

29/2024

## On the way to a complete seafloor map

### GEOMAR and Seabed 2030 sign Memorandum of Understanding in Barcelona

**10 April 2024/Barcelona.** At the United Nations Conference for the Decade of the Ocean in Barcelona, GEOMAR Helmholtz Centre for Ocean Research Kiel and the Seabed 2030 project have signed a Memorandum of Understanding to jointly improve the mapping of the seabed. The collaboration aims to fill gaps in knowledge about the topography of the seafloor and create a comprehensive map of the ocean floor.

– Joint press release of the GEOMAR Helmholtz Centre for Ocean Research Kiel and GEBCO Seabed 2030 –

At least twice in the last 20 years, nuclear submarines have collided with previously unknown underwater mountains called seamounts. The reason: they were not on any nautical charts. Just last year, a study discovered 19,000 new, previously unknown seamounts. There are now around 43,000 known seamounts over 1,000 metres high. But most of them have never been mapped.

Mapping the topographic shape of the seafloor is called bathymetry (from the Greek words *bathýs* deep and *métron* measure). And there are still many gaps in the bathymetric maps of the world's oceans. The example above dramatically illustrates the need for accurate underwater maps. But it is also essential for understanding ocean circulation and climate models, for assessing geohazards such as submarine slides on oceanic island flanks, for exploring seabed resources, and for marine spatial planning, including the delineation of marine protected areas.

Only about 25% of the seafloor has been mapped using ship-borne echosounders, which is the only method capable of producing high-resolution (10m) seafloor maps. Another survey method is satellite altimetry, which infers seafloor topography from satellite measurements of deviations in the sea surface. This provides global coverage, but with a much lower resolution of several kilometres, allowing only large-scale structures to be identified. As Professor Dr Lars Rüpke, head of the Seafloor Modeling Group at the GEOMAR Helmholtz Centre for Ocean Research Kiel, explains, “ship-based echosounder surveys remain indispensable” for more detailed seafloor mapping. Currently the group is campaigning for a closer integration of underway data with urgent research questions. Rüpke: “For example, data collected during transits by German research vessels can be used to systematically map seamounts.”

“Our vision is to have a complete and freely accessible map of the entire seafloor,” says Dr Rüpke. “We share this vision with the many researchers from all over the world who are involved in the Seabed 2030 project”. As part of the United Nations Conference on the Decade of the Ocean, which starts today in Barcelona, GEOMAR and Seabed 2030 have now signed a Memorandum of Understanding (MoU) to work together to improve seabed mapping.

**Professor Dr Katja Matthes, Director of GEOMAR:** “The international availability of collected data is the basis for successful cooperation and a decisive step towards a global map of the seafloor. The signing of this Memorandum of Understanding with Seabed 2030 shows the enormous potential to jointly pursue the goal of the UN Decade of the Oceans ‘to protect and sustainably use the oceans and marine resources for sustainable development’. The international networking of GEOMAR's expertise with the global Seabed 2030 initiative is a further milestone in international marine research.”

**Jamie McMichael-Phillips, Director of Seabed 2030** stated: “I am absolutely delighted that we have partnered with GEOMAR, a world leading institution in marine research. Our MoU reinforces the strong links with their extensive science team and the combined GEOMAR/German research fleet which has global reach. This will undoubtedly strengthen the SB2030 global ocean mapping community, driving us forward in supporting the GEBCO mission.”

### **About Seabed 2030:**

Seabed 2030 is a joint project of GEBCO and the Nippon Foundation, launched at the 2017 UN Ocean Conference in support of UN Sustainable Development Goal 14, which aims to conserve the oceans and marine resources for sustainable use. At that time, only about six per cent of the seabed had been mapped with sufficient accuracy. By 2030, all available information on the seabed is to be collected and integrated into a seamless digital map of the world's oceans. To do this, Seabed 2030 brings together a global community of marine cartographers, hydrographers and other researchers, as well as industry and the public. Governments, organisations and individuals around the world are invited to join this common mission for the global seabed by the end of the decade.

### **About GEOMAR:**

GEOMAR Helmholtz Centre for Ocean Research Kiel is one of the world's leading marine research institutions. GEOMAR investigates the global ocean from the seafloor to the atmosphere, covering a unique spectrum of physical, chemical, biological and geological processes in the ocean. Since last year, the new Seafloor Morphology working group at GEOMAR combines expertise in seafloor mapping and geological research based on bathymetric observations. The group investigates the processes that shape the seafloor and the role its morphology plays in the ocean system. It uses data from expeditions as well as ocean observations, rock analysis, modelling and data science.

### **About “Underway” Research Data**

As part of the EU AtlantOS project, GEOMAR started systematically mapping the seafloor along the transit routes of large German research vessels in international waters in 2015. Since 2019, this new approach has been continued in Germany as part of the research data project “Underway” of the German Marine Research Alliance (DAM). GEOMAR has a coordinating role in this project. The data will be made available internationally according to the FAIR principles.

### **Links:**

<https://www.geomar.de/en/research/fb4/fb4-muhs/research-topics/modelings> Working Group 'Seafloor Modeling' at GEOMAR

<https://seabed2030.org/> Seabed 2030

<https://www.nippon-foundation.or.jp/en> Nippon Foundation for Social Innovation

<https://www.gebco.net/> General Bathymetric Chart of the Oceans (GEBCO)

<https://www.allianz-meeresforschung.de/en/activities/data-management-and-digitalisation> Data management and digitisation activities of the German Marine Research Alliance (DAM)

<https://atlantos-h2020.eu/index.html> Website of the AtlantOS project (Optimising and Enhancing the Integrated Atlantic Ocean Observing Systems)

**Images:**

Images are available for download at <http://www.geomar.de/n9399-e>

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