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MOBILISATION AND MUTUAL LEARNING WORKSHOP

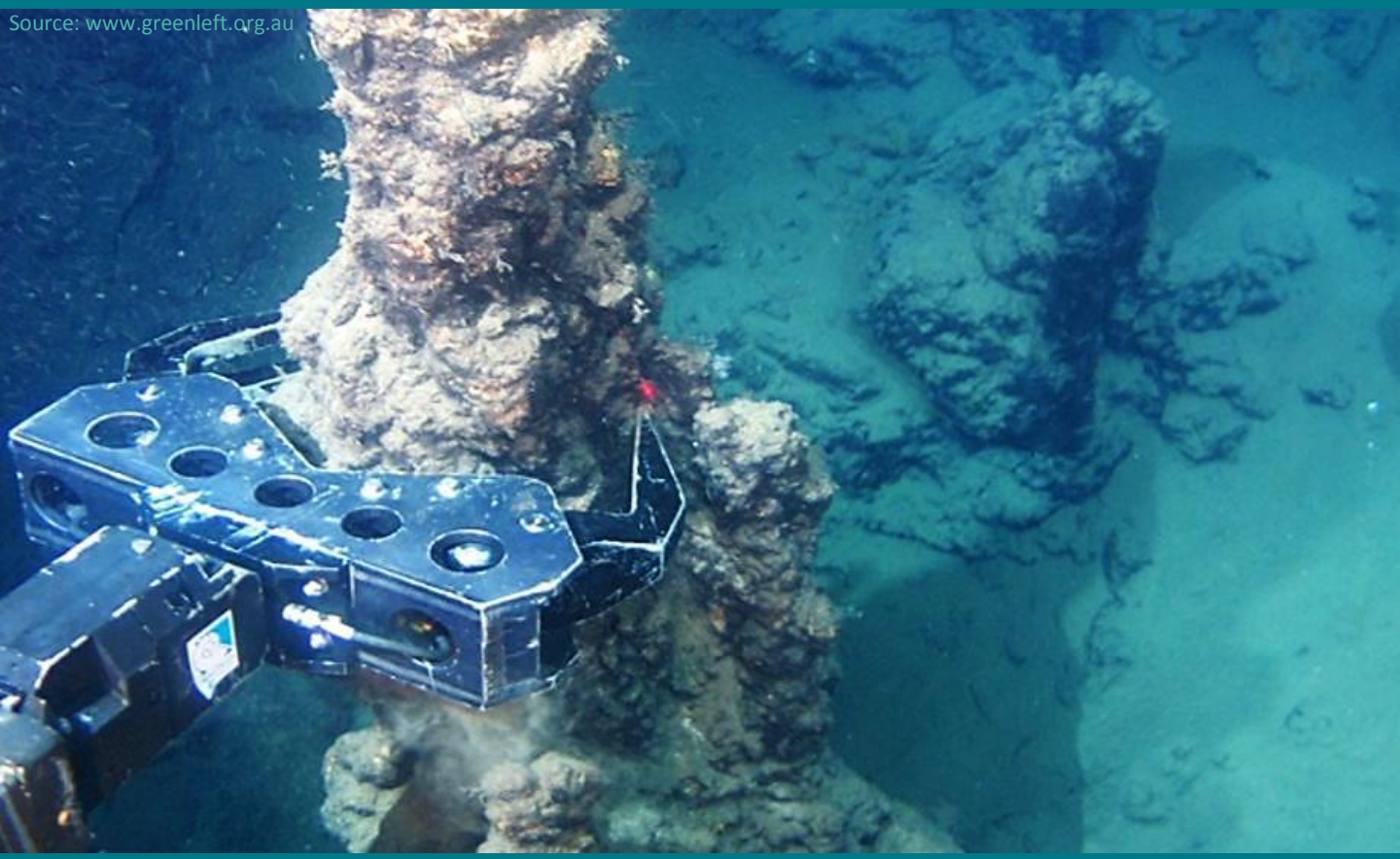
Discuss, Discover, Suggest, Network

DEEP SEA MINING

AN OPPORTUNITY TO DO THINGS RIGHT

7 May 2018

Gulbenkian Foundation | Lisbon | Portugal


Source: www.greenleft.org.au

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Why are so many people talking about deep sea mining?

14 August 2017, NYC. A delegation of a small European country delivers the final documents supporting a request to the UN Commission on the Limits of the Continental Shelf aiming at expanding the country's territory into something larger than India. That was the last step of a massive effort that Portugal had begun more than a decade before. Many other countries around the world did the same. And now they are all waiting. Should the requests be approved, the new continental shelves will enlarge their territories at sea quite significantly, by extending their jurisdiction over the sea floor and subsoil beyond the 200 nautical miles Exclusive Economic Zone.

The Portuguese case serves to illustrate what may happen all over the planet. Its dry land occupies 92.000 km^2, to which is attached a 1.6 million km^2 EEZ. Its new continental shelf will convert Portugal into the owner of 3.8 million km^2 of the North Atlantic sea floor. That is more than 40 times the country's area. To put things in scale, Portugal is about to become the landlord of an area almost as big as the whole EU territory. This example shows that **your concept of the world map may be about to become obsolete**.

The Law of the Sea states that any country rules the water mass within its EEZ and the same for the sea floor and subsoil within its continental shelf. The eventual extension of the continental shelf will therefore have no impact on the what takes place at the sea surface or along the water column - fisheries, offshore renewable energy production, maritime transportation, etc. However, extending the continental shelf opens up the potential to what could be done deep down.

The **vast repository of minerals of the deep sea floor**, including the precious cobalt, zinc, manganese and rare earth materials are needed for example for smart phones, laptops and hybrid cars, are present in three forms of ore: polymetallic manganese nodules over the sea floor; cobalt-rich ferromanganese crusts that cover seamounts; and polymetallic sulphide deposits around hydrothermal vents.

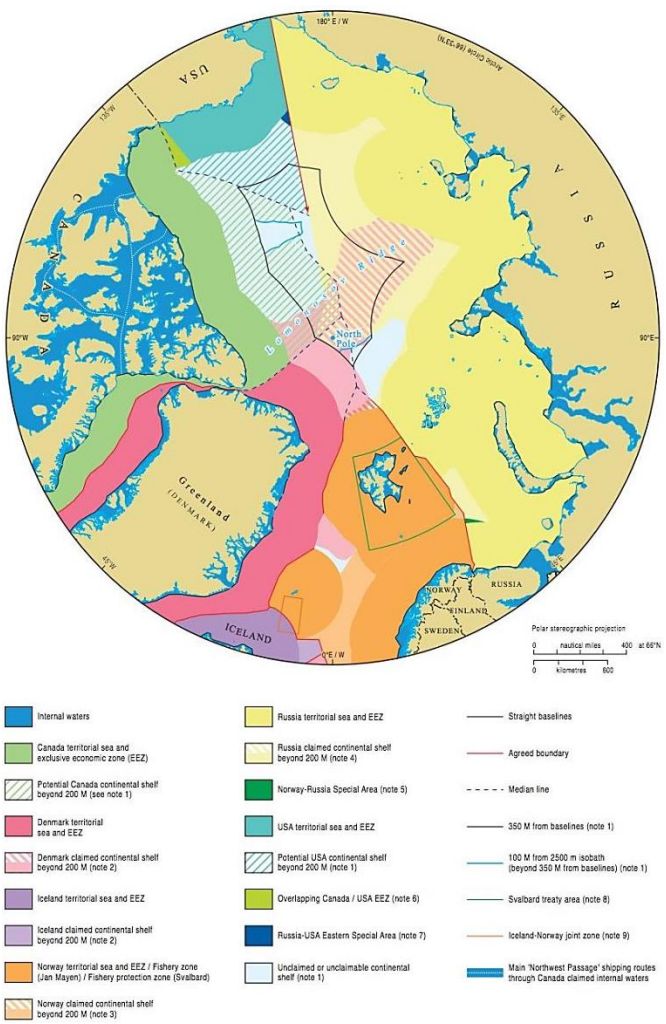
Typically, a deep sea ore is seven times more enriched with minerals than that mined from land. On the other hand, biological and genetic resources such as bacteria for new biotechnology products and medicines are reportedly abundant on the deep sea floor. **A plethora of resources that lures governments fast running out of reserves on land**.

It is not defined exactly how long the UN commission will take to evaluate all the continental shelf extension requests. While the countries wait, it is time to debate what has to be done.

What is at stake? What are the benefits, the drawbacks, the challenges and the responsibilities of any country that wishes to start exploiting what lies at the deep sea floor and below?

This is also the time to question if we really need to explore resources that are part of one of the most remote and unknown environments of the planet.

Mankind has made many mistakes throughout its history when exploring new wild territories. This is a unique opportunity to do things right.



Source: http://www.environmentandsociety.org

OCEANS & LAW OF THE SEA
UNITED NATIONS

How can Responsible Research and Innovation (RRI) serve to bridge deep sea mining, sustainability and policy?

Deep sea mining is about to take an enormous step into the future. The first successful test to extract minerals from the deep sea floor was recently conducted by Japan and in Papua New Guinea the logistics are nearly ready for the first major commercial project to start. However, some important doubts persist. Time will tell if extracting something from depths down to 5000 meters in the middle of a vast ocean is a profitable and sustainable activity with bearable impacts.

In international waters, deep sea mining is governed by the International Seabed Authority, which issues exploration and exploitation licenses. Even though the ISA has set environmental regulations for exploration activities, there is no such framework in place for commercial mining. In the meantime, already over a million km² is licenced for exploration in the Pacific, Indian and Atlantic. Both state-owned and government-sponsored companies from India, France, Russia, Germany, China, Singapore and the UK have sought permission for minerals prospecting in the high seas. One of these, UK Seabed Resources, an English subsidiary of the US defence giant Lockheed Martin, has secured exploration rights to an area larger than the entire UK.

Deep sea mining is expected to begin in 2018. The Clarion-Clipperton Zone in the Pacific Ocean will likely be the first to be mined for polymetallic nodules. While explorations sponsored by Russia, China, Japan and France will come to an end in a couple of years, Tonga, Nauru, Belgium, Germany and the UK will continue to exploit the zone for several years. The ISA allocated 150,000 km² to India for carrying out various developmental activities for polymetallic nodules in the Central Indian Ocean Basin.

At the EU level, deep sea mining is a priority sector of the Blue Growth strategy and is part of the European Innovation Partnerships on Raw Materials and its circular economy ambitions.

Deep sea mining has caught the attention of part of society. The media have been dedicating some articles to the continental shelf extension processes and some citizens and NGOs have established environmental movements to fight deep sea mining. This is indeed a hot topic.

The potential impact on the maritime economy and marine science is huge; but with that also comes a series of issues:

- **How to ensure smart growth and an economy based on knowledge, research and innovation?**
- **What is needed to put sustainable industries at the top of their competitive markets?**
- **Are the foreseen policies aiming at inclusive growth in which job creation and poverty reduction are key goals?**
- **How do the investments and risks associated to deep sea mining look in comparison with the development of green alternatives such as the reduction of consumption and recycling of materials?**

The deep sea and the natural processes operating down there are lesser known than any other environment on the planet.

- **How many citizens know this?**
- **Who is responsible to make sure society has access to scientific information about the deep sea?**
- **What needs to be done to have real society needs and priorities answered in research outcomes?**

The wide-ranging perspectives existing in society will be the base of the discussion at this MARINA workshop.

RRI
RESPONSIBLE RESEARCH AND INNOVATION

What are the main challenges faced by deep sea mining?

TECHNOLOGICAL CHALLENGES

One thing is to know what resources – say minerals – exist and to have the legal right to explore them. Another thing is to reach them and bring them up from some of the deepest parts, for example, of the Atlantic Ocean. This can only be achieved with the proper technology**.** And this **technology is in the making.**

Although deep sea minerals extraction has been investigated since the 1970's, it was at some point abandoned because of changing commodity economics, advances in on-land exploration techniques, growing concern on environmental impact and political and legal aspects with regard to ownership issues. The developmental data from those days, if still available, are not anymore adequate to designing and building an integral system for extraction of deep sea minerals without additional research. Thus, deep sea mining was seen until very recently as not possessing the technology readiness level sufficient to be successfully undertaken. Recent research on technological innovations was not tested in conditions that realistically reproduce the deep sea environment in terms of depth, pressure, currents and temperature.

ENVIRONMENTAL CHALLENGES

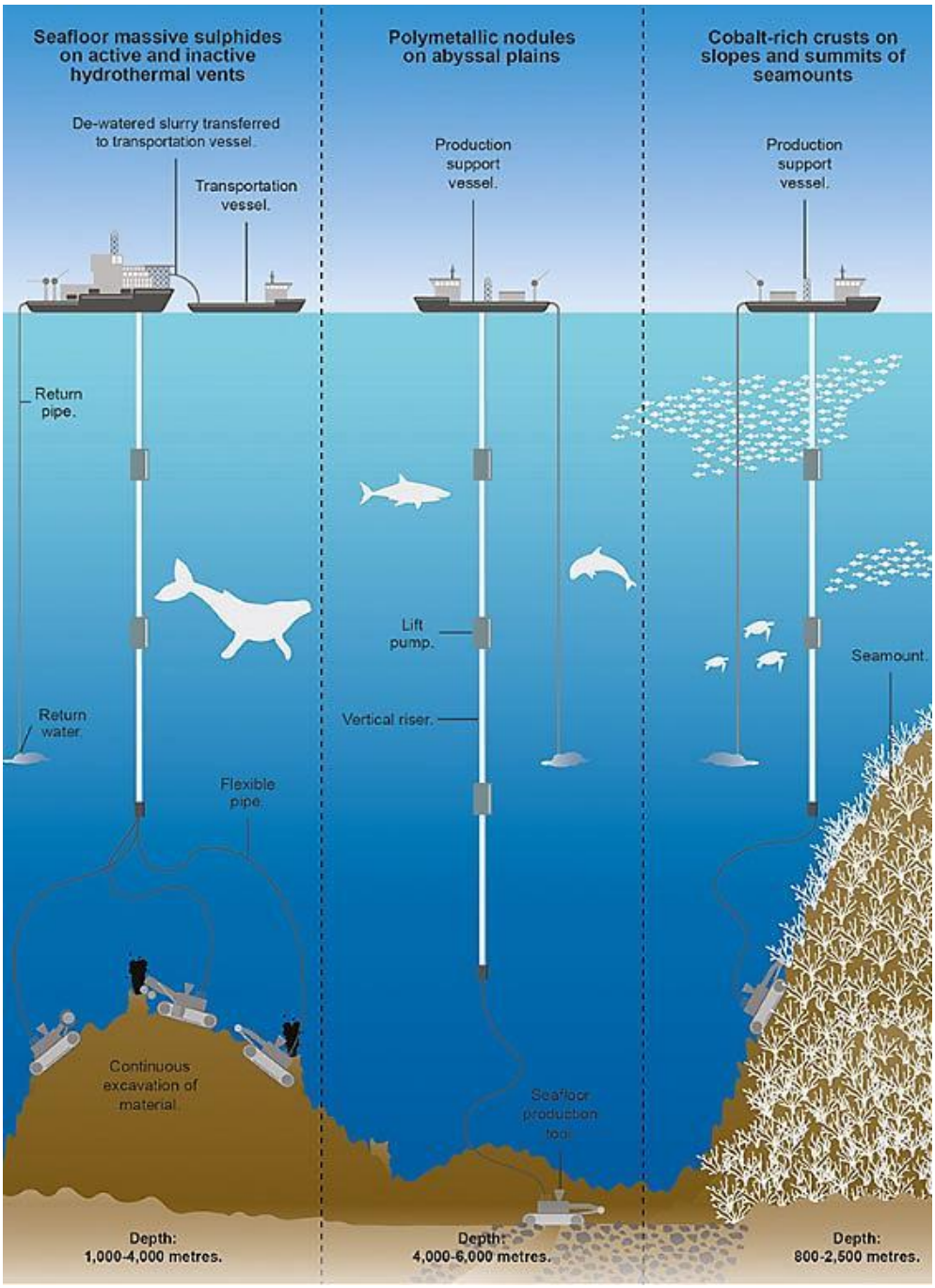
Simply put, **no one really knows** what the consequences of disturbing one of the most remote environments of the planet will be. There are solid concerns about our ability to safely extract anything from the sea floor without affecting its dynamics and wildlife.

The likely physical impacts include the widespread disturbance or loss of habitats, the generation of large plumes of fine particulate matter and the introduction of potentially toxic chemicals into the water column.

Suspension feeders such as corals, bivalves and sponges may be smothered and the life cycles and larval migration of species may be affected by plumes.

Extensive phytoplankton blooms could be triggered when cold, nutrient-rich water is brought from the deep up to the sea surface. Conversely, the fine particulate matter within a plume may depress primary production, disrupting the marine food chain.

And then there is the noise.



Source: https://doi.org/10.3389/fmars.2017.00418

What else?

ECONOMIC CHALLENGES

The ever increasing need for resources in Europe - and around the world – and the need to reduce dependencies of outside countries is one of the main motivations behind deep sea mining. Apart from becoming resource-wise independent, countries wish to have a surplus of raw materials and energy that they could export. This is one of the reasons why some are convinced that it is only a matter of time until deep sea mining becomes an important source of those materials. Nevertheless, with the current level of technology and knowledge, deep sea mining in the middle of a 5.000 metres deep ocean **may turn out to be a not sufficiently profitable** activity. A proper cost-benefits analysis would allow to better estimate the return on investment and the real worth of deep-sea mining. Environmental costs would have to be factored into that exercise.

POLITICAL CHALLENGES

On 16 January 2018, the European Parliament called for a moratorium on deep sea mining. European legislators have voted overwhelmingly for a resolution that advocates halting efforts to mine the sea floor for minerals – until the environmental consequences of industrializing the high seas can be determined. The European Parliament also urged the European Commission to persuade member states to stop sponsoring and subsidizing licenses to explore and exploit the seabed in international waters as well as within their own territories. While the resolution is nonbinding and the European Parliament has no legal say in international deep sea mining, it marks the **highest-profile opposition to date** to the nascent industrialization of the sea floor.

On a global scale, China is estimated to contribute to 90 per cent of the global production of minerals. Recent developments show that China has been using this monopoly to control the production and price of the minerals. There have been **worldwide attempts to realign strategic relations** around exploration of rare earth metals in the sea floor. Japan, along with the US and the EU, formed an alliance to challenge China's restrictive policies in the World Trade Organization. In April 2014, the WTO ruled against China.

SOCIAL CHALLENGES

In recent years, the possibility of deep sea mining led to a debate within the society of various European countries. New citizen groups were formed to defend the "no exploration" option. Existing environmental NGOs also joined these movements, converting deep sea mining in one of most divisive environmental topics currently being discussed. The big idea is that the reduction of the demand for raw materials by effectively recycling them, and better product design based on other more accessible materials **may show that deep sea mining is actually not required**. In terms of solutions to the potential lack of raw materials, there is a growing perception about the need to have society adopting lifestyle changes towards sustainability. These include moderating consumption and sharing, reusing, and repairing equipment that uses the minerals that are to be mined, among other actions.

Much of the **society feels confused** about what will happen. On the one hand, some political actions may lead to the idea that deep sea mining is not to advance, at least for now. But then, why did so many countries made such a significant investment in order to have their continental shelf extended?

Going deep into the six dimensions of RRI

PUBLIC ENGAGEMENT

The fact that the potential impacts of deep sea mining cannot be witnessed brings up an issue: how to make sure that people care about something they do not see? In a time where ocean literacy is booming, our ability to demonstrate how we affect the ocean and how it affects us was never so challenging.

Many European countries have been promoting public participation processes. Public engagement therefore exists. However, is the political power really willing to convert public opinions into policies?

SCIENCE EDUCATION

If deep sea mining is an important part of Blue Growth, then why is the deep sea absent from public school educational programmes? How will our entrepreneurs, researchers, politicians and general society be aware of what exists at the sea floor and what consequences will emerge if we disturb that environment?

OPEN ACCESS

How should deep sea data be converted into information accessible to help the public? What can funding agencies do to make scientists invest on really efficient outreach and make the public to use the outcomes of their work?

ETHICS

What is correct thing to do: to invest in research and innovation to reduce the impacts and risks of deep sea mining or to invest in changing lifestyle habits that reduce the need of more resources? Is the solution in the bottom of the sea or in our houses?

GENDER EQUALITY

For the first time in history of the Portuguese Navy, a woman joined the Submarines Course as a student in December 2017. This was only possible once the Navy realised that the equipment needed to be adapted for them. What other obstacles may exist in Europe that are blocking the access of women to the deep sea?

GOVERNANCE

How to ensure full implementation of European regulations on deep sea mining by all member states?

How far is the circular economy being enhanced to diminish the need to extract resources from the sea floor?

If and when deep sea mining starts, who will license, manage and monitor it?

Source: www.pinterest.com

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