

# The German DeepSea Mining Alliance in close cooperation with its European members

An article by JOHANNES POST

A group of German companies founded the DeepSea Mining Alliance (DSMA) in 2014 as a joint industrial platform to foster the German and international activities regarding deep-sea minerals and the corresponding mining of these resources. Its main objective is to support the coordinated representation of interests regarding politics, industry and society. Nowadays the DSMA consists of 28 members in total – containing six foreign members as well as seven scientific institutions. The most promising activities with the partners from France, Belgium and Norway are introduced.

Deep-sea mining | raw materials | rare earth elements | DSMA | ISA | Mn-Nodules | seafloor massive sulfides  
Tiefseebergbau | Rohstoffe | Seltene Erden | DSMA | ISA | Manganknollen | Massivsulfide

Eine Gruppe deutscher Unternehmen gründete 2014 die DeepSea Mining Alliance (DSMA) als gemeinsame industrielle Plattform zur Förderung der deutschen und internationalen Aktivitäten bezüglich Tiefseemineralien und ihres Abbaus. Hauptziel der DSMA ist die koordinierte Interessenvertretung gegenüber Politik, Wirtschaft und Gesellschaft. Heute besteht die DSMA aus insgesamt 28 Mitgliedern – darunter sechs ausländische Mitglieder sowie sieben wissenschaftliche Institutionen. Die vielversprechendsten Aktivitäten mit den Partnern aus Frankreich, Belgien und Norwegen werden vorgestellt.

## Author

Johannes Post is Managing Director of HYDROMOD Service GmbH in Hannover and of the DeepSea Mining Alliance e. V.

[johannes.post@hydromod-service.de](mailto:johannes.post@hydromod-service.de)  
[post@deepsea-mining-alliance.com](mailto:post@deepsea-mining-alliance.com)

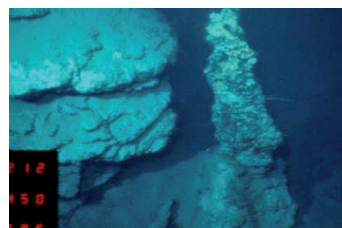
## Introduction: Responsible commercial deep-sea mining – Expertise and visions

As we all know, the oceans cover 71 % of the world surface. Today, the extraction of oil and gas from offshore sources as well as electricity from marine wind farms provide a considerable contribution to the global economy. At the same time, deep-sea mining is in a pre-industrial phase, while the world urgently needs to transfer into a low carbon future. Regarding the global industry's high demand on high-tech mineral resources, a new international industry is emerging. There are windows of opportunity to solve these demands with regard to:

- The supply of critical raw materials for clean technologies and responsible industries;
- The development (and export) of innovative deep-sea mining technologies for world markets;
- The shaping of high technical and environmental standards to minimise impacts.

The growing demand of energy is highly welcome to politicians, industry and consumers. When it comes to metals and to rare earth elements (REEs), there is an important maritime dimension as well. The mantle of our planet contains mineral resources on land and on the seabed. The significant potential of seabed minerals can provide many key minerals such as copper, cobalt, zinc, nickel, manganese, gold and silver and also REEs, to name a few.

While many land-based resources are increasingly depleted, turning to lower grade ores, or producing under critical environmental conditions, deep-sea mining will diversify and add to the world supplies for mankind. Both, the EU Commission and the Federal German Government have included deep-sea mining in their respective R&D programs as well as in environmental projects. The coalition-agreement of 2018 advocates the testing of hardware for future deep-sea mining.



**Fig. 1:** These three deep-sea minerals (Mn-nodules, seafloor massive sulfides, Co-rich crusts) are the main marine resources administered by the ISA

Source: BGR

The Federation of German Industries (BDI) put it correctly: »There will be no high-tech industries »made in Germany«, without a safe supply chain of critical raw materials.«

Since several decades, the following three types of seafloor mineral resources are getting more and more in the focus of the global industrial community as well as of the International Seabed Authority (ISA), which governs the seafloor and its resources on behalf of the United Nations and the United Nations Convention on the Law of the Sea (UNCLOS):

- Manganese nodules, i.e. potato-shaped poly-metallic minerals on the flat ocean seabed at 4000 to 6000 m water depth, which contain considerable amounts of manganese, iron, nickel, cobalt as well as less concentrations of REEs (Fig. 1, left).
- Seafloor massive sulfides (SMS) with poly-metallic content (iron, copper, zinc, lead, silver, gold) are built in the vicinity of hydrothermal vents (»black smokers«) on mid-ocean ridges and other tectonic plate boundaries at depths around 1500 to 4500 m (Fig. 1, middle)
- Cobalt-rich ferromanganese crusts on the flanks of seamounts with iron, manganese, cobalt, copper and REEs (Fig. 1, right).

All three types are multi-metal resources in that they contain a mix of different metals plus – in many cases – a »cocktail« of different REEs. The resources either occur directly on the seafloor (manganese nodules) or like a »chocolate coating« (cobalt rich crust) on subsea mountains. The SMS can be found within the seafloor's upper subsoil portion. They are ready for recovery without penetrating deep into the subsoil. The deposits of manganese nodules are measured by kg/m<sup>2</sup> and require relatively spacious areas of a few hundred km<sup>2</sup>. The sulfides and the crusts occur in high-grade local deposits of limited extension.

Germany holds an exploration license for manganese nodules in the Clarion-Clipperton Fracture Zone (CCZ) of the Pacific Ocean since 2006 (see Fig. 2 and Fig. 3) and a second exploration license for seafloor massive sulfides in the Indian Ocean since 2015 (see Fig. 2 and Fig. 4). With the support of the German Association for Maritime Technology (GMT), the German government's National Masterplan Maritime Technologies (NMMT) and the DeepSea Mining Alliance (DSMA), policy-makers and society have become more aware of deep-sea mining in recent years, and the issue has been highlighted at various events.

The German exploration licenses are held by the Federal Ministry for Economic Affairs and Energy (BMWi) and managed by the Federal Institute for Geosciences and Natural Resources (BGR). The ISA exploration licenses are issued for a period of 15 years. In general, these licenses can be extended

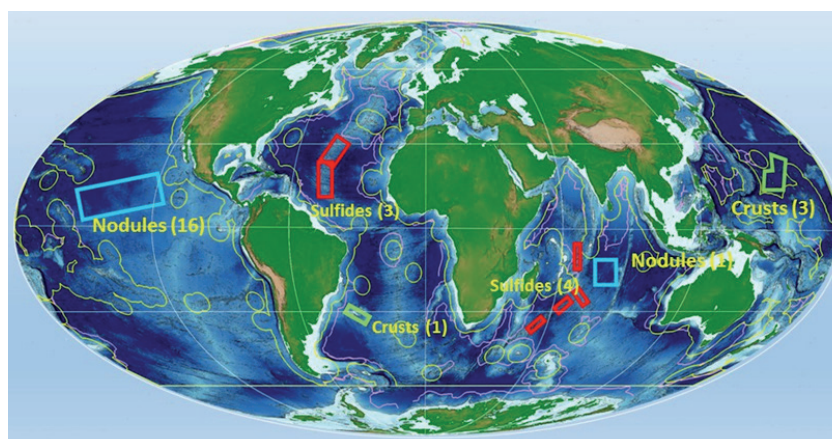


Fig. 2: The 29 ISA claims hold promising mineral resources of three different types in high grades and quantities

Source: BGR

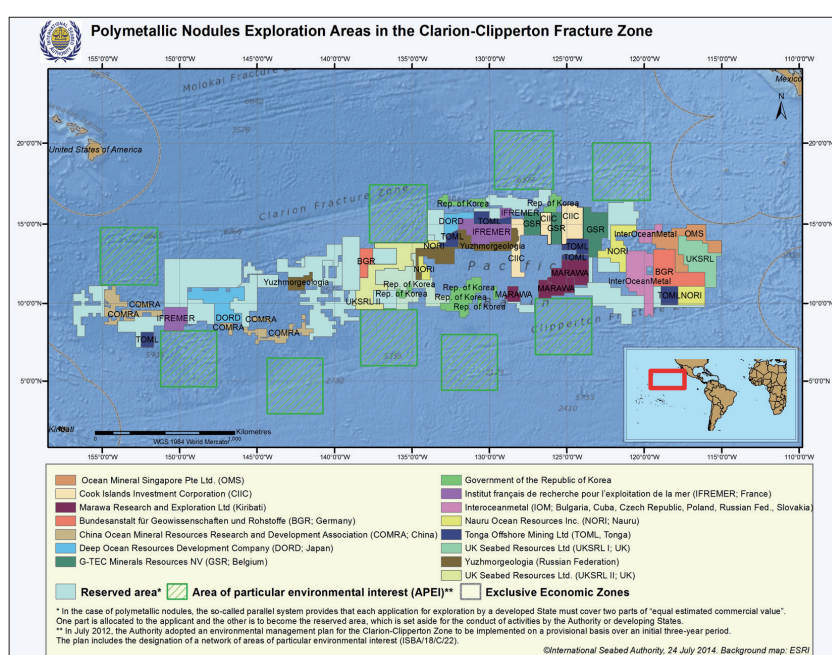


Fig. 3: 16 exploration licenses for nodules issued by ISA are in the Clarion-Clipperton Zone

Source: ISA

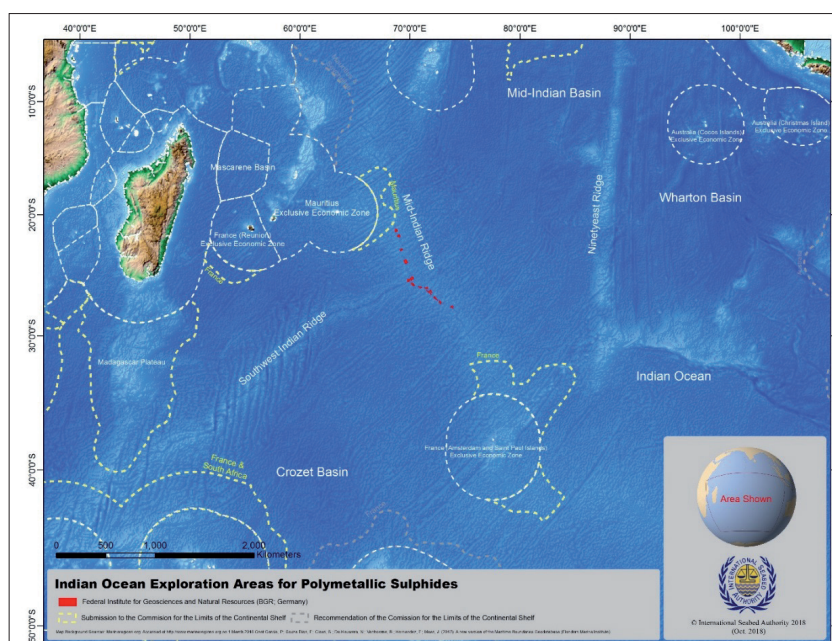


Fig. 4: The German SMS exploration license area (red dots) within the Indian Ocean

Source: ISA

on application by another five years. For that reason, the German Mn-nodules license in the CCZ officially will be finished in the year 2021 and the SMS license in 2030.

### DeepSea Mining Alliance – DSMA

A group of German companies founded the association DeepSea Mining Alliance in April 2014 as a joint industrial platform to foster the German and international activities regarding deep-sea minerals and the corresponding mining of these resources. Its main objective is to support the coordinated representation of interests regarding politics, industry and society, focussing on the following items:

- Common platform for industrial and research partners;
- Development of international cooperation projects;
- Support of deep-sea mining innovations based on research and development and joint industry projects;
- Preparation and realisation of a »Pilot Mining Test«;
- Close cooperation with leading research institutes, taking into consideration all environmentally relevant aspects.

Due to the fact, that the German government holds two ISA licenses on deep-sea mineral resources, soon the question came up in the public and politics, how the German industry could get involved in this new deep-sea business. After many discussions with German industrial stakeholders and thorough investigations regarding the question, which companies are interested in the deep-sea mining business, it came out, that mainly small and medium size enterprises (SME) were interested to participate and revealed a broad spectrum of expertise regarding marine mining. However, this expertise mainly focuses on companies

for marine services or companies, who develop special mining and monitoring equipment. A big »global player« from the German industry, who is interested to be the system-leader of this huge mining business, could not be found.

Based on this background, that no German global player could be recruited to take the position as a system-leader for the German deep-sea mining business, a number of companies decided in 2014 to found the DeepSea Mining Alliance e. V., an association with the goal to foster the international deep-sea mining issue. This was also the reason, why the association got an English name and recruited both, German and foreign members. The recent DSMA membership consists of 28 members in total – containing six foreign members as well as seven scientific institutions. Furthermore, the DSMA maintains a close cooperation with the BGR, which looks back on more than fifty years of experience in marine mineral resources.

### The DSMA in cooperation with European partners

As already pointed out, the DSMA strives for a good cooperation with international partners. Especially the situation that in Germany until now no big company or even mining company could be recruited for being the system-leader of the future deep-sea mining business is the reason that the cooperation with foreign companies is essential for the DSMA.

Furthermore, the huge financial efforts necessary to realise the deep-sea mining business require for financially strong partners, particularly from the mining industry. Due to the fact that Germany owns almost no metallic mineral resources this type of mining industry is quite scarce in Germany. Whereas countries like Poland, France, Finland, Norway in Europe and Australia, Canada and the USA have own huge mineral resources and a corresponding strong mining industry. Because of this situation, a cooperation between strong mining companies from abroad and Germany's high-tech industry is strongly recommended.

### France

Starting with a joined visit of a German delegation with members from the BMWi and a number of German associations at the French Ministère de l'Économie, du Redressement productif et du Numérique Conseil Général de l'Économie on 20th of May 2014 in Paris, a joint cooperation between the French Cluster Maritime Français and the DSMA was initially discussed.

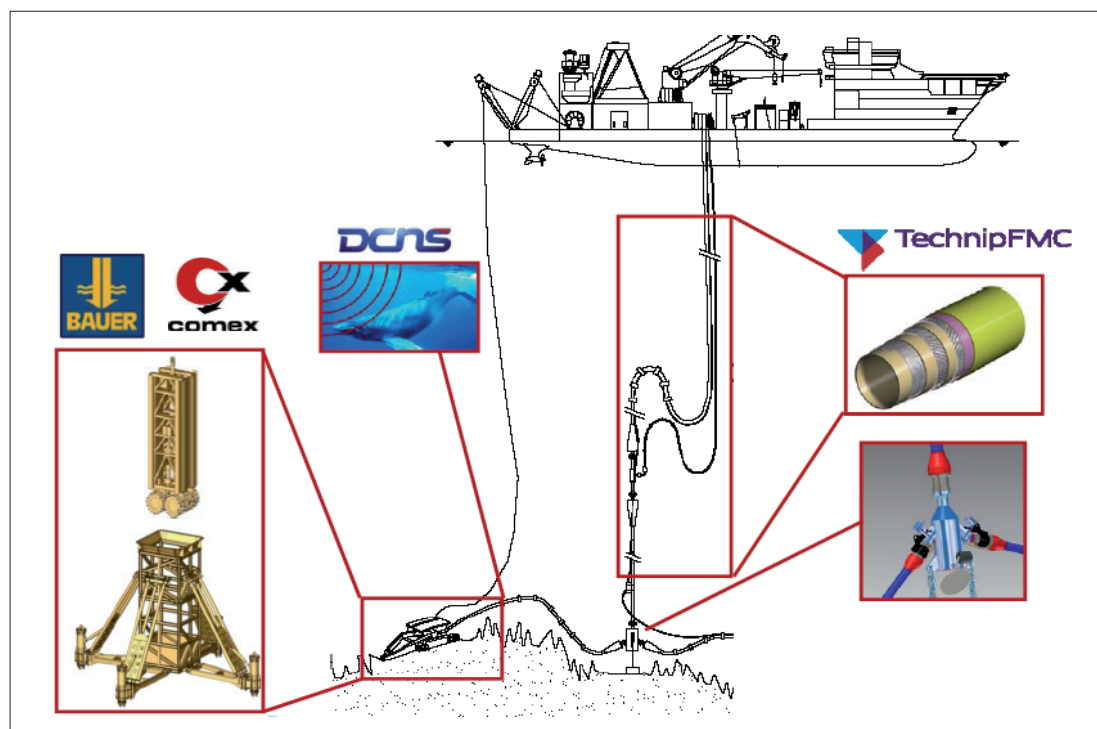
This cooperation was signed as a joint Memorandum of Understanding (MoU) during the 9th National Maritime Conference (NMK) on the 20th October 2015 in Bremerhaven (Fig. 5).

Major goals of these two MoU were the cooperation concerning joint industry projects, pilot



**Fig. 5:** Signature of two MoU between the French and German Ministries of Economy as well as between the Cluster Maritime Français and the DeepSea Mining Alliance during the 9th National Maritime Conference in Bremerhaven

Source: BMWi



**Fig. 6:** Scheme of the cooperation activities between the French and German companies as project partners in the joint industry project FONASURF

mining tests, joint RTD projects, joint marketing activities, joint exploration cruises, deposit evaluation, environmental impact assessment studies, impact monitoring and remediation as well as development and qualification of innovative and sustainable deep-sea technologies and technology and sciences education and training.

The following guidelines of the cooperation within the MoU were mutually agreed:

- Europe and mainly France and Germany have a unique and coherent set of resources, skills and expertise concerning seabed and mining operations.
- With respect to several EU activities both parties are discussing possible options to join deep-sea mining forces in France and Germany in order to achieve higher impact strength for deep-sea mining in the EU and push for a much more ambitious vision from the European Commission.
- Possible deep-sea mining partners in France and in Germany would be, for example, the members of the French Maritime Cluster and of the DeepSea Mining Alliance.
- French and German companies could form the core of an obvious network in an internationally-based deep-sea mining strategy.

Furthermore, following joint activities and projects are envisaged:

- Joint R&D projects;
- Initiation of joint European R&D projects in the frame of the European H2020 framework program;

- Bilateral national R&D projects;
- Joint marketing activities regarding marine mineral resources and deep-sea mining activities;
- High-level French-German activities in Brussels, e.g. discussions on the consideration of marine and deep-sea minerals and mining proposals in the European framework programs;
- Joint exploration cruises on deep-sea mineral resources;
- Cooperation regarding planning and execution of future Pilot Mining Tests;
- Joint industry projects (JIP), i.e. cooperation between French and German companies regarding the development of deep-sea mining technology.

The following two short examples may show how the cooperation between CMF and DSMA took place:

The joint industrial project FONASURF focused on the development of a concept for a pilot sub-sea mining system for the extraction of minerals from deep-water seafloor massive sulfide deposits (Fig. 6). BPI France sponsored the project, through the »World Innovation Challenge Phase 2« program (2015 to 2017).

Together with our French CMF partners and further project partners from Belgium, Finland, Netherlands, Portugal and UK, the DSMA submitted in April 2015 a proposal with the short title »Deep-Sea Mining 2.0« to the European Commission. The proposal with the full name »Highly automated industrially-driven technologic and economic solutions for European deep-sea mining – Minimizing



**Fig. 7:** The scaled prototype of the Mn-nodules collector *Patania II* during launching operation

Source: GSR-DEME

the footprint on the marine environment» passed the evaluation, but was not funded because of too many successful proposals.

### Belgium

The Belgian company Global Sea Mineral Resources (GSR), a subsidiary of the dredging company DEME, is studying polymetallic nodules since 2012. For this purpose, GSR collaborates with scientists from various universities from Belgium and abroad. GSR joined the DSMA in 2016 to facilitate the cooperation with German research institutions (e.g. GEOMAR and Jacobs University) as well as with the BGR and other interested member companies from the DSMA.

#### Update: Patania II trial

As announced on 21 March 2019, GSR had to postpone the trial of its purpose-built prototype nodules collector *Patania II* (Fig. 7) due to damage caused to the vehicle's communications and power cable (umbilical). Since then, GSR has completed a thorough root-cause analysis, the issues have been resolved and a new trial is being planned with a new winch and umbilical combination.

The launch of *Patania II* overlaps with a four-year independent transnational scientific research project initiated through JPI Oceans (2018 to 2022), to which GSR remains fully committed. Both teams have been working together to maintain focus on the overall goal of studying the environmental aspects of the seafloor minerals industry for the benefit of all potential users of such scientific information.

As scheduled in the JPI Oceans project, research has been conducted to gather adequate

environmental baseline information from both the Belgian (GSR) and German (BGR) contract areas within the Clarion-Clipperton Zone, where the *Patania II* trials will take place. After the trials, both areas will also be revisited to study potential effects on the deep-sea ecosystems and their environments.

Since the GSR news release in March 2019 concerning the problems during the first component test, BGR decided to include the JPI Oceans environmental monitoring studies within their exploration program. The next trial was planned for October and November 2020. However, due to Covid-19 disruptions, BGR suggested postponing their offshore campaign until early 2021.

In line with its commitment to an open, transparent, and scientifically rigorous testing program, GSR has also agreed to postpone the launch of the *Patania II* expedition to ensure that an independent scientific monitoring of the trial will still take place. GSR will – in collaboration with JPIO II – invite independent scientists to join the mission and monitor its activities when *Patania II* launches in due course.

GSR remains focused on the successful collection of polymetallic nodules from the seafloor and believes that responsible nodule collection can help meet future metal demand and provide an environmentally and socially responsible alternative to the development of land-based mineral resources.

### Norway

Since about five years, when the first successful reports about the exploration on marine minerals, especially on seafloor massive sulfides (SMS), within the Norwegian EEZ were published (see Fig. 8), intensive discussions on future cooperation between Norwegian marine stakeholders and the DSMA started.

The Norwegian Ministry of Foreign Affairs initiated the first bilateral seminar on seafloor minerals and deep-sea mining. It took place in Oslo in the headquarters of DNVGL at May 30, 2017. It was a very fruitful meeting with participants from politics, industry and science. As one important result of this seminar, the next German-Norwegian seminar was already arranged for end of September 2017 in Berlin.

Due to the fact, that in Norway no association similar to the DSMA existed, it took some time to do the next steps to intensify the cooperation between Norwegian and German stakeholders. Finally in February 2019 the Norwegian Forum for Marine Minerals (NMM), the Norwegian pendant to the DSMA, was founded and some months later on July 1st 2019 the Norwegian government issued the new and important law on the marine minerals within the Norwegian EEZ.

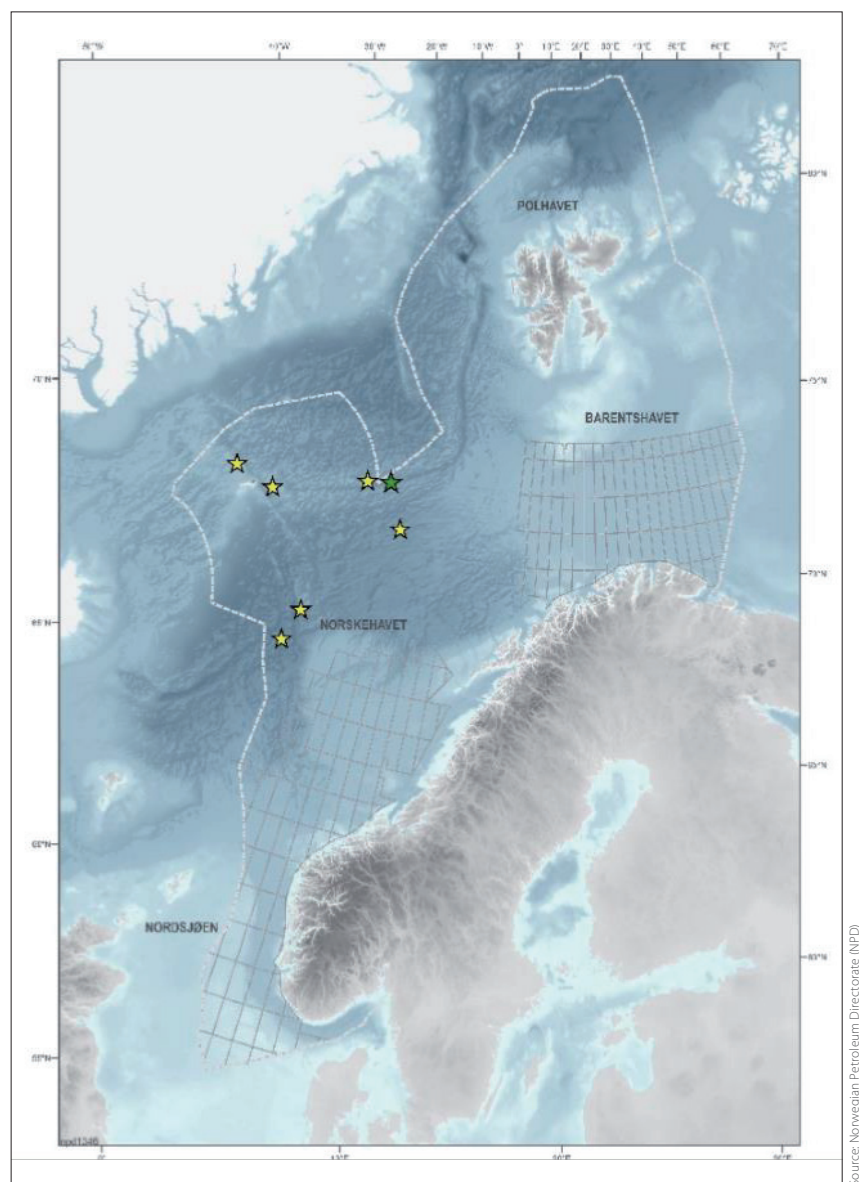
At the latest Norwegian-German workshop at December 10th 2019 in Hamburg, new joint steps, activities and goals were envisaged. However, due to the worldwide Covid-19 shutdown the bilateral discussions between the DSMA and the Norwegian Forum for Marine Minerals (NMM) are proceeding slowly. The follow-up of these planned cooperation efforts started again in May via video conferences between the management of the NMM Forum and the DSMA. The following three major goals were agreed:

- Preparation of a cooperation agreement between NMM and DSMA, based on the bilateral membership of the NMM in the DSMA and vice versa;
- Promotion of closer contact and communication between the members of both associations;
- Promotion and intensification of contacts and communication between the corresponding political players in Norway and Germany based on a soon meeting in the »Royal Norwegian Embassy« in Berlin.

Regarding the intensification of contacts between the Norwegian and German political players, a first meeting has been carried out 28th of July 2020 in the »Royal Embassy of Norway« in Berlin. One of the major results of that meeting was that a joint road map will be prepared to foster the cooperation not only between the two associations but also directly between industrial and political stakeholders.

### Summary

The above-discussed cooperation between the DSMA and CMF (France), GSR-DEME (Belgium) and NMM Forum (Norway) were selected for this report, because they are the actual most intense and promising activities of the DSMA. However, the DSMA maintains several other cooperation, which reveal only few activities in the moment, but of course also important on the long run. For example the Interoceanmetal Joint Organization (IOM) from Poland, one of the first license applicants at the International Seabed Authority as well as the Dutch Royal IHC, in Europe one of the first and important companies, which focused on the development of deep-sea mining technology are important international members of the DSMA. Furthermore, the DSMA members themselves



**Fig. 8:** The Norwegian continental shelf and the EEZ boundaries. The Norwegian EEZ amounts to 2 million km<sup>2</sup>

maintain a number of cooperation, either on a bilateral base or in European or international R&D projects or joint industry projects.

However, due to the Covid-19 restrictions and the therefrom caused cutback of the before committed activities, causes not yet a shutdown, but clearly a slow-down concerning the seafloor minerals and deep-sea mining business. Especially the focus of politics as well as industrial »global players« has changed completely due to the Corona challenges! //