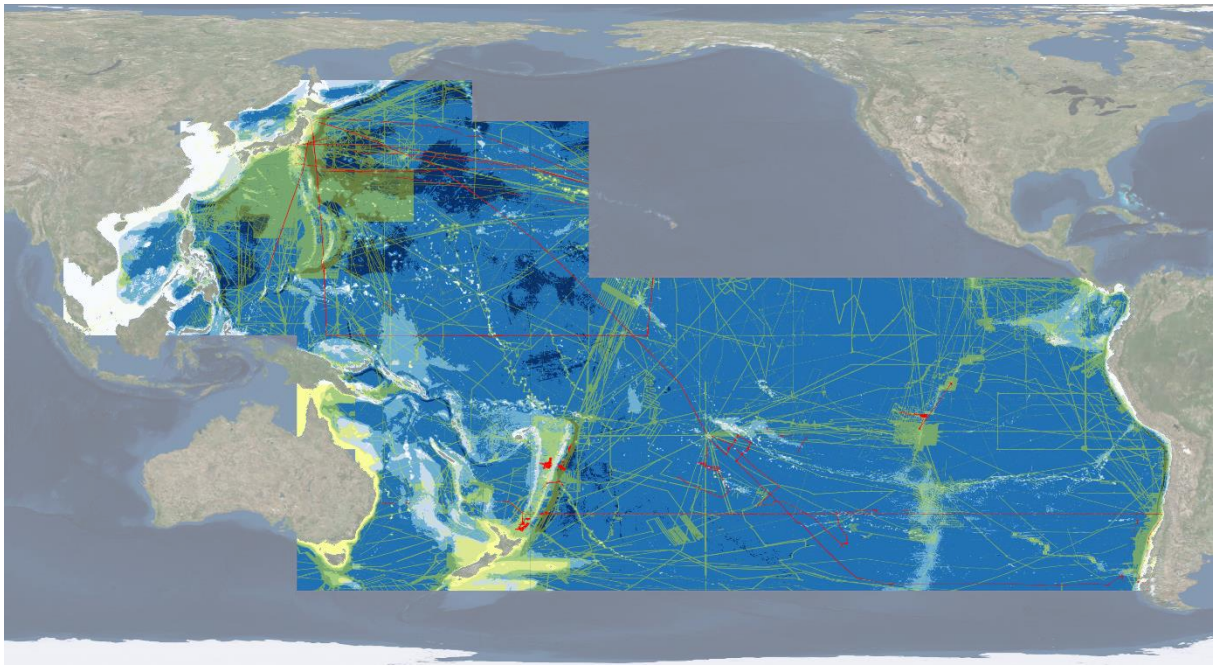
Nippon Foundation – GEBCO – Seabed 2030

Inaugural South and West Pacific Centre Workshop

3rd – 6th March 2019 - Royal Port Nicholson Yacht Club, Wellington, New Zealand

Factual Report



Geoffroy Lamarche,
Convenor and Chair; NIWA and University of Auckland

Committee: Jenny Black (GNS Science); Adam Greenland (LINZ); Kevin Mackay (NIWA); Helen Neil (NIWA); Glen Rowe (LINZ); Vaughan Stagpoole (GNS Science); Tilmann Steinmetz (NIWA); Deborah Frost (LINZ); Evgenia Bazhenova (NIWA)

email: pacific@seabed2030.org

Meeting programme and note: https://seabed2030.gebco.net/news/south_west_pac_rmc_mtg_2019.html

Synopsis

Seabed 2030 (SB2030) is a collaborative project between GEBCO and the Nippon Foundation which aims to facilitate the complete mapping of the ocean floor by the year 2030. The Seabed 2030 South and West Pacific Regional Data Centre (SaWPaC) tasks are to identify existing data in the assigned region; compile these into regional gridded bathymetric datasets; work to encourage and improve coordination between mapping expeditions; develop protocols and tools for data collection and common software needed to assemble; and attribute appropriate metadata as the Centre assimilates regional grids using standardized techniques.

SaWPaC is responsible for an area covering c. 124,000,000 km^2 from the west coast of South America to the east coast of Australia and north to Japan, Korea and China. It includes the Exclusive Economic Zones of 39 countries as well as a very large region Beyond National Jurisdiction. The centre is hosted at the National Institute of Water and Atmospheric Research (NIWA) in New Zealand, and coordinated by a team from NIWA, GNS Science and Land Information New Zealand (LINZ).

SaWPaC, like the other three Regional Centres was tasked with appointing a Regional Mapping Committee (RMC). RMCs consist of a group of regional key representatives for the mapping activities within the ocean region of responsibility who will work with the Regional Centre in identifying sources and facilitating the collection of bathymetric data in the region.

On 3-6 March 2019, the Centre held its inaugural (first) Regional Mapping Committee Meeting in Wellington. The objectives of this meeting were to:

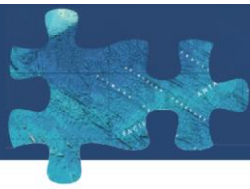
- Establish a Regional Mapping Committee with representatives from relevant organizations,
- Identify sources of bathymetric data,
- Discuss methods and protocols of data sharing, and management,
- Identify upcoming mapping expeditions; and
- Discuss all matters related to the efficient and smooth operation of the project.

Sixty-five people from 18 countries within and around the Pacific Basin registered an interest in participating in the meeting. Delegates originating from 13 countries attended the workshop and two from New Caledonia attended remotely. Five Nippon Foundation - GEBCO Alumni attended the workshop demonstrating the strong link with that educational program.

During the 2.5 days of the workshop, Wellington gratified us with some of its finest weather. Following a short formal Māori welcome, the workshop opened with a keynote address from Dr Robin Falconer, ex. Chair of GEBCO Guiding Committee and member of the Seabed 2030 establishment team, who presented the Seabed 2030 Project and its mission. The day continued with presentations on the Seabed 2030 Project and initiatives that could benefit from and to the Project. Some great pieces of work are being undertaken in Japan, the Pacific and Australia. On Tuesday, presentations on a slightly more technical level focused on data portal and data sharing, the XPRIZE and the potential that Satellite Derived Bathymetry could bring to the Project.

Discussions ensued in the afternoon from which we drafted **a list of action points** (see below). Wednesday morning consisted of three short break-out sessions during which we discussed the role of the Regional Mapping Committee, the need to facilitate data sharing by developing data sharing agreement and the importance of understanding the value proposition for all stakeholders.

Value proposition indeed vary for different stakeholders, and it is important that Seabed 2030 centre head be aware of these. During a short break-out session, participants listed their perceived added-value that Seabed 2030 could provide to their sector. These were varied and extensive from those already recognised by the Seabed 2030 team such as government involvement in UN Decade of Ocean Science for Sustainable Development, Education, Scientific database at the Pacific scale and safety of navigation, to those more



novel such as international interoperability; tax benefit from participating, market opportunity, career development, personal development and Building relationships with coastal states

The **sharing of the data** has been the focus of good discussion too. The Data Sharing Agreement of the Seabed 2030 (see appendix) was discussed, and many ideas shared as to how to improve it. The community was keen for the SaWPaC to host a data portal containing all open data submitted.

One key point discussed, of course, was the **role and composition of the RMC**. While most seemed to favour a large, open group, a few participants strongly recommended to restrain it to a small number of people so that it is functional. A list of 17 points was drafted for the of the RMC: these include: searching for data and funding; advocating and building the community; involving regional and government leaders; developing crowdsourcing initiatives; providing feedback to Seabed 2030 as point of contact for their country/sector; source of local knowledge; Prioritization of area of mapping.

It is interesting to note that the role of the RMC still needs to be clarified as steering or advisory committee; as a committee or a community in terms of roles/weight. The need to ensure that every region of the Pacific is represented/involved was voiced clearly and will be the role of the Centre Head as chair. In short, the RMC is a source of local knowledge, for building regional network, providing guidance, and should be open for opinions and contributions. Members should be active and dynamic.

An **annual meeting of RMC** was discussed and the possibility to hold them in another (sub-)region was well received (e.g. east Pacific, NW Pacific). Also, a joint one with the Atlantic-Indian Centre.

There was a request for sending letter of invitation/intent for formal support from the GDACC. This will need to be investigated.

Other tasks such as developing an online calendar, list of possible meetings, RMC mailing list, generic pptx presentations to pass a consistent and clear message about the SB2030 goals are all already being implemented.

This factual report includes the notes taken during the meeting and a list of action points, and list attendees and a data sharing agreement template. The presentations are available in PDF format (here). We strongly encourage members of the regional mapping community to share information about the upcoming meetings, available online resources etc., through SaWPaC.

The actions points raised during the meeting are many and wide-ranging from setting up a strategy of communication, engaging with industry, developing specific outreach events, developing standard data sharing agreements, reviewing metadata, ensuring data security, etc. We will reflect on these action points and propose a timeline.

The response of all delegates was overwhelmingly positive regarding the Project, which bodes very well for its future, even though all recognised the immense task at stake.

We understand many tried hard to attend the meeting, but travelling to New Zealand is not always easy, and requires allocating a substantial amount of time for it. We will ensure that everyone is kept updated and involved in the activities of the centre.

Acknowledgements

We wish to thank Deborah Frost from LINZ for her enormous effort in helping organising the workshop. Khushboo Jhugroo relentlessly took the notes during the two first days of the workshop, Evgenia Bazhenova took notes on the final morning. These notes are given below. Amelie Vavasseur and Alexia Saint-Macary helped with the registration desk. Funding was provided by the Seabed 2030 Project for organising this workshop.

We wish to gratefully acknowledge the financial support of **The University of Auckland** which was essential in bringing experts from the Pacific Islands to the meeting.

Actions Points

This is a list of 15 actions points generated from Tuesday's afternoon discussion.

Action	What	Priority
1	Finalise the list of members of the TMC	1
2	Set up strategy for communication with industries. A table of point-of-contacts for sectors. How do we identify roles in SaWPaC's RMC? How do we communicate (Dropbox, weblinks, Slack, Microsoft Team, Monday.com…)?	1
3	Develop Web site w.r.t. gaps (online and offline solutions)	1
4	Connection with National Initiative	1
5	How to submit data, who to contact. Consistent procedure for everyone.	1
6	Standard licensing agreements	1
7	Review metadata DCDB currently has for recommended metadata. Need for minimum standard.	1
8	Ensuring we have the appropriate procedures for attributions.	1
9	Create a "common message" for outreach purposes	1
10	Create a common internal communication channel for RMC	1
11	Engagement with shipping companies re. shipping line (see Act 12)	2
12	Identify priority areas of "no data" within the SaWPaC region	2
13	Contact SB2030 Director to investigate about adding an attribute to AIS	2
14	Data security. Getting a clear idea of the position we are in; How are we going to legally contribute? Know licensing procedures.	2
15	Outreach and industry contacts in South America	3

List of Participants

Sorted by last name

1st Name	Surname	Organisation	Email	Country
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Crossman	David	IIC Technologies Ltd	david.crossman@iictechnologies.com	NZ/AUS

* Presented remotely

** Registered but did not attend

Online bathymetric portals mentioned by the workshop participants

Database name	Organisation	Coverage	Link to online bathy portals/viewers
CCOM/UNH	CCOM/UNH	North Pacific	https://maps.ccom.unh.edu/portal/apps/webappviewer/index.html?id=842b171a903b48b8aec2a193f1ce6a73
SaWPaC	NIWA	South & West Pacific	https://data-niwa.opendata.arcgis.com/pages/seabed2030
AusSeabed	Geoscience Australia	Australia	http://ausseabed.gov.au/surveys-data
DeepReef Explorer	James Cook Uni.	Great Barrier Reef and Coral Sea bathymetry	3D-GBR project https://www.deepreef.org/bathymetry/65-3dgbr-bathy.html crowd-source bathymetry https://www.deepreef.org/projects/246-crowdsourcebathy.html
SHOM	SHOM	Including Pacific	https://data.shom.fr
IHO DCDB	NOAA	Global	https://maps.ngdc.noaa.gov/viewers/iho_dcdb
SeaDataNet	IFREMER	Global	Metadata on bathymetric data acquisition http://seadatanet.maris2.nl/v_cdi_v3/search.asp

Calendar of meetings of interest mentioned by the workshop participants

Meeting	Contact person	Web link	Location	Date
Data standards workshop	K. Picard		Geoscience Australia	Week of May 20th
AusSeabed workshop at AMSA 2019 Conference	K. Picard	http://amsa19.amsa.asn.au/workshops/	Perth, Australia	July 12
21st Pacific GIS and RS users conference	S. Singh	www.picgisrs.org	Fiji	Last week Nov.

We encourage members of the regional mapping community to share information about the upcoming meetings with SaWPaC, which will further distribute it to people on the contact list.

Programme Summary

Monday 4th March

Introduction - chair Geoffroy Lamarche

- Mana Whenua Mihi Whakatau - Māori (indigenous people of the land) welcome, *Peter Jackson*, Kaumatua - Taranaki Whānui; *Geoffroy Lamarche* (NIWA, SaWPaC Head)
- Welcome - *Helen Neil*, General Manager, Operations, NIWA
- Opening keynote - SB2030: Past, present and future, *Robin Falconer* (GEBCO)

Session 2.1: Presentations (Data in the region) - chair Vaughan Stagpoole

- Introduction and objectives, *Geoffroy Lamarche* (NIWA, SaWPaC Head)
- Bathymetric Surveys of JHOD: Sharing in SB2030, *Masanao Sumiyoshi* (JHOD, Japan Coast Guard)
- Introduction to JAMSTEC and its possible contribution to SB2030, *Eiichi Kikawa* (JAMSTEC)

Session 2.2: Presentations (Data in the region) - chair Adam Greenland

- South and West Pacific Centre: progress so far, *Kevin Mackay and Tilmann Steinmetz* (NIWA)
- Arctic and North Pacific RDACC Update, *Paul Johnson* (CCOM-UNH)
- Bathymetric datasets held at SPC on behalf member countries, *Sachindra Singh* (SPC)
- AusSeabed: Collaborating to maximise Australian Seabed Mapping Efforts, *Kim Picard* (Geoscience Australia)
- Seabed mapping efforts in the Coral Sea, *Robin Beaman* (James Cook University)

Session 3: Presentations (Data in the region) - chair Jenny Black

- French contribution to SB2030 (SHOM), *Mikael Le Gleau* (SHOM Nouméa)
- Deepsea swath bathymetric data from research vessels in the EEZ of New Caledonia, Wallis and Futuna, French Polynesia, *Julien Collot* (Geological Survey of New Caledonia, Nouméa)
- ~~Status of Bathymetry Data in Cook Islands, *Vaipo Mataora* (Infrastructure Cook Islands)~~ [cancelled]
- The RNZN and SB2030 - *CDR Matt Wray* (Royal New Zealand Navy)
- Satellite-derived bathymetry – filling shallow water depth gaps – *Magnus Wettle* (EOMAP)
- Day 1 wrap up

Tuesday 5th March

Session 4: Presentations (Data centres, collection, technology) - chair Kevin Mackay

- GNFA Team's entry in the XPRIZE competition, *Evgenia Bazhenova* (GEBCO Alumni, SaWPaC)
- The Role of the IHO Data Centre for Digital Bathymetry in SB2030, *Gina Brewer-Mills* (NOAA)
- Bathymetric Data Management: Challenges, Approaches and Innovations, *Caitlyn Raines* (ESRI)
- Open Geospatial Consortium (OGC) on DGGS (Discrete Global Grid System), *Robert Gibb* (Landcare Research)

Session 5: RMC Discussion – led by Geoffroy Lamarche

- Discussion on Crowd-Sourced Bathymetry, short communications by *Kevin Mackay, Robin Beaman*
- Relationship Building in SW Pacific, *John Maschke* (Australasian Hydrographic Society)

Session 6: SAWPAC Data Discussion – led by Vanessa Lucieer

- Action plan for SaWPaC proposed

Session 7: Data Discussion cont. – led by Geoffroy Lamarche & Kevin Mackay

Wednesday 6th March Day 3 – Summary & Conclusions

Session 8: Discussions (strategy planning) – led by Geoffroy Lamarche

- Presentation of online bathymetric portals, Tilmann Steinmetz (NIWA), Gina Brewer-Mills (NOAA)
- Discussions on Regional Mapping Committee role and goals, value propositions for SB2030

Detailed notes

Session 1: Introductions by workshop participants (Chair: Geoffroy Lamarche)

The session included an introduction from Geoffroy Lamarche on the objective of the workshop and a keynote by Dr RF on the overall organisation and aspiration of the SB2030 Project

Session 2: Data in the South and West Pacific Region (Chair: Vaughan Stagpoole)

Geoffroy Lamarche (NIWA). Introduction and objectives

This presentation included a detailed account of the SB2030 Project with a focus on the South and West Pacific Centre. Key points raised were about the mission, the importance of good governance, the 4 pillars of the Project and the working programme.

- Governance will rely on the GEBCO guiding committee and sub-committees; the Project team consisting of the Director and Centre Heads and the advisory groups
- A multiresolution target grid will be implemented from 2020 as follow: 0–1500 m, 100 × 100 m; 1500–3000 m, 200 × 200 m; 3000–5750 m, 400 × 400 m;5750–11,000 m, 800 × 800 m; Only 6% has been mapped according to the above.
- The concept of **X+Y+Z = 100% is key to the project.**
- The preferred data flow is through the NOAA NCEI channel, but other supported data flows will be supported via the Regional Centres.
- Many questions revolved around "how to get involved in SB2030?"
- Stakeholders need to let the Project team know what the added value from is for their sector.
- Scientific uptake is important and need to be addressed specifically

Questions:

Q- About comms and outreach coverage?

R- A private communication organisation in the UK has been contracted to run the communication for SB2030.

IHO, IOC and Regional canters are supporting through their media offices,

- Outreach is the responsibility of global and regional centres. It includes organising seminars and conferences; 1 on 1 companies, corporations meetings for promoting SB2030.

Q- Enabling policy decisions. What routes for policy uptakes? Scientific or more direct routes?

R- Scientific route – this is self-nurtured

- Direct ones – need bigger effort. Director involvement + scientific advisor
- UN is also promoting SB2030 as one of its flagship project (top-down approach).
- This project will help define spatial areas on cabinet areas [Vaughan Stagpoole]

Q- How is the governance within SB2030 going to cope? Will it slow things down?

- Good governance is in place. GEBCO has administration protocols in place that can slow the process from time to time. NIWA is NZ govt owned, and can act fast [GL]

Masano Sumiyoshi (Japan Coast Guard). Bathymetric surveys of JHOD – sharing in Seabed 2030

This presentation focused on (1) Bathy surveys of JHOD and (2) How JHOD can contribute to SB2030. The main points were: the importance of multibeam data available and provided to SB2030; the importance of capacity building and how team japan will contribute to SB2030.

- Japan is like NZ being an archipelago with huge open ocean around; active tectonics and geology. Water Depths >4000-6000m on open ocean end.
- JHOD has 11 hydrographic and oceanographic departments throughout the country. Also using AUVs to get higher resolution data
- **How can JHOD contribute to SB2030?**
  - Large multibeam data coverage to the east is adding to the existing GEBCO 2014
  - Multibeam data in Antarctic; 4 grids near Japan's base eastwards. Data in SB2030.
  - JICA group training course for capacity building –6 months training programme for hydrographic surveyors every year since 1971.
  - Collaborate with JAMSTEC for SB2030.

Questions

Q- How much more multibeam contributions to come in 15yrs?

R- Difficult question. Surveys that were planned have been completed. JHOD does not plan to do similar surveys in the same region (no repetition); Continue to focus on the tasks they already working on now. Mapping, hydrographic + nautical charts etc.

Eiichi Kikawa (JAMSTEC). Intro to JAMSTEC and to possible contribution to Seabed 2030

Director-General, R&D Center for Submarine Resources; Co-chair: ODP SCIMP and IODP SCIMP. EK is new to SB2030.

- JAMSTEC has 6 sites in Japan. 60% of employees are scientists + engineers
- USD 400 million annual budget; Most goes to operations of 6 vessels (R/Vs), 1 D/V, 1 deep submergence vehicle, AUVs, ROVs
- Need to renew MOU with NIWA. Action for Geoffroy Lamarche
- Keen to contribute to SB2030 based upon agreement, considering JAMSTEC dataset, facilities, state of art management + visualizations; Not all data available to public as some are for govt (heavy bureaucracy).
- Prof Martin Jakobsson (GGC) and Mr Unno (Nippon Foundation) suggested that JAMSTEC be a Mapping Technology and Resource Center. More discussion needed and waiting for New SB2030 Director. Mr Shin Tani (GCC Chair) and Graham Allen (Acting Director SB2030) held discussions. Still some unknown as to how JAMSTEC could be involved.
- JAMSTEC contribution could include: Mapping new areas; new technologies;
- Member of Japan team joined Shell Ocean Discovery XPRIZE Round 2 (with DeSET)

Questions

Comment on JAMSTEC contribution: SB2030 is valuing JAMSTEC potential contribution to the project and is ready to help in any ways it can to define a mission. JAMSTEC databases are already key to the Project; w.r.t. technology innovation, someone must take the lead of WP4 and JAMSTEC is well positioned. The role is not imposed on JAMSTEC, JAMSTEC should work hand in hand with SB2030, organising workshops etc.; No specific idea of what JAMSTEC should do but it's independent to the 'mapping the gap' contribution to SB2030 [Geoffroy Lamarche].

Q - Connection in data? Other global datasets that can contribute to the project?

Comment- summarise X+Y+Z = 100. Build relationships and work together and bring data together for SB2030. Put together regional mapping committee. About collaboration and putting data together for SB2030. About Z = We can use existing technology to fill the gaps. Collecting new info with existing technology + use smart ideas to fill gaps. [Vaughan Stagpoole]

Kevin Mackay/Tilmann Steinmetz. Data we have so far + technology use to manage the data.

KMK:

- Data compilation, data sources, resolution improvement from GEBCO 2014 to GEBCO 2019
- SaWPaC 2018 has delivered a 15-arc sec grid for GEBCO 2019
- Processing & gridding raw and unprocessed data is very time consuming
- Two-way data flow between region's centres → can share data if available

Tilmann Steinmetz

- NIWA ArcGIS Online portal and data viewers
- SaWPaC interactive dashboard shows coverage and individual datasets contributions
- Work in Progress to improve viewers
- Want to deal with X and Y easily, but also for outreach. Use services set for various reasons. Hopefully make it easier to assess where the gaps are.
- ArcGIS extension for maritime bathymetry BIS/ Web BIS used for database management, makes it possible for remote users to query and filter the data based on metadata
- Metadata: a standard set of metadata can be used for SB2030 members to agree

Questions

Q – Are data formats important to know?

A - Focus on managing datasets. Go for data behind the gridded dataset if possible.
Plan is to deliver new set of data every year.
Decided not to include any land because this is being done by someone else.

Q - Grids supplied, then transferred to GEBCO?

A - We are responsible for gridding and releasing.

Q - Are metadata standard? What agencies?

A - NZ agencies, regional partners from data centres. We are not using the nicest standard yet.
Cookbook will be published on the GEBCO website (not SaWPaC).

Paul Johnson (CCOM/UNH). Arctic and Northern Pacific Ocean RDACC

- Group of Martin Jakobsson (Stockholm Uni) works on the Arctic bathymetry (IBCAO)
- Interactive viewer for IBCAO is updated weekly
- Fall 2018 - delivered new North Pacific gridded data to GDACC
- Have data that extend in South & West Pacific that can be provided to SaWPaC
- North Pacific Bathymetry, online portal
- BathyGlobe –new bathy viewer (Colin Ware/ UNH), true global data density, 3D viewing options.

Questions

Q - Different gridding method for SB2030?

A - Still evaluating what method, use GIS or existing method.

Sachindra Singh (SPC – Pacific community). Pacific spatial data infrastructure

- Geoinformatic services, regional initiatives – Note: SaWPaC should explore this.
- Pacific Spatial Data Infrastructure
- open data for sustainable development
- Prioritize open source software
- Pacific Regional Navigation Initiative, MEDIN metadata standard
- Capacity building – 21st Pacific GIS and RS users conference, Fiji, Nov 2019

Questions

Q - Who owns what? Resolved?

A - Signed contract about data agreement to be transferred LINZ. Then to GEBCO.

Kim Picard (Geoscience Australia). Australia's seabed mapping efforts – AusSeabed

- Australian national priorities – mapping, charting, marine biodiversity
- Marine Biodiversity Hub 2015-2021 – assessment of national bathymetric shelf data
- Standard Operating Procedures & best practice, field manuals (Australian multibeam guidelines)
- AusSeabed resources of bathymetry data
- Data standard workshop (week of the 20th of May)
- Seafloor Mapping Symposium, AusSeabed AGM & Workshop, July 11-12, Perth

Robin Beaman (James Cook Uni). Seabed mapping efforts in the Coral Sea

- Project 3D-GBR, Great Barrier Reef and Coral Sea bathymetry
- Crowd-Source Bathymetry on the Great Barrier Reef
- Future mapping opportunities: trans-Pacific cruise 2019, and others

Session 3: Data in South and West Pacific region - Online presentations. (Chair: Jenny Black, GNS)

Mikael Le Gleau (SHOM Nouméa). Contribution to SaWPaC - Seabed 2030

Remote presentation via Skype from New Caledonia

- Bathymetric data holdings at SHOM (SaWPaC should make use of it)
- EMODNET data sources – data in Norfolk Basin (SaWPaC should make use of it)
- IHO DCDB data holdings (SaWPaC should make use of it)
- DEM exists for Clipperton Island (100 m res. Grid), need similar grid for New Caledonia
- Technical suggestions for work as part of SaWPaC: metadata requirements, citations, webservices for visualization and data upload, data processing shall be documented

Questions

Q - What surveying capabilities have they got in terms of boats in New Caledonia?

A - 45m long, 6m long. Both equipped with brand new multibeam. started 1 year ago. One other vessel R.V. Allis based in Nouméa. French Polynesia – only 1 ship equipped with single beam. Soon to be equipped with multibeam.

Julien Collot (Geological Survey of New Caledonia, Nouméa). Deepsea swath bathy data from research vessels in EEZ of New Caledonia, Wallis & Futuna, French Polynesia

Remote presentation via Skype from New Caledonia; Co-authored with Samuel Etienne (NC), Cécile Pertuisot and Benoit Loubrieu (Ifremer). Includes a short presentation of the legal status of NC's EEZ.

New Caledonia

- EEZ 1.45 million km^2; 100 m resolution DEM (2009, updated in 2014). Publicly available.
- Foreign R/Vs need permission from NC Govt, French vessels need to provide data to French national ocean database
- Integrating new data with SHOM and Geosciences Australia
- French vessel L'Atalante coming in the region soon will bring more data. 100m res to 30m res.

- Access to data via Georep map explorer portal:

Ifremer

- SISMER database includes all data acquired from French R/Vs
- Many vessels in SW pacific. Portal show maps of French vessels and time periods
- Data are not directly publicly available. But metadata are. Data available upon request. Usage of data, geographical area – dissemination rules. Agreement required.
- Quality controlled. EMODnet bathy project. Quality indicators respected
- Data format: netcdf before 2010, Netcdf + Kongsberg after 2010
- Ifremer support SB2030 – provide multibeam data, technical support, processing data

Questions

Q - What was the method of data acquisition around Tahiti? Multibeam or what?

A – Yes, multibeam – by Atalante mostly. L'Allis did multiple surveys.

Q - IFREMER has a policy that one needs chief scientist's consent to access data so what is the next step when CS retires?

A - (received at review time from Cecile Pertuisot, IFREMER): data distribution is complex as bathymetric data are global and acquired over several EEZ. A moratorium of 3 years is generally put in place after acquisition during which the Chief Scientist/Voyage Leader may be consulted. This is to provide opportunity for the science crew to publish the data. Most often, when the voyage Leader/Chief Scientist leaves the organisation (incl. retirement) the embargo is lifted. Data release also depend on whether the data are from academic or industry origin. Within the frame of Seabed 2030, it is reasonable to think that IFREMER could share the data acquired in the EEZ of the French territories of the Pacific and acquired onboard its fleet.

Q – KMK to GL: have we got any agreement between GEBCO and IFREMER?

A - I don't think so. We have agreements with IFREMER but not regarding SB2030. There is an agreement between GEBCO and EMODnet.
[Julien Collot] There is an agreement between GNS and IFREMER – data merging between Australia, NZ and New Caledonia - on seismic data in the past years. There is a report on it with all technical details. Project to develop similar agreement for bathymetry data.

Matt Wray (Royal NZ Navy). The RNZN and Seabed 2030

- RNZN operations throughout Asia-Pacific, NZ territorial waters and EEZ
- Single beam on every ship, multibeam sonars on some vessels (more in the future), AUV, satellite-derived bathymetry
- Education of new surveyors
- Data restrictions: classification of military data
- Stringent requirements about non-surveyor ships
- Will try to contribute as much as they can. New ships will be coming in, need to identify gaps and can try fill in those gaps, can also hand over what they have.

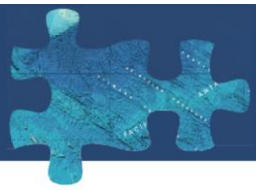
Questions

Q - Portable multibeam, issues about getting them on Australian trawling vessels?

A - Getting more portable boats – so hopefully those will help.

Magnus Wettle (EOMAP). Satellite-derived bathymetry – filling shallow water depth gaps

Presentation pdf missing



- EOMAP - SDB provider for 13+ years; offices in Australia and Germany
- Use data from earth orbiting sensors: non-intrusive, need shallow waters with good clarity, extensive coverage, go back in time, low cost compared to ship based, and quick
- SDB best available data: LINZ / PRNI project
- Uncertainties: depend on colour of water column and sea floor.
- SDB in hydrographic surveys: Planning + surveying +monitoring+ charting
- Hosting international satellite derived bathy day in Aus; Developing global SDB feasibility layer

Questions

Q – What about the sensor? Combining spectral signatures or using it alone?

A - Combining it. Use any good quality satellite sensor out there – not tied to one sensor.

Q – What about resolution?

A - Spatial resolution not as important. Need 4 bands – therefore multispectral. No limit to what we can theoretically do.

Session 4: Presentations on data centres, data collection, technology

Evgenia Bazhenova (NIWA). NF-GEBCO Alumni Team's entry in the XPRIZE competition

- Intro to NF-GEBCO Training program in Ocean mapping at the UNH
- Shell Ocean Discovery XPRIZE competition - development of deep-sea technologies, high resolution ocean exploration; NF would like all teams to contribute to SB2030
- Team made extensive use of ArcGIS Online portal for data visualization and survey planning

Questions

Q - What other data except for bathymetry can an AUV collect?

A - AUVs can be equipped with other sensors, e.g. to measure sound velocity, water temperature, DVL, equipment for sub-bottom profiling, magnetometer, gravimeter.

Comment RF – possible autonomous transit of the newly built USV (SeaKit) from Canada to Europe (?) The European Space Agency has confirmed 50% of funding. This transit is meant to demonstrate the unmanned surface vessel and develop satellite data transfer technologies.

Gina Brewer-Mills (NOAA). The role of IHO data centre for Digital Bathymetry in Seabed 2030

- IHO DCDB– data repository, accepts data and metadata, **Cruise Data Packager** to be realised soon (SaWPaC should check this)
- Bathymetric data viewer (tracklines, mosaics)
- Collaboration with industry – Fugro, Ocean Infinity
- Crowdsourced bathy project
- Willing to work with SB2030 to get as much data into DCDB as possible

Questions

Q - WMS provided AusSeabed into viewers, only displaying. Duplication across the world, could we work towards preventing that from happening? [Kim Picard]

A - Have a database of other surveys. Try to make sure that surveys that we are showing have raw data for those. Try not to pull extra WMS, try use what we have.

Caitlyn Raines (Esri Redlands, USA). Bathy data management, challenges, approaches, and innovation

Presentation pdf missing

- 3 parts: Acquisition and processing, ArcGIS, and dissemination
- GEBCO_2014 @ 30" grid vs. SB2030 @ 100 m grid, size could increase by the order of 5
- Direct applications of data: Through living atlas – curated collection of data – making data access to the public - service well documented
- TopoBathy service can be pulled into ArcGIS Online and Desktop, and be used for analysis
- Community maps program allow users to pull out mistakes, point what can be changed or improved, provide feedback, edit features, share data
- BIS filter: interactive interface, powerful web app, a raster service. A way to talk to users, or for quality control analytics. Can even take profile by profile data
- Crowd sourcing priorities for hydrographic survey.
  NOAA created a grid for people interested in surveying, - spatial prioritization widget for WebApp builder.
  Provide the app to show where the most important places to start mapping were.
  Show mapping priorities, and take action based on that. Something SB2030 could start and would be helpful.

Questions

Q - Michigan example. How can we do something similar? Easy?

R - Simple thing to set up. One editable web service. Need ArcGIS Online organisational account and apply this. Tricky part is to set the grid and who are involved. Philosophical and political issues. But exciting way to share the information and identify gaps.

Q - Kim Picard: on the above: open source way?

R - An editable way. Esri

Q - Geoffroy: We are not all ESRI users, so the process must be cross-platform.

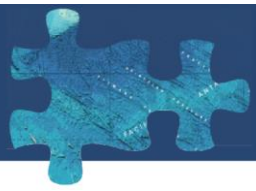
R - The info is just a web service – so it can go anywhere. Partners that have data in gaps and the resources need to identify them; priority votes and then they go through. Then aggregated and use of crowd sources.

Comment - Brings community as contributors – good starting point for that

Robert Gibb (Landcare Research NZ, retired). Open Geospatial Consortium (OGC) on DGGS – discrete digital grid systems

Presentation pdf missing

- Presented the work of the Discrete Global Grid Systems (DGGS) Standard Working Group (SWG) and its evolution towards an international standard. Purpose of the SWG is to explore and propose terms for a standard to enable interoperability using DGGS.
- DGGS designed to support global approaches, to solve multidisciplinary data problems; ties together: Feature geometry + Spatial relationships + Observation and measurement
- DGGS brings together vectorised and rasterised – accommodates both views of the world in one way of looking at the data
- Cell size chosen represents the resolution that you want, and tiling needed



- DGGS clouds – 3D view instead of plane view of things.
- Geospatial analysis can be done without GIS
- Source contributors – DSTL, risk-aware open EAGGR, UBER 3H
- China and Canada have adopted 3D DGGS

Session 5: Discussion led by Geoffroy Lamarche

SB2030 needs to submit its WP plan by mid-May for a final June workplan deadline.

Crowdsourcing bathymetry approach. Something we must implement in the region

Kevin Mackay. IHO crowdsourced bathy initiative and working group

- Short talk reporting from the CrowdSourcing Bathy (CSB) workshop in Quebec, Jan. 2019
- Lots of gaps in the ocean
- Hydro Conf in 2014, set up inter-regional coordination committee, working group, collaboration between people and the field
- Publication standard B-12 – how things are done: contribution, collection, management. Data and metadata must follow B 12 standard. Uncertainties considerations.
- Edition 1 released, edition 2 to be released in June 2019 (TBC)
- Need to increase awareness, data contribution, incentives, need to make things easier to encourage contributions, need to get more vessels logging their data

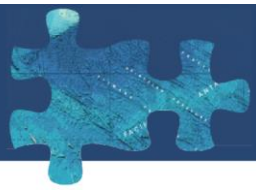
Robin Beaman. Case study – crowdsourced bathy on GBR, Australia

- Collection of depth measurements from vessels using standard navigation instruments
- TeamSurv data logger – MV argo, Smartlog NMEA data logger + USB
- Merging the citizen-science programme for funding.
- CSB processing: from raw to python filtering to Caris HIPS to gbr100/30.
- Data from navy is very dense and compact.
- James Cook University (JCU) has a trusted node with Aus Hydro Office, IHO data centre, GBR 100/30
- Media release to ask for volunteers got positive responses from yachts, commercial boats…
- CSB data coverage. Identified other vessels that are already collecting data.
- Legal side: data made publicly available, but with release form, with research permit to vessels, and be useful to SB2030. Happy to include vessel names, data/time, permit on our vessels for SB2030 too similar to GBR legal procedures

John Maschke (Australasian Hydrographic Society). Relationship building in SW Pacific – a personal experience

Building of groups is key.

- Social and cultural – built on family grounds, friends, i.e. dealing with people in the region especially in SW pacific, importance of building relationships, connections
- Professional relationships and how one deals with any issues is important – otherwise consequences get more complex, in the form of bureaucratic impediments
- Honesty and transparency



- Sticking points – aggregation of data, be aware of national security and political issues, we should be careful about the data we are dealing with.
- Engagement with people – especially in the region of concern. Participate and get the people to participate – share and explain to them what you are doing. About sustainable development, especially to fishermen
- Sources of data can be found within: Govt departments, land, forestry, environment, housing (because of floods), Educational organisations, Research organisations, Aid NGOs- when they do aid projects around the place; Cultural institutions, museums, national archives (might not be modern formats but might still be useful); Private industries (cruise lines, fishing companies, oil and gas companies when doing exploration);
- SW Pacific nations are happy to get engaged and want to get involved as their interests are being addressed too.

DISCUSSION – crowdsourcing

- GL: something we need to implement in next 24 months
- RF: Team surV: Can deal with mapping side of things, technological side is the difficulty. The vessels being used can be clunky. Technological barrier. Get companies that make these things to get involved and solve things from the beginning rather than having to deal with consequential issues.
- KMK: By default, all data will be logged, but if you don't want that you should let SB2030 know. Fugro is similar – standard contract. But you can opt out. Key to make SB2030 work, is to make the industry do the work upstream of data acquisition.
- Kongsberg looking at setting up automatic data logging. Need to develop more.
- KMK: CBops? Cruise ships should have multibeam systems. Should be open to this concept.
- Rob Beaman: High end quality multibeam systems in Coral Sea from outside people (multibillionaires etc) who are keen to get involved
- GL: It's not yet a commitment for every country to facilitate and giving their electronic hydrographic chart but can happen.
- RF: Need permission first then IHO can go forward with making the data available.
- GL: Need to develop crowdsourcing in each country we are coming from. We need to support each other. Will be discussed in further details tomorrow.
- Kim Picard: Is there going to be a hot spot for crowdsourcing? Finding a hot spot might help. Eg. Coral Sea– easier to get people engaged and get started on that.
- GL: Yes, but open pacific regions equally should be prioritised – who will do that?

Session 6: SAWPAC Data Discussion

Led by Vanessa Lucieer [VL] (see Lucieer.Session6.RMC-March2019.pdf). Starts with a short presentation from VL to set the scene and the objectives of the session. Productive discussion was held and summarized below. A lengthy action list was shortened to 13 priority actions (next session). Discussion notes follow:

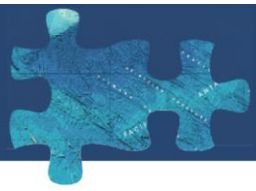
1. What data do we have? What do we know about them? How do we contribute to the Project? What about security, data release arrangements, and the gaps? Where do we need to focus for our investment and time? Our focus for this region is on the regions of depths >3000m (80% of the region). This is beyond the scope of many projects we are involved in. Think about who and

how we need to get involved. How we are going to build this momentum. What will the actions be? We all need to take courage and responsibility.

2. Important to acknowledge the investments in SB2030 and creating an asset from that time. When we look at data available, we should recall where those data are, and what data are not available because they can be available in near future.
3. How is SB2030 going to release data? Open data portal, by licence agreement with restrictions, or only metadata? Missing datasets, where might other data come from?
4. Reflect on your own sector to find out why people might consider sharing data.
5. Spatial data and their resolution available from various sources. How to access, process, convert?
6. How to upload our own data? How we do know that our data has been harvested? Survey register to make SaWPaC aware of where surveying is required.
7. Use of submarine cable route surveys – clicking on each line to see bathymetry of each line – how do we access this data? KMK: IHO did not want to make cable data publicly available for security reasons. They thought of making the resolution coarser but refrained. Currently engaging with submarine cable sector to log data. Robin Beaman: Pipe international to run pipe survey from Guam (?) to Sydney – they explained why their survey data was so important and they gave approval to use the data ultimately. It can be quite an effort to find out who pays for it.
8. John Maschke: SB2030 need to explain what we want to do and explain to individuals.
9. VL: Need to start identifying roles within the group
10. GL: (1) SB2030 director and regional centers' heads need to take the lead. It would be impossible to contact every organisation individually. (2) individuals may not be able to represent SB2030 officially but can pass on the information to the heads. From top to bottom and bottom to top

    Action: Kim Picard: It's a communication tool and message – allow people to use that as a tool. We can keep a track of people's communication and actions.
11. Peter Jensen: Is there engagement at a defence level?
12. Misty Savell: NGA produces charts but don't own the data from military hydro surveys. No conversation about releasing at coarser resolutions but discussing how they can release it.
13. John Maschke: We need to talk to people to find out about possibility of releasing data at coarser res. Can we persuade them and give them the right reasons to let the data out?
14. RF: comment: Talking about things starting 2.5 yrs ago. Some centers got selected last year. Out of which most did not have funding. People spending more time than they are supposed to on the project. New staff at NIWA just started. These things are the reality of the people in the group. We need to recognise that it still is very early in the whole process and should expect that it will take a while, and not be over ambitious at the beginning. Give ourselves time.
15. Comment from Fiji: Introduced to GEBCO two weeks ago. Most people that need to understand these things are not. This is something we should transmit to sub committees.
16. RF: Cook Islands not present but people who work with them are. They have been very active in mineral exploration work. Inside the EEZ. Lots of data collected.

    Action - Glen Rowe will contact Cook Islands to convey this meeting's point
17. Statistics: > 54% of the region is outside EEZ? We need a unified approach to submit to SB2030. We are going to start filling the gaps very quickly. How we might universally make this work?
18. VL: How do we bring the larger international companies? How we cross boundary regions?
19. Rog Gibb: Shipping lines give indication of vessels crossing these areas. How regularly?



20. **Action for Kim Picard** 1. in July AusSeabed mapping WG + AGM. Engage more with industry and internationally 2. In Aus, when foreign ship comes in – where do they come from? how do they collect their data? Dept Foreign Affairs involvement? When we approach these vessels, we need to make them aware of where the data is going (including SB2030)
21. KMK: Most commercial ships don't have a kit onboard and don't log the data.
    VL: Maybe put a single or multibeam on these vessels; John Maschke: The cost involved in doing that is big;
22. Note: Nautilus from OET will be transiting through Kiribati, Tokelau and Cooks alter this year; Schmidt Ocean Institute is doing the same

    Action: Implement system to increase awareness of vessels of opportunity in the region
23. Tion Uriam: Kiribati has agreements - the release of the data must be through the commission. But if not found, it must go back to the country.
24. Hugo Montoro: trying to get South America involved with his hydro office. Peru has a new vessel going to the Antarctic yearly– conducting a couple of lines. Seismic surveys imposed certain restrictions geographically. Plans to start visiting other sites to start contacts, and greater similar workshops in countries around to increase connections and collaboration, esp. with universities. Hugo is proposing to make a relationship/record of information from all vessels to preserve the environment by IMO

    Action: get in contact with IMO to raise awareness about preserving the environment. To follow up on this with Hugo.
25. Thomas Maddison: In Sept 2019, NGA will travel to Marshalls Isl. Discuss data availability. Follow up on that reporting.
    Kim Picard: Do they have access to the grid area? Just collect anywhere? Use the same track each time? Who is going to make this grid?
    John Maschke: Some do have the same track, need encouragement to go an extra km to expand the area. Pacman game!

    Action: Provide data with the right format.
26. VL: How to contribute to data security and harvest? How to improve communication? Who and where to contact?

    Action Picard: national initiatives should go to SB2030. Make sure we don't overlap. There should consistent procedure for everyone to follow: How to submit data, who to contact.

    GL: heads have discussed workflow, procedures, internal politics, infrastructure, security etc. Tasked to draft a workflow and plan. It will happen.

    Action: How can we engage with communities that have a plan, so we can put a consistent workflow for everyone and email to GL?
27. Misty Savell: need to ensure everything goes to centres, and we do not duplicate
28. Hugo Montoro: Need a legal doc to be presented to the data people. A MOU? GL: A generic Data Sharing Agreement is being developed by SB2030. The template is simple but needs to be validated by the data centres but progressing well.
29. VL: data goes to centre on one-way portal. What are the authorities? What procedures are used? How can we become a partner? What are the benefits? Having these procedures in place is important. We will have multiple outputs in the future, so we need to know what we can gain from all this. How do we engage with something that we have all helped developed?

30. Robin Beaman: about the Australian data - the grid is available without restrictions. Putting a lot of data up, adopted license already, attribution license. Whatever is created can be used freely in any way. Compilation grid, with metadata. The only thing we want you to do is attribute to us. This point is made right at the beginning. Not selling it, welcome people to use in any way they like, but acknowledgement is key.

    Action: Ensure that the licensing procedures are respected.

31. If we don't ask at the beginning, we will be getting the data at the wrong resolution. KMK: ask for highest resolution the data provider can give. We take point clouds. We'll be getting pre-gridded datasets. We are not a data portal though. Misty Savell: Have a recommended metadata for navigational authorities – achievable. What sort of feature to achieve? Need for minimum standard. Build metadata carefully now for better handling in 10 yrs.

    Action: How to structure the data for DCBD. Room for improvement of adding the data there. General metadata collection and how it can be easily ingested there

    Action: Review metadata. Need for minimum standard.

32. Rob Gibb: some groups may only want acknowledgement of releasing data at a coarser grid? KMK: This was proposed to the cable line association. Receptive to that as an approach. Caitlyn: Sometimes one deals with unexpected data of super high resolution. Some people choose not to be acknowledged.

    Action: Ensuring we have the appropriate procedures for attributions. We absorb a whole bunch of uncertainties, so that we have the power to take control.

33. Robin Beaman: Who is the contact and what am I holding (email needed)? Surveyors want more info, but personal info can be problematic. VL: aware of that. We follow rules through the right procedures when the data is already publicly available (e.g. portal,)

    Action: Investigate about adding an attribute to AIS and contact them. Caitlyn warning about AIS: Not easy to get data from AIS and some cons.

34. John Maschke: Is it just security about the data? Are we making an issue of the situation? Are we going to publish everything? Publish only verified data. VL: We are not only concerned about now, also thinking of the future when things can open up and become available. GL: Every release of SB2030 will have a list of acknowledgements. Robin Beaman: We do similar thing. Misty Savell: Ideally want high quality data, but anything is better than nothing when it comes to navigation.

35. John Maschke: raises the question of safety of navigation? Misty: Who collects what and what quality things are and can differentiate between transit lines and other lines for example depending on the quality? RF: Provide loggers to fishing boats. There to Olex where a good bathy map is produced from all the data. Olex gives them back from anywhere in the world at quite a nice resolution. So, they have option of moving somewhere else where they can go try fishing. GEBCO gets vast amount of data but does not give the individual data to everyone. The data quality exceeds the IHO standards. But the supergrid goes into it. We must accept that and work in different ways. Get into the Olex fashion?

36. Eiichi Kikawa **Action**: Need to think about data security. But was not discussed. Getting a clear idea of the position we are in – how are we going to legally contribute. Know what our position is. Know our licensing procedures. Robin Beaman: In as context, we have pile of license agreements. Every individual survey. Not allowed to hand out the raw data. Very manageable.

Session 7: Prioritisation of List of Action

Geoffroy Lamarche, Kevin Mackay - the list of actions discussed above were grouped and reorganised in priority order.

Action	Who	What	Priority
1	GL	Finalise the list of members of the TMC	1
2	SaWPaC	Set up strategy for communication with industries. A table of point-of-contacts for sectors. How do we identify roles in SaWPaC RMC? How do we communicate (Dropbox, weblinks, Slack, Microsoft Team, Monday.com…)?	1
3	TS/EB	Develop Web site w.r.t. gaps (online and offline solutions)	1
4	KMK	Connection with National Initiative	1
5	GL	How to submit data, who to contact. Consistent procedure for everyone.	1
6	GL/AusSeabed	Standard licensing agreements	1
7	Gina	Review metadata DCDB currently has for recommended metadata. Need for minimum standard.	1
8	GL	Ensuring we have the appropriate procedures for attributions.	1
9	GL	Create a "common message" for outreach purposes	1
10	GL	Create a common internal communication channel for RMC	1
11	Director	Engagement with shipping companies re. shipping line (see Act 12)	2
12	SaWPaC	Identify priority areas of "no data" within the SaWPaC region	2
13	GL	Contact SB2030 Director to investigate about adding an attribute to AIS	2
14	SaWPaC	Data security. Getting a clear idea of the position we are in; How are we going to legally contribute? Know licensing procedures.	2
15	Hugo Montoro	Outreach and industry contacts in South America	3

Session 8: Presentation of bathymetric online portals, discussions on values for Seabed 2030, RMC role and goals

s used for data collection/visualization

Tilmann Steinmetz (NIWA). NIWA ArcGIS Online Portal
https://data-niwa.opendata.arcgis.com/pages/seabed2030

- Different map layers, filtering
- Access issues – so others could contribute and download data (demo version)
- Update database in addition to GEBCO 2014/2019

Questions

- KMK– 180/90 degrees (dateline) remains an issue with ArcGIS
- RF– add RDACC boundaries, have RDACCs boundaries been reviewed with GDACC?
- Kim Picard – possible political issues rel. to EEZ boundaries of states
- Adam Greenland – add EEZ boundaries and refer to the source
- Caitlyn Raines – ESRI put disclaimers on the EEZ layer
- Jenny Black - is it possible to download polygons as shape files? KMK – new polygons to come in several months. Tilmann Steinmetz– decision support for regional groups to work on specific areas
- John Maschke – access issues for different user levels
- Prepare guidelines on usage of the portal as pdf to share with the possible contributors

Gina Brewer-Mills (NOAA). IHO Data Centre for Digital Bathymetry (DCDB) online portal

https://maps.ngdc.noaa.gov/viewers/iho_dcdb/

- Contact details on the site
- Crowd-Sourced Bathymetry; Metadata; GEBCO, other sources
- Online portal – data viewer (different basemaps, contours, MBES holdings by tracklines, image mosaics, search by ship …, download raw files or products)
- Gap analysis
- Other bathymetric compilations – GMRT, EMODNET data
- Comparable with the NOAA NCEI bathy viewer (call the same portal for NCEI holdings), but additional data in terms of what is not held by NCEI

Value propositions for Seabed 2030

Breakout session in 5-6 people. A list of value propositions for Seabed2030 was compiled as follows:

- Government involvement in UN Decade of Ocean Science for Sustainable Development
- Progress on UN guidelines implementation, Sustainable Development Goal 14
- Governmental investment into better ocean practices, navigation benefits
- Government for Blue Economy; Social responsibility
- Possible economic tools for industry, exploration
- Reputational gain for industry; Recognition by industry
- Contact the specialists

- Career development, personal development
- Market opportunities
- Recognition by PS
- Technical learnings
- Blue Economy, Pacific climate changes, risks
- SB2030 as platform for integration of bathymetric data holdings
- Collaboration and road map, bringing data for the future
- Education, science benefits
- Scientific database at the Pacific scale
- High-res. data, open data holdings for better understanding of the ocean; Suggestion was made about SaWPaC hosting a data portal for all open data submitted to the region.
- Navy contribution to investigation of the ocean, better maritime security
- Building relationships with coastal states, EEZ issues
- Sharing knowledge, optimizing resources for international interoperability
- Leveraging with hydrographic organizations/government
- Tax consulting

NF-GEBCO SB2030 Licensing Agreement

A template of the SB2030 Data sharing agreement was distributed. See appendix 1.

<u>To be included if possible</u>

- Usage of high-res. data
- Can data be potentially opened in the future?
- Data is contributed to GEBCO. What about opening the data to community?
- KMK - RDACC is to deliver grid.
- Raw data goes to DCDB, becomes open, or will be potentially opened in the future
- Gina Brewer (NOAA): Data work flow
- Hugo Montoro– is the agreement going to be similar for every contributing country?
- Caitlyn Raines – leave the template simple, specific points to be negotiated
- Start from make the high-res. data open, negotiate down
- AG – agreement between regional data holding centres (SPC, charting authority, university, governments) and SB2030. Extra step in between data originators and SB2030

What about the Z (mapping the gaps)?

- <u>How to get the money</u>?
  - Crowd-funded bathymetry. Sponsors. Donations for recognition.
  - Can NF start an initiative for fund raising?
  - Possible tax reductions for sponsors
  - Fugro, Google…
  - Involve industry to help scientists with negotiations
  - RF - SB2030 Director to step in
  - Involve governmental agencies/Ministries of Social Affairs
- GL - Optimizing surveys, routes, prioritization of areas
- AG - RDAACs to assist the RMC to identify the survey areas
- Gina Brewer – new NOAA initiative for transits, make sure instruments are collecting MBES data

- GL – NF may look at funding some survey days to divert transit line to get more coverage
- VL – no money is paid to process the transit data
- GL – M. Jakobsson is working on white paper: facilitate collection of transit data
- Include collection of transit data into SB2030 policy
- RF – communication with NF on additional funding for data collection, outreach
- Paul Johnson – US collects transit data that costs no additional manpower (sound velocity sensors etc. are on)
- Kim Picard – need for initiative to accumulate data (in the frame of Map of the Gaps?)

Regional Mapping Committee

Discussion on the role (what can/should you contribute?) and composition of the RMC. Breakout sessions by group of 4-6. Result compiles below.

- Search for data, funding
- SB2030 community - anyone willing to contribute to SB2030 goals
- Spreading information/promoting/advocacy for SB2030 in home country
- Involving regional leaders/policy makers/governmental bodies/industry. All sectors
- 14 out of 25 countries attending the 1st SB2030 regional workshop (March 3-6, 2019)
- Collection of bathymetric data / Crowd sourcing
- Regional mapping community, national representatives, organization of regional meetings
- Role: Steering/advisory committee? Committee vs. community in terms of roles/weight
- Need for management committee (RMC) - members from different parts of the Pacific (national representatives) to collect regional feedback
- Spokesman to talk to the authorities. Number of members to run RMC. Chairman to make sure all the Pacific regions are represented/involved in actions, visits, regional meetings
- RMC is source of local knowledge, building regional network, providing guidance, open for opinions and contributions, members should be active
- Prioritization of area of mapping
- Annual meeting of RMC in connection with RDACC
- Letter of invitation/intent - formal support from the GDACC
- Online calendar, list of possible meetings, RMC mailing list, circulate Workshop minutes, make presentations by workshop participants available online
- Clear message about the SB2030 goals
- Standard presentation of SB2030 purposes (several slides) – exists (GL)

Next meeting of RDACC

- Should be annual
- Location other than NZ (discussion started with Japan, South America)
- Smaller regional meetings
- Warning well in advance (e.g. not to contradict with the financial year plan)

Wrap-up of the 1st SaWPac Workshop

- Regional questions raised
- Will circulate the minutes, communicate results to the other RDACCs
- Need to spread the word about SB2030
- Looking for information about bathy data that can be contributed after the year 2030

Appendix 1

Nippon Foundation-GEBCO Seabed 2030 Project
Bathymetric Data Supply Agreement

THIS AGREEMENT dated ***<DDth MMM YYYY>*** is made BETWEEN:

(1) The General Bathymetric Chart of the Oceans. Hereinafter referred to as 'GEBCO'.

(2) *<Data Contributor>.* Hereinafter referred to as 'the Data Contributor'.

RELATES to the bathymetric data as specified in Schedule 1, hereinafter referred to as 'The Data'

and their usage in the production of the GEBCO Grid and other GEBCO information products, hereinafter referred to as 'The GEBCO Grid'.

Definitions

'Bathymetric Data' refers to measurements made by various instruments of the ocean depth, associated ocean properties and the supporting metadata.

'Information products' are the result of applying algorithms, mathematical techniques, scientific theory and Intellectual Property to data to create useful, derived values.

Background

Seabed 2030 (https://seabed2030.gebco.net) is a collaborative project between the Nippon Foundation of Japan and the General Bathymetric Chart of the Oceans (GEBCO). Under the auspices of the International Hydrographic Office (IHO) and the UNESCO-Intergovernmental Oceanographic Commission (IOC), GEBCO's mission is to provide the definitive, publically-available map of the world ocean floor (the GEBCO Grid) and other derived information products.

GEBCO creates The GEBCO Grid by the synthesis of interpolated bathymetric data and regional sub-grids. GEBCO also derives other information products from The GEBCO Grid.

The aim of the Seabed 2030 Project is to complete The GEBCO Grid by 2030.

The Seabed 2030 Project comprises of four Regional Centres and a Global Centre and is managed by a Project Director.

At the time of writing, the Seabed 2030 Regional Centres are:

- Southern Ocean - at the Alfred Wegener Institute (AWI), Germany (southern-ocean@seabed2030.org)
- South and West Pacific Ocean - at the National Institute of Water and Atmospheric Research (NIWA), New Zealand (pacific@seabed2030.org)
- Atlantic and Indian Oceans - at the Lamont Doherty Earth Observatory (LDEO), Columbia University, USA (atlantic-indian@seabed2030.org)

- Arctic and North Pacific Oceans - at Stockholm University (SU), Sweden and the Centre for Coastal and Ocean Mapping at the University of New Hampshire (UNH), USA (arctic-pacific@seabed2030.org)

And the Global Centre is:

- Global Centre - British Oceanographic Data Centre (BODC) of the National Oceanography Centre (NOC), UK (gdacc@seabed2030.org)

The number and location of Seabed 2030 Project Regional and Global Centres may change to meet the needs of the project.

The Data Contributor:

- Donates The Data to GEBCO for the exclusive use by GEBCO in preparation of The GEBCO Grid.
- Agrees to The Data being incorporated into the GEBCO Grid.
- Agrees to distribution of The Data exclusively to the Seabed 2030 Centres as required in the production of The GEBCO Grid.
- Does NOT grant permission to GEBCO making The Data available to third parties without written approval by The Data Contributor.
- Confirms they have authority to supply The Data to GEBCO for use in The GEBCO Grid.
- Confirms they have read and understood the terms of use of The GEBCO Grid in Appendix 1.

GEBCO undertakes to:

- Limit distribution of The Data to only Seabed 2030 Centres as required in the production of The GEBCO Grid.
- Use The Data exclusively in the production of The GEBCO Grid.
- Give appropriate acknowledgement to The Data Contributor when publishing or supplying The GEBCO Grid.
- Take reasonable precaution to securely store The Data.

EXECUTED as an agreement:

SIGNED for and on behalf of **The General Bathymetric Chart of the Oceans**

Name:

Position:

Signature:

Date:

SIGNED for and on behalf of _____

Name:

Position:

Signature:

Date:

SCHEDULE 1

Bathymetric Data included in this Agreement:

(1) <Data set 1>
(2) <Data set 2>
(3) <Data set 3>
(4) .....

Appendix 2

Terms of Use of The GEBCO Grid and derived information products

Scope

- These terms of use apply to The GEBCO Grid and other GEBCO derived information products
- For brevity 'The GEBCO Grid' is used throughout and should be interpreted as meaning The GEBCO Grid and other GEBCO derived information products.
- Bathymetric data used in the creation of The GEBCO Grid are subject to copyright and are not distributed as part of The GEBCO Grid.

Terms of use

The GEBCO Grid is placed in the public domain and may be used free of charge.

Use of the GEBCO Grid indicates that the user accepts the conditions of use and disclaimer information given below.

Users are free to:

- Copy, publish, distribute and transmit The GEBCO Grid
- Adapt The GEBCO Grid
- Commercially exploit The GEBCO Grid, by, for example, combining it with other information, or by including it in their own product or application

Users must:

- Acknowledge the source of The GEBCO Grid. A suitable form of attribution is given in the documentation that accompanies The GEBCO Grid.
- Not use The GEBCO Grid in a way that suggests any official status or that GEBCO endorses any particular application of The GEBCO Grid.
- Not mislead others or misrepresent The GEBCO Grid or its source.

Disclaimer

- The GEBCO Grid should NOT be used for navigation or for any other purpose involving safety at sea.
- The GEBCO Grid is made available 'as is'. While every effort has been made to ensure reliability within the limits of present knowledge, the accuracy and completeness of The GEBCO Grid cannot be guaranteed. No responsibility can be accepted by GEBCO, IHO, IOC, or those involved in its creation or publication for any consequential loss, injury or damage arising from its use or for determining the fitness of The GEBCO Grid for any particular use.
- The GEBCO Grid is largely a deep ocean products (based on trackline data from many different sources of varying quality and coverage) and does not include detailed bathymetry for shallow shelf waters.
- As The GEBCO Grid is an information product created by interpolation of measured data, the resolution of The GEBCO Grid may be significantly different to the resolution of the underlying measured data.