IHO-IOC Publication B-6 – Standardization of Undersea Feature Names when a new Edition is deemed necessary.

The Sub Committee also decided to include in its programme of work liaison with the IHO S-100 Working Group and the Nautical Cartography Working Group to provide expertise on undersea feature names.

The 29th meeting of the SCUFN was hosted at the National Center for Environmental Information (NCEI) of the National Oceanic and Atmospheric Administration (NOAA), in Boulder, Colorado, USA, from 19 to 23 September 2016. The meeting, chaired by Dr Hans Werner Schenke, was attended by 25 participants, including 10 of the 12 SCUFN members (five IOC and five IHO representatives), together with 14 observers including Mr Shin Tani and Mr Osamu Miyaki (IOC Secretariat). The meeting was attended by two new SCUFN Members: Ms Roberta Ivaldi (Italy-IHO) and Ms Ksenia Dobrolyubova (Russian Federation-IOC). Mr Norman Cherkis (USA) had informed the members that he wished to step down from his position in SCUFN.

The SCUFN considered proposals for 133 undersea feature names, submitted by various bodies and supporting organizations from the following countries: Brazil (7), China (50), Denmark (1), Dominican Republic (2), France (1), Japan (23), Republic of Korea (2), Malaysia (4), New Zealand (31), Russian Federation (1), UK (3) and USA (8). The Sub Committee decided to follow the experimental fast-track procedure in its review of the proposals made by Canada (12) and New Zealand (84) related to names that already appear on nautical charts. It was agreed that for the time being SCUFN could not consider in a systematic manner the other 139 names that had been proposed by Canada for international recognition by SCUFN because they relate to features located in its territorial sea. This outstanding task will be addressed later, subject to the establishment by the IHO Hydrographic Services and Standards Committee (HSSC) of an S-100 Undersea Feature Names Project Team for which draft Terms of Reference were endorsed at the meeting, thanks to input provided by Canada.

While a large number of the names proposed to the Sub Committee were accepted, decisions on some others were postponed for further consideration for various reasons, including the increasing number of submissions now being received and the lack of time available during the meeting.

In addition to consideration of the naming proposals, the Sub Committee considered several “corporate” issues, including:

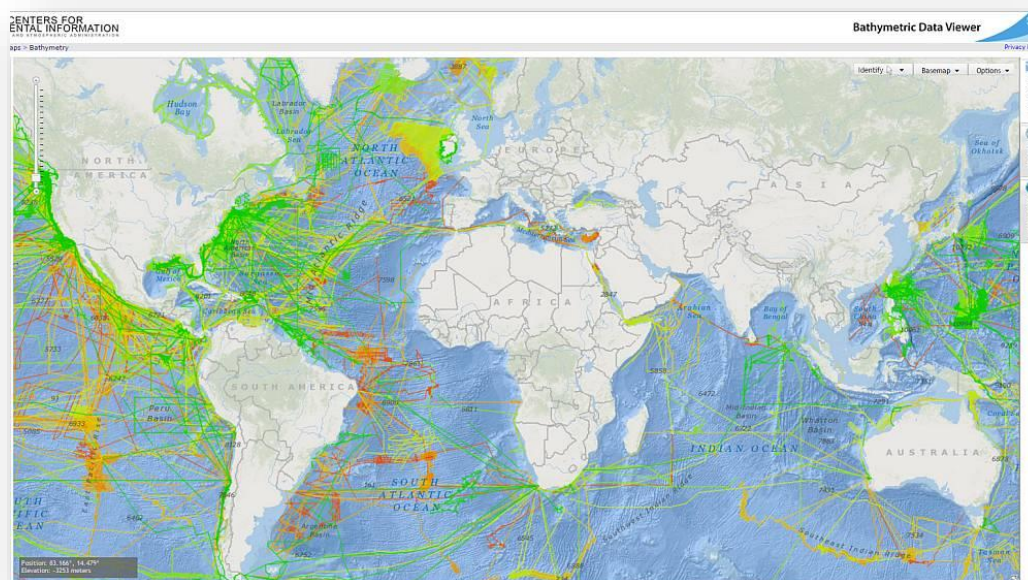
- The maintenance and improvement of the GEBCO Gazetteer interface,

- The ways and means to improve the efficiency and quality of SCUFN activities (inter connexion of the web services that already exist: the IHO SCUFN webpage, the internal SCUFN submission and review web services developed by the Republic of Korea, and the GEBCO Gazetteer itself maintained by NOAA),
- The future of SCUFN (membership, scope, new Edition of B-6 – Standardization of Undersea Feature Names (Guidelines, Proposal Form Terminology) – including the integration of a fast-track procedure for existing names which are already charted, the capitalization of best practices, the relations between naming authorities in common areas of interest, etc.),
- The increasing resources needed to incorporate SCUFN naming decisions into the GEBCO Gazetteer and the fact that this can only be achieved by contracting out some work during the inter-sessional period.

As a consequence of a contract awarded in 2015, the SCUFN Members were pleased to note a decrease in the total number of pending names (proposals and related actions) between 2015 and 2016.

Operation of IHO Data Centre for Digital Bathymetry

Since its inception, the IHO Data Centre for Digital Bathymetry (DCDB) has become a prominent repository of digital oceanic bathymetry and is used by IHO Member States and other ocean science communities. The IHO DCDB facility is generously hosted by the National Oceanographic and Atmospheric Administration (USA) on behalf of the IHO Member States.



IHO DCDB Web Map Interface

The IHO DCDB data store contains oceanic soundings that have been acquired by hydrographic, oceanographic and other vessels during surveys or while on passage. These data are used for the production of improved and more comprehensive bathymetric maps and grids, particularly in support of the GEBCO Project. Bathymetric data located at the IHO DCDB can be viewed/filtered via a web map interface, and freely downloaded. The map interface can be accessed from: <http://maps.ngdc.noaa.gov/viewers/bathymetry/>

Contribution of bathymetric data to the IHO DCDB

The GEBCO Project is dependent on the availability of bathymetric data and undersea feature information. In order to achieve its goals, GEBCO proactively collects and stores bathymetric data for the world's oceans. GEBCO has worked towards improving its participation in regional mapping activities and has also appointed representatives to participate in selected IHO Regional Hydrographic Commission (RHC) meetings.

Traditionally GEBCO has focused on areas deeper than 200 m, however, it is now actively collecting data in shallow water areas to support activities such as coastal zone management and the mitigation of seaborne disasters such as storm surges and tsunami inundation. IHO and IOC Member States are encouraged to contribute bathymetric data in shallower coastal areas to support the production of higher resolution gridded data products, which will benefit coastal nations through improved tsunami modelling, for example.

Bathymetric publications

- B-4 - Information concerning recent bathymetric data

Bathymetric data from ten multi-beam and single beam surveys were added to the IHO DCDB during 2016. These data can be viewed or downloaded using the web mapping facility provided at: <http://maps.ngdc.noaa.gov/viewers/bathymetry/>

In response to IHO Circular Letter 11 of 2016, requesting Member States to provide bathymetry in coastal and shallow water areas, contributions were received from Argentina, Colombia, Brazil, Ukraine, and Uruguay. An index of data received is available from the GEBCO website at: http://www.gebco.net/data_and_products/gridded_bathymetry_data/shallow_water_bathymetry/

- B-6 - Standardization of undersea feature names

Edition 4.1.0 of Publication B-6 on the Standardization of Undersea Feature Names entered into force in September 2013 (English/French version). It provides guidelines for naming features, a naming proposal form and a list of generic terms with definitions. Edition 4.1.0 of B-6 is now available in English/Spanish, English/Russian, English/Japanese, English/Korean and English/Chinese versions. Some definitions were reviewed in 2015 in preparation of a future edition. A draft new edition of B-6 was developed in 2016 including the outcome of the work done by the SCUFN Generic Term Sub-group and some editorial corrections. Due to the concerns raised at the 29th meeting of SCUFN on possible improvements of B-6 to better reflect some sensitive cases, and considering that the fast-track review procedure was not finalized yet, SCUFN Members agreed that there was no need for speeding up its review within SCUFN and issue a new edition.

- B-8 - GEBCO Gazetteer of Undersea Feature Names

The on-line GEBCO Gazetteer of Undersea Feature Names, developed by the IHO DCDB, was maintained jointly by the IHO Secretariat and IHO DCDB and was fully available to the users during the period of this report. The continuing maintenance of this interface, for corrections and possible upgrades, was raised at the SCUFN-28 meeting in October 2015, as matter of concern, especially since the Gazetteer of Undersea Feature Names database is connected to other geospatial portals around the world (Marine Regions for instance). All decisions made at previous SCUFN meetings were implemented into the database, thanks to a contract awarded in 2016.

- B-9 - GEBCO Digital Atlas

IHO publication B-9 - *GEBCO Digital Atlas* (GDA) - is a two-volume DVD and CDROM set which contains: the GEBCO global bathymetric grid at 30 arc-second intervals; the GEBCO One Minute Grid global bathymetric grid, a global set of digital bathymetric contours and coastlines, the GEBCO gazetteer of undersea feature names and a software interface for viewing and accessing the data sets.

- B-11/IOC Manuals and Guides, 63 - *GEBCO Cook Book*

The GEBCO Cook Book is a technical reference manual that has been developed to assist and encourage participation in the development of bathymetric grids. It is an important GEBCO reference document that is used by academic institutions and hydrographic organizations. The Cook Book covers a wide range of topics such as data gathering, data cleaning, gridding examples and provides an overview of different software applications used for producing bathymetric grids.

The Cook Book was first released as IHO Publication B-11 in April 2012 and as IOC Manuals and Guides, 63 in October 2012. The Cook Book has been adopted as an important resource by the University of New Hampshire, the Texas A&M University and various other educational institutions. The Cook Book was last updated in December 2016. The updates include a new chapter on mosaics, a new chapter covering “Nautical Chart Adequacy” and updates to the sections on Satellite Derived Bathymetry and some of the internal references.

Outreach and education about ocean mapping

GEBCO continues to promote the importance of bathymetric data to the international community.

The GEBCO Outreach Working Group considered how to improve the GEBCO website in order to make ocean mapping more interesting / enticing for scholars and students. The WG discussed what content could be added to make it a valuable resource for student projects, and considered how this could be harmonize with Seabed 2030 Project developments.

A significant GEBCO annual outreach event is the annual Science Day which includes oral and poster presentations on topics relating to ocean-floor mapping and its applications.

The IHO-IOC GEBCO Cook Book (B-11, Manuals and Guides 63) continues to be used as an important educational resource for ocean mapping students.

GEBCO Website

The GEBCO website provides access to information about GEBCO's products, services and activities. The website can be viewed at <http://www.gebco.net>.

GEBCO bathymetric maps and data sets can be downloaded from the website. These continue to be accessed by a wide user community that includes commercial and academic sectors and the general public. The GEBCO website also provides access to the world grid via a Web Map Service (WMS). The GEBCO's website is maintained and updated on behalf of GEBCO by the BODC since July 2008.

GEBCO Gazetteer (B-8) for internet access

Maintenance of the underlying geospatial database of the on-line gazetteer is carried out by a network of appointed editors (mainly, SCUFN members) under the coordination of an Administrator who is currently the SCUFN Secretary from the IHO Secretariat. In order to improve the content and the quality of the Gazetteer and to remove some inconsistencies, a comprehensive review and corrections of anomalies were undertaken by contract in 2015 and 2016 under the IHO Secretariat supervision. The results, covering about 3,000 feature names, have been used to improve significantly the quality and consistency of the database.

The continuing maintenance of the interface, for corrections and possible upgrades, was raised at the SCUFN-28 meeting in October 2015 and also at SCUFN-29 in September 2016, then at the 33rd meeting of the GEBCO Guiding Committee as matter of concern, especially since the Gazetteer of Undersea Feature Names database is connected to other geospatial portals around the world. Dysfunctions of the maintenance interface were also reported to NOAA at the end of 2016 that have prevented the IHO Secretariat from including the names approved at SCUFN-29 into the database.

Officers

GEBCO Guiding Committee:

Chair - Mr Shin Tani (Japan – IHO)
 Vice-Chair - Professor Martin Jakobsson (Sweden – IOC)
 Permanent Secretary - Mr David Clark (USA – IOC) (until 2015)
 Permanent Secretary - Mr David Wyatt (IHO) (from 2016)

Sub-Committee on Undersea Feature Names (SCUFN):

Chair - Dr Hans Werner Schenke (Germany – IOC)
 Vice-Chair - Dr Yasuhiko Ohara (Japan – IHO)

Technical Sub-Committee on Ocean Mapping (TSCOM):

Chair - Dr Karen Marks (USA – IOC)
 Vice-Chair - Mr Thierry Schmitt (France – IHO)

Sub-Committee on Regional Undersea Mapping (SCRUM):

Chair - Professor Martin Jakobsson (Sweden – IOC) (until 2016)
 Chair - Dr Vicki Ferrini (USA – IOC) (from 2016)
 Vice-Chair - Ms Pauline Weatherall (UK – IHO)

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