

Ocean Decade Bathymetry Data Sharing Guideline

The United Nations
Decade of Ocean Science
For Sustainable Development
2021-2030



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of Ocean Science
for Sustainable Development

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Purpose:

This document highlights the opportunities for industrial companies working in the marine environment to make their bathymetry data publicly available. It presents the mutual benefits of data sharing to both science and industry and provides guidelines and best practices on how to achieve this.

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1 Objectives - Why is sharing ocean data important?

Making ocean data publicly available helps fill critical gaps in data, information and knowledge that is necessary for sustainable ocean management. Bathymetry data contributes to the creation of a comprehensive map of the world's ocean floor and is a foundational layer for almost all scientific studies of the ocean. As of 2024, only about 26% of the ocean floor has been mapped. Therefore, we must unlock and tap into existing data repositories that have not been shared yet, to help fill this huge gap in our knowledge and foster greater scientific understanding of the ocean and its processes.

Benefits of using detailed bathymetric data include:

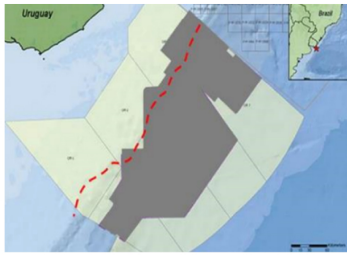
1. Scientific Research: A detailed map of the ocean floor is essential for understanding oceanic processes, geological features, and marine ecosystems. It also aids in the study of climate change and improves ocean modelling and forecasting - which provides a return benefit to industry (see below).
2. Industry: A detailed map of the seabed improves design of marine infrastructure and supports more effective siting and planning of offshore operations thanks to improved ocean modelling, digital twins and forecasting that leads to fewer unexpected delays or downtime.
3. Resource Management: Accurate maps of the seabed are valuable for identifying potential mineral and energy resources, as well as for managing fisheries and other marine resources. It can furthermore inform Marine Spatial Planning (MSP), which often forms the foundation for permitting of industry activities.
4. Environmental Conservation: Mapping the ocean floor helps in identifying, monitoring and protecting vulnerable marine ecosystems, such as deep-sea coral reefs and hydrothermal vent habitats.
5. Navigation and Safety: Precise bathymetric data enhances navigation safety by providing accurate information about underwater topography, potential hazards, and safe passage routes for ships and submarines.
6. Disaster Prevention: Better understanding of natural hazards for disaster preparedness and response, including tsunami modelling and coastal inundation forecasting and early warning system.

For these efforts, collaboration amongst multiple stakeholders and disciplines is required. Private-sector companies are an essential partner in expanding the pool of ocean data generators and users to fill existing data gaps and support the science we need for the ocean we want.

The private sector holds a large amount of ocean data that is not yet publicly available. Helping to unlock and facilitate access to privately owned ocean data, information, and other in-kind resources will improve our collective understanding of the world's oceans. This will lead to improved modelling and predictions to optimise sustainable offshore operations and reduce business risk, while helping to restore our ocean's health and protect the livelihoods that depend on it.

Below is an example that demonstrates how unlocking private industry data can significantly improve available bathymetric data.

FIGURE 1



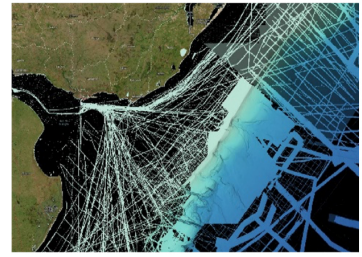
Combined total 3D seismic data coverage collected by various private-sector companies off the coast of Uruguay.

FIGURE 2



Seabed 2030 data coverage off the coast of Uruguay in 2014.

FIGURE 3



Bathymetric data coverage off the coast of Uruguay in 2024, following contributions of bathymetry data extracted from 3D seismic data by the National oil company, ANCAP.

Source: seabed2030.org*

By contributing their ocean datasets, private industry companies can reinforce their position as a key player in the blue economy supporting sustainable development, demonstrate their commitment to Corporate Social Responsibility - and the UN's Sustainable Development Goal 14 in particular - as well as being seen as an employer of choice and an attractive prospect for potential investment.

2 Sharing bathymetry data – what, where and how to share?

2.1 What to share – Sources of bathymetry data

Whether companies have collected bathymetry data for their ongoing marine operations, or whether they plan to acquire bathymetry data in the future, sharing this data through open-access data platforms such as the Global Bathymetric Chart of the Ocean (GEBCO) is of huge benefit to ocean science.

Bathymetry data is traditionally used to produce nautical charts. In the private sector, companies operating offshore will collect bathymetry data for a variety of reasons, including:

- As a base layer for siting, designing, engineering, permitting and construction of an offshore development project (e.g. energy infrastructure, telecom/power cables, ports/harbours, etc.)
- During transit between the port of operations and the project area
- To guide ongoing operations (e.g. during fishing)
- To demonstrate project completion (e.g. capital/maintenance dredging).

The data itself can be generated from a variety of sources, including:

- Satellite imagery
- Airborne LiDAR data
- Echosounder data (single or multi-beam)
- 3D seismic data

Bathymetry data can be shared by companies in a variety of formats:

- Raw data: echosounder/sonar data in a native sensor format
- Processed data: the raw data is processed into a grid file, with a grid size (or resolution) of anywhere between a few metres, to hundreds of metres. The resulting grid files can be in the following formats: gsf, BAG, NetCDF, tiff, xyz, sd, ascii, etc.
- Grid size/resolution: the finest grid size requested for the GEBCO data platform is 100m x 100m. The platform will accept finer grid-size data, which can then either be processed to a 100m-grid, or provided at the original resolution if acceptable to the data owner. Coarser resolutions are also accepted, as any data is better than none at all. See also Section 3.2 below for further information on this topic.

Metadata is an essential element to include with the bathymetry data because it provides valuable information on how the data was acquired, its provenance, terms of use, etc. This greatly facilitates the cataloguing and interoperability of the data. XML or text are widely used metadata standards to use.

2.2 Where to share the data – GEBCO and Seabed 2030

The GEBCO Seabed 2030 platform

A recommended platform to submit bathymetry data to is the Global Bathymetric Chart of the Ocean ([GEBCO](#)), which is a joint initiative of the International Hydrographic Organization (IHO) and the

Intergovernmental Oceanographic Commission of UNESCO ([UNESCO-IOC](#)). GEBCO describes the depth and shape of the ocean floor through gridded bathymetry.

[Seabed 2030](#) is an accelerator programme for GEBCO that is funded by the Nippon Foundation, which aims to increase the sharing of bathymetry data to deliver a complete, publicly available map of the entire seafloor by 2030. Seabed 2030 has published a series of seabed mapping [use cases](#), demonstrating the indispensable role of seabed mapping in addressing some of the world's most pressing marine and maritime challenges.

In addition to compiling existing datasets from a broad range of sources, the Seabed 2030 team also seeks to both unlock existing data not currently shared and identify gaps to inform future survey campaigns. Private-sector companies are an essential partner in expanding the pool of ocean data generators and users to fill existing bathymetric data gaps by opening their archives.

There are several ways to contribute bathymetric data and metadata to Seabed 2030:

- 1) Via one of its four Regional Centers:
 - a) Southern Ocean Regional Center, Alfred Wegener Institute (AWI), Germany.
 - b) Atlantic and Indian Oceans Regional Center, Lamont-Doherty Earth Observatory of Columbia University, USA.
 - c) Arctic and North Pacific Ocean Regional Center, University of New Hampshire, USA and Stockholm University, Sweden.
 - d) Pacific Ocean Regional Center, National Institute of Water and Atmospheric Research (NIWA), New Zealand.
- 2) Directly to GEBCO via the Seabed 2030 Global Center - based at the British Oceanographic Data Centre (BODC), UK.
- 3) Directly via the IHO Data Centre for Digital Bathymetry (DCDB) - this is the central repository for all non-proprietary bathymetric data compiled by Seabed 2030.

2.3 How to share bathymetry data – instructions

The simplest option is to submit data online via the Seabed 2030 website by following the instructions indicated below:

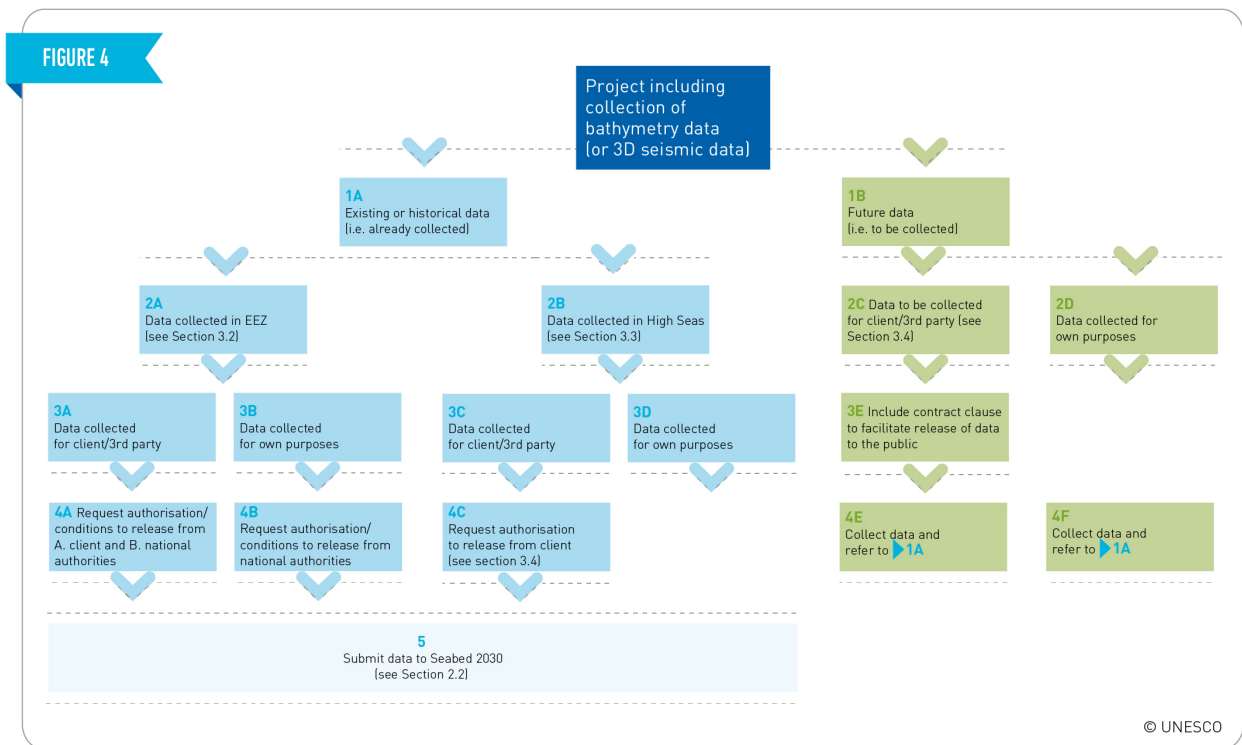
1. Go to [Seabed 2030](#).
2. Click on 'Contribute data' and fill in the form.
3. In the form, provide a URL to an accessible network or instructions on how to access the data.

Your data will then be downloaded, reviewed, processed (if needed) and integrated into regional information products by Seabed 2030 affiliated staff, who will make these products available through the GEBCO platform.

Note that GEBCO and Seabed 2030 do not charge any fees for handling the data and contributing companies and organizations are recognized as 'contributors' on the GEBCO website.

Additional details to submit data directly to the IHO Data Centre for Digital Bathymetry for long-term preservation and access, are included [here](#).

The diagram below provides a summarised guideline on the steps required to make bathymetry data publicly available through platforms such as the GEBCO Seabed 2030 programme.



3 Important considerations and required action

3.1 Authorisations for data sharing

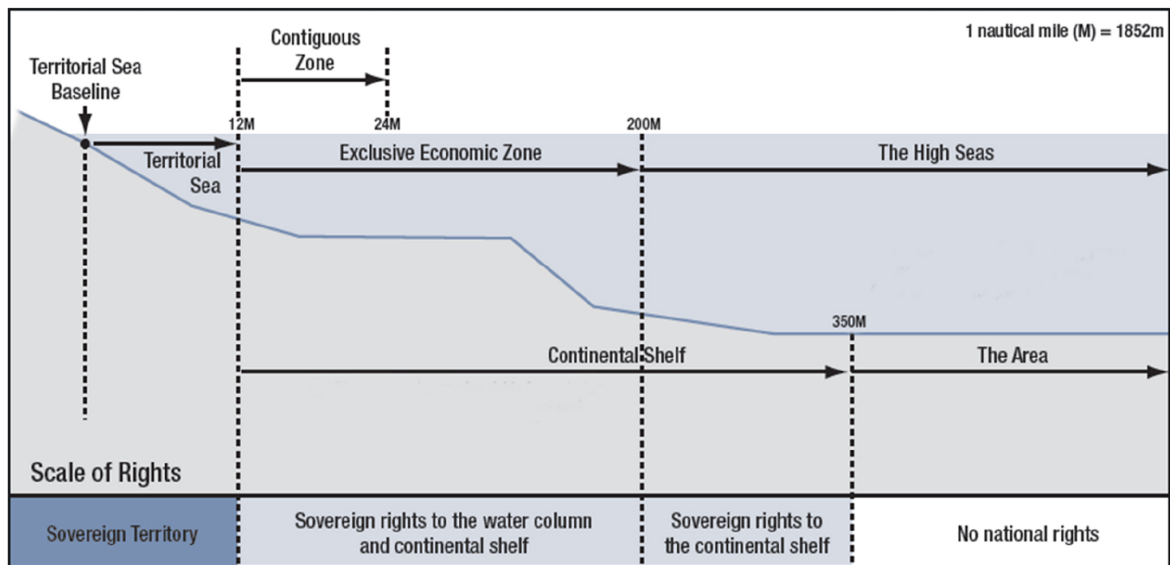
Authorisation both to collect bathymetry data and to share it in the public domain is required in most cases. This can depend on where and for whom the data has been collected. The ocean, as understood in the law of the sea, is viewed as a continuous, interconnected system covering the seabed, water column, and the atmosphere above. The United Nations Convention on the Law of the Sea ([UNCLOS](#)) is the prevailing legal framework governing these marine spaces, dividing the ocean into specific maritime zones that determine the extent of states' jurisdiction and sovereign rights. UNCLOS distinguishes between maritime zones under full territorial sovereignty, those with limited jurisdiction, and areas beyond national jurisdiction.

State jurisdiction and sovereign rights in the ocean refer to the legal authority and control that countries exercise over specific areas in the ocean.

The main maritime zones in the ocean as provided by UNCLOS are described and illustrated below.

1. Territorial Sea, international straits, archipelagic waters: These are the waters bordering a coastal state's land territory, extending up to 12 nautical miles from the baseline. Coastal states have complete spatial jurisdiction and territorial sovereignty over these waters, including the airspace above and the seabed below.
2. Exclusive Economic Zones (EEZs): EEZs extend from the edge of a coastal state's territorial sea to up to 200 nautical miles from the baseline. Within the EEZ, the coastal state has limited spatial jurisdiction but sovereign rights, including the exploration and exploitation of marine resources. Other states enjoy freedom of navigation in the EEZ, however.
3. Continental Shelf: The continental shelf is the natural prolongation of a coastal state's land territory underwater. It extends beyond the territorial sea and EEZ and consists of the seabed and subsoil of the submarine areas that extend to the outer edge of the continental margin, but no more than 350 nautical miles from the baseline. Coastal states have sovereign rights to explore and exploit natural resources on the continental shelf.
4. High Seas: The high seas, also known as international waters, are areas of the ocean beyond any national jurisdiction. They are open to all states and are governed by the principle of freedom of the high seas, which includes amongst others freedom of navigation, overflight, fishing, and scientific research.
5. Archipelagic Waters: Archipelagic states, which consist of groups of islands and associated waters, have special rights and jurisdiction over the waters enclosed by the archipelago's baselines. These waters are treated as internal waters, but states must ensure that international navigation rights are respected.

FIGURE 5



Source: Flanders Marine Institute / VLIZ / Arctic Council, Arctic Marine Shipping Assessment 2009 Report (for illustrative purposes only).*

Each maritime zone has its own set of rights, responsibilities, and limitations, and they are established and governed by international law, including UNCLOS. It is essential to understand the distinctions between maritime zones under territorial sovereignty (complete national jurisdiction), zones where states exercise sovereign rights (limited spatial jurisdiction), and areas beyond national jurisdiction. These differences play a key role in regulating ocean activities, promoting sustainable resource management, and resolving disputes between countries. Companies must understand and abide by the national jurisdiction legislation with respect to data collection and data sharing.

The Corporate Data Group's [Call to Action](#) pronounced at the 2024 Ocean Decade Conference in Barcelona (April 2024), noted that National governments must "Clarify mechanisms to authorise sharing of ocean data collected in Exclusive Economic Zones (EEZs)." This clearly identifies that national governments have a key role to play in working with industry to establish pathways for open data sharing of bathymetry and other ocean data sets.

In addition, as of September 2023, the Data Governance Act became applicable in the European Union (EU). The Data Governance Act is intended to address barriers to data sharing while ensuring the protection of individuals' rights and promoting innovation and economic growth within the European Union. The act aims to create a framework for data sharing across sectors, including public and private entities, by establishing mechanisms for data intermediaries to facilitate secure and transparent data sharing. Under this act, governments are mandated to release data, including ocean data collected within national jurisdictions. This data is accessible to companies through platforms provided by data intermediaries.

3.2 Data collected within national jurisdictions

Authorisation required or conditions that apply to share ocean data collected within national jurisdictions, i.e. within the state's Exclusive Economic Zone (items 1-3 above), can vary depending on the country's legal framework and regulations governing ocean data. In many cases, the government of the respective nation may claim ownership of the data collected within its territorial and EEZ waters, as the data pertains to land and water columns where the coastal state exercises

sovereign rights, including the government's responsibility for managing and protecting marine resources, ensuring national security, and supporting scientific research and public interests.

Organisations collecting ocean data in territorial and EEZ waters for projects such as building offshore energy infrastructure need special permission and licences to do so from the coastal state. With this permission, organisations have specific rights to access the data for their own use. However, they are in most cases not authorised to unconditionally share the collected data with the public. The procedure on how to share collected ocean data with the public differs between coastal states, but in most cases special permission will need to be acquired before sharing of ocean data is allowed.

3.3 Data collected beyond national jurisdictions

For sharing of data collected outside of territorial and EEZ waters, i.e. in the High Seas, authorisation must be obtained from the organisation that conducted or contracted the data collection.

3.4 End-client authorisation

If an organisation collects data for 3rd-party clients rather than for its own purposes, they must also ensure they are authorised to share the data by acquiring the clients' consent. For future data collection activities, companies should consider including a clause in contracts that allows both organisations to share the data, or a version of it, within a defined timeframe.

Here is an example of such a clause:

“Nothing in this Contract shall preclude the [data collector/supplier] from using underlying data not specific to the [project's end-product/infrastructure/system], such as, for example, bathymetry data, to contribute this data to existing oceanic databases, such as, for example, the General Bathymetric Chart of the Oceans (GEBCO), or the International Ocean Data Exchange (IODE), or any other global ocean science data exchange program.”

3.5 Commercial sensitivity and security concerns

Bathymetry data might be considered not suitable for open data sharing due to commercial or security concerns, especially if this data is at a very detailed resolution (e.g. 25m grid). This concern may be addressed by downgrading the resolution of the original data set to a lower, more acceptable resolution, which is a task that GEBCO Seabed 2030 staff can perform. For reference, the lower detailed resolution sought by the GEBCO Seabed 2030 programme is a 100m x 100m grid - which is equivalent to one measurement for an area roughly the size of football field. The resolution requirement is even lower as the ocean depth increases. This is an important point to explain early on to the organisation(s) authorising the data release, to alleviate any commercial or security concerns.

Additionally, GEBCO Seabed 2030 can accommodate for sensitive data or 'commercial-in-confidence' concerns, for example by applying embargoes on data until an agreed date, among other options.

4 More information

For more information, please use the following links:

- Ocean Decade: <https://oceandecade.org/>
- Seabed 2030: <https://seabed2030.org/>
- UN-Oceans and Law of the Sea: <https://www.un.org/depts/los/>

You may can also submit your query though the contact sheet at: <https://oceandecade.org/contact/>

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