



# TSCOM report to GC 2016

Preliminary report

13-14 October 2016

Hosted by the Hydrographic and Oceanographic  
Service of the Chilean Navy (SHOA)

Viña del Mar, Chile

# Venue

TSCOM met jointly with SCRUM October 10-11, 2016, at the SHOA Naval Club

We gratefully acknowledge the Chilean Navy for:

- Excellent logistical support
- Fine venue
- Superb hospitality provided by our hosts

# Reports of Activities

- TSCOM tabled reports on:
  - GEBCO\_2014 grid
  - EMODNet
  - Crowd-Sourced Bathymetry
  - Outreach
  - High-Resolution Product
  - Science Day
- Reports of regional mapping activities and Seabed 2030 were taken under SCRUM
- See reports for the details

# TSCOM Membership

## **Committee Members**

Jenifer Austin – Google Earth, USA

Vicki Ferrini – LDEO, USA

John Hall – Geological Survey of Israel

Timothy Kearns – OneOcean Corporation, USA

Karen Marks – NOAA, USA (Chair)

Marzia Rovere – Istituto di Scienze Marine, Consiglio Nazionale delle Ricerche, Italy

Thierry Schmitt – SHOM, France (Vice Chair)

Walter Smith – NOAA, USA

Shin Tani – Hydrographic and Oceanographic, Coast Guard, Japan

Pauline Weatherall – British Oceanographic Data Center, UK

## **Scientific Advisors**

Paul Elmore, NRL, USA

Tony Pharoah, IHO, Monaco

Martin Jakobsson, Stockholm University, Sweden

David Sandwell, Scripps Institution of Oceanography, USA

# TSCOM Leadership

- Thierry Schmitt appointed Vice Chair in Aug. 2016
- Karen Marks appointed Chair at 2013 GEBCO GC Meeting
- 10 Members on TSCOM committee, but others attend meetings and are active in TSCOM/SCRUM Working Group
- Seek new committee members?

# ToRs & RoPs- Updates?

- Potential updates to 2008 version
- Biggest changes are:
  - Reduce Chair and Vice Chair terms from 5 to 3 years, may be re-elected to additional terms (Chair has served 3 yrs)
  - Eliminate terms for TSCOM members
  - Members not asked to resign if absent from 2 consecutive meetings
  - Members not appointed by GC

# ToRs & RoPs



## TECHNICAL SUB-COMMITTEE ON OCEAN MAPPING (TSCOM) (*former SCDB*) TERMS OF REFERENCE AND RULES OF PROCEDURE

### 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.

By 2006 it was recognized that all GEBCO products and nearly all cartographic activities are “digital”, and after the SCDB XXII meeting in Bremerhaven, Germany it is 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

- 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;
    - 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.

# ToRs & RoPs



- 1.2.3 Provide advice to individuals and appropriate authorities on the 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 **or project teams**, 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~~ **Members should be encouraged to participate** 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 **in their own right** acting exclusively for the benefit of the Joint IHO-IOC GEBCO Project.<sup>1</sup>
- 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 Chair~~person~~ and Vice-Chair~~person~~ shall be elected by the Sub-Committee subject to endorsement by the GGC.

<sup>1</sup> So far as IOC is concerned, the Sub-Committee is classed as a Joint Group of Experts under the IOC guidelines for



# ToRs & RoPs



- 2.3 The Chairperson and the Vice-Chairperson are elected for a **three 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~~ **terms if desired by the sub-committee members and available**.
- 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 **invitation discretion** of the Chairperson or Vice-Chairperson.
- 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 **as Expert Contributors** 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 **one more than half the members of the 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.

# TSCOM Work Plan and Budget

## 1.1. IHO-IOC GEBCO Technical Sub-Committee on Ocean Mapping (TSCOM) Work Plan 2017-2018

### 1.1 TSCOM Tasks

- B Ensure conduct of TSCOM meeting in 2017 (IHO Task 3.8.1.2)
- C Ensure effective operation of IHO DCDB (IHO Task 3.8.2)
- D Encourage the contribution of bathymetric data to the IHO DCDB (IHO Task 3.8.3), identify priority areas for regional mapping (IHO Task 3.8.3.1) and promote data contribution through GEBCO participation in RHCs meetings (IHO Task 3.8.3.2)
- E Maintain IHO bathymetric publications (IHO Task 3.8.4) including: B-4 (IHO Task 3.8.4.1), ~~B-7 (IHO Task 3.8.4.3)~~, B-9 (IHO Task 3.8.4.5), B-10 (IHO Task 3.8.4.6) and B-411(IHO Task 3.8.4.7)
- F Develop the on-line function of B-4 (Information concerning recent bathymetric data) (IHO Task 3.8.4.8)
- G Contribute to outreach and education about ocean mapping (IHO Task 3.8.5) by development of outreach and educational materials (IHO Task 3.8.5.1) and printing of IHO-IOC GEBCO World Map (IHO Task 3.8.5.2)
- H Ensuring IHO-IOC GEBCO Web site is kept current and updated regularly (IHO Task 3.8.6)
- I Develop short course and course material on compiling digital bathymetric models (DBMs) to be included in GEBCO from a heterogeneous bathymetric source database (IHO Task 3.8.7)

| Task | Work item  | Priority<br>H-high<br>M-medium<br>L-low | Milestones | Start Date | End Date | Status<br>P-planned<br>O-ongoing<br>C-completed | Contact Person(s)<br>* indicates leader   | Related Pubs/Standard | Funding Bid (€) | GGC Decision |
|------|--|---|------------|------------|----------|---|---|-----------------------|-----------------|--------------|
| B    | Ensure conduct of TSCOM meeting                                | H                                       |            | 2017       | 2017     | P   | Chair TSCOM                               |                       |                 |              |
| C    | Ensure effective operation of IHO DCDB                         | H                                       |            | Continuous |          | O   | Director DCDB                             |                       |                 |              |
| D1   | Encourage the contribution of bathymetric data to the IHO DCDB | H                                       |            | Continuous |          | O   | All members of GEBCO GC through the Chair |                       |                 |              |

# TSCOM Work Plan and Budget

| Task | Work item  | Priority<br>H-high<br>M-medium<br>L-low | Milestones   | Start Date                   | End Date   | Status<br>P-planned<br>O-ongoing<br>C-completed | Contact Person(s)<br>* indicates leader   | Related Pubs/Standard   | Funding Bid (€) | GGC Decision |
|------|--|---|--|------------------------------|------------|---|---|---|-----------------|--------------|
| D3   | Promote data contribution through GEBCO participation in RHCs meetings | H                                       |  | Continuous                   |            | O   | All members of GEBCO GC through the Chair |   | See SCRUM WP    |              |
| E    | Maintain IHO bathymetric publications                                  | M<br>H<br>M<br>L<br>M                   |  | Continuous                   | Continuous | O   | All members of GEBCO GC through the Chair | B-4 - Information concerning recent bathymetric data<br>B-7 - GEBCO guidelines<br>B-9 - GEBCO digital atlas<br>B-10 - The history of GEBCO<br>B-11 - GEBCO Cookbook | See SCRUM WP    |              |
| F    | Develop the on-line function of B-4                                    | M                                       |  | 20??                         | 20??       | O   | Director DCDB                             |   |                 |              |
| G3   | Printing of IHO-IOC GEBCO World Map                                    | M                                       |  | 20??                         | 20??       |   | Chair TSCOM + Chair SCRUM                 | B-9 - GEBCO digital atlas   | 2,000           |              |
| H    | Ensuring IHO-IOC GEBCO Web site is kept current and updated regularly  | M                                       | Add news items relating to GEBCO's activities<br><br>Add documents relating to GEBCO's meetings and events | Continuous<br><br>Continuous |            | O<br><br>O                                      | BODC                                      |   | 5,000           |              |

# TSCOM Work Plan and Budget

| Task | Work item  | Priority<br>H-high<br>M-medium<br>L-low | Milestones   | Start Date | End Date | Status<br>P-planned<br>O-ongoing<br>C-completed | Contact Person(s)<br>* indicates leader | Related Pubs/Standard | Funding Bid (€) | GGC Decision |
|------|--|---|--|------------|----------|---|---|-----------------------|-----------------|--------------|
| I    | Develop short course and course material on compiling digital bathymetric models (DBMs) to be included in GEBCO from a heterogeneous bathymetric source database | M                                       | Break-out session at 2016 TSCOM/SCRUM meeting (assign leader for course development) | 2016       | 20??     | O   | Chair TSCOM                             |                       |                 |              |

## 1.2 TSCOM Meetings (IHO Task 3.8.1.2 refers)

| Date                | Location                       | Activity                     |
|---------------------|--------------------------------|------------------------------|
| 1-4 October 2012    | IHB, Monaco                    | XXVIII <sup>th</sup> Meeting |
| 7&9 October 2013    | Venice, Italy                  | XXIX <sup>th</sup> Meeting   |
| 11-13 December 2014 | Mountain View, California, USA | XXX <sup>th</sup> Meeting    |
| 5-7 October 2015    | Kuala Lumpur, Malaysia         | XXXI <sup>th</sup> Meeting   |
| 10-12 October 2016  | Viña del Mar, Chile            | XXXII <sup>th</sup> Meeting  |

Chair: Karen Marks  
Vice-Chair:  
Secretary: David Wyatt

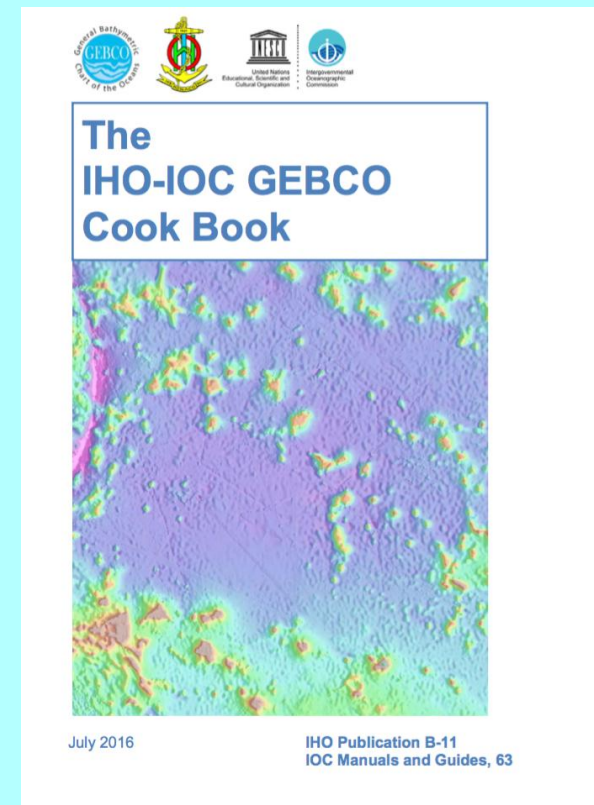
Email: Karen.Marks@noaa.gov  
Email: Thierry.Schmitt@shom.fr  
Email: adso@iho.int

# Future GEBCO\_2014 Updates

- Update to GEBCO\_2017 next year, incorporate new and updated regional bathymetric compilations and ENC data
- Keep SRTM30\_Plus V5 as base grid
- After GEBCO\_2017, next update results from Seabed 2030 efforts
- Plan new release paper for GEBCO\_2017 including GEBCO Hi-Resolution Product

# New Updates to Cook Book

- **Updates published Dec. 2015 and July 2016**
- Chapter 8, Section 8.2.11, *References updated (Doucette)*
- Chapter 11, "LANDSAT 8 Satellite-Derived Bathymetry" *has been replaced with an updated version (Pe'eri et al.)*
- Chapter 13.0 Mosaics in CARIS (*Crespo*)
- Chapter 14.0 Nautical Chart Adequacy (*Klemm et al.*)
- Chapter 15.0 Map Digitizer Program Version 2.1.0 (*Keller and Hall*)



# Short Course

- Develop course materials on gridding data for inclusion in GEBCO grid
- IHO-IOC Cook Book has chapters with step-by-step instructions on gridding data
- Can course be built from Cook Book chapters?
- Should course be offered online?
- Spans TSCOM, SCRUM, and Outreach WG
- Leader needed for course development

# 11<sup>th</sup> Annual GEBCO Science Day



- SHOA Naval Club Conference Room, Oct. 12, 2016
- Tim Kearns and Jaya Roperez, Conveners
- 9 oral and 6 poster presentations
- Excellent presentations and forum



# Nautical Chart Adequacy Workshop



- Workshop developed and hosted by NOAA Coast Survey and UNH/CCOM
- Trained hydrographers on procedures to assess adequacy of nautical charts using public information
- **Used Chapter 11 “Nautical Chart Adequacy Procedure” of Cook Book**

Shachak Pe’eri and Rochelle Wigley, UNH/CCOM

Workshop- July 2016

# Update the GEBCO grid Break-out

- Led by Jakobsson, Weatherall, Marks, Schmitt
- Discussions on regional compilations and base grid
- Notes to be submitted to Permanent Secretary
- Activity is ongoing

# Update the GEBCO grid Break-out Results

- **Update to GEBCO\_2017 grid next year**
- **Keep current SRTM30\_Plus V5 base grid**
- **After GEBCO\_2017, next update results from Seabed 2030 efforts**
- **Plan new release paper for GEBCO\_2017 including GEBCO Hi-Resolution Product**
- **Define metadata requirements for contributing to GEBCO**
- **Identify regional contributors to provide data for 2017, optimally at higher resolution**
- **Investigate how to contact industry to ask for data contributions**

# Break-out on Outreach

- Led by Sung, Chang, and Weatherall
- Discussions on outreach activities – reported by WG
- Notes to be submitted to Permanent Secretary
- Activity is ongoing

# Break-out on Seabed 2030

- Led by Jakobsson, Weatherall, Marks, Schmitt, Taylor, Ferrini
- Discussions on Roadmap for Future Ocean Floor Mapping- reported by SCRUM
- Notes to be submitted to Permanent Secretary
- Activity is ongoing

# END OF PRESENTATION

# Seabed 2030 Break-Out Results:

## What is lacking? – Group 1

- Promo material is needed stating why we need to map the ocean floor, for use by industry, public, government, crowd-source, academia?
- Metadata should include a provided datum and projection
- Seabed 2030 needs to communicate how contributing data may be advantageous- socially, corporate, as a tax deduction, socially, and to academia (brochure?)
- Make clear that any resolution is acceptable, but highest resolution is preferred
- Roadmap is not finished with regard to regional organizations
- GEBCO needs to be clear about developing products that will serve the user base
- Demonstrate how unmapped the ocean floor is in areas of high public interest (missing plane area, sub-crash area, etc.)
- Build marketing, communication and outreach into Seabed 2030 Roadmap
- Communicate that some areas will be harder, or easier to map
- Think bigger and use network we already have- make it an international initiative

# Seabed 2030 Break-Out Results:

## What is lacking? – Group 2

- The budget is missing from the Roadmap
- Clear distinction on where Seabed 2030 fits into GEBCO, both organizationally and operationally
- Make the distinction between the role of SCRUM and the role of a regional center
- What is a regional center, and what is expected from them, what is the governance piece regional and global – equality of regional centers
- The outcome should be more than just a map- how will it benefit the world?
- How do we measure success? Resolution or coverage as yardstick measurement?
- Annual reports of progress and improvements- measure % and resolution achieved, and remaining gaps- give examples of benefits
- Compilation is job of Seabed regional centers- let industry decide where to collect, guided by knowledge of gaps
- What is the motivation to survey the most remote parts of the oceans, where surveys are not needed?
- How do we tie the marine component into the broader global community of geospatial information managers?
- What is the benefit and motivation for an organization to contribute data?



# Seabed 2030 Break-Out Results:

## What is lacking? – Group 2

- Fundraising plan to pay for surveys, or stimulus for startups and innovation to map seafloor
- Missing is engagement plan with technology providers, software, hardware, cloud space, identify potential donors like Google, Amazon, Microsoft, IBM, etc.

# Seabed 2030 Break-Out Results:

## What is lacking? – Group 3

- Business plan and financial plan have been developed, but not yet included in Roadmap because the structures may change depending on funding
- Demonstrate that the Roadmap plan can work on one or two regional mapping centers, and when successful then expand to other regional centers
- Tie climate change to the global ocean floor
- Roadmap needs some discussion of output products
- This is the goal, these are the outputs, and this is how we get there, a one-page handout (executive summary and mission statement), also translate to multiple languages
- Potential tax advantage for contributors may help motivate data sharing
- Offer fellowships for students to work in Regional data centers?
- How does Seabed 2030 program relate to Nippon training program
- Define what GEBCO is today, and what is Seabed 2030, s statement why 2030