Deep Sea Mining: the case for a moratorium

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Strategic Roundtable Discussion with Parliamentarians on the Protection of the Deep Seabed
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UNCLOS Part XI: Seabed Mining

Article 145

*Protection of the marine environment*

• “Necessary measures shall be taken...to ensure effective protection for the marine environment from harmful effects” and “the prevention of damage to the flora and fauna of the marine environment”

Additional obligations Part XII: e.g. Art 194.5
UNCLOS Part XI

The International Seabed Authority is obligated to act ‘on behalf of’, and ‘for the benefit of’, humankind as a whole

UNCLOS Articles 137, 140, 143 and paragraph 6 of the Preamble
Biodiversity loss from deep-sea mining

Nature Geoscience June 2017

Biodiversity loss from deep-sea mining unavoidable, irreversible on human timescales and offsets in the deep-sea “scientifically meaningless”

Biodiversity of the Clarion Clipperton Fracture Zone

One-half of species discovered to date depend on nodules & nodules and nodule-dependent animals may take millions of years to recover from the impacts of mining, and even the partial recovery of the animals living in the sediment may take hundreds to thousands of years.”


https://t.co/2guyyvGfmC
Clarion Clipperton Zone

17 Exploration contracts: Belgium, China, Cook Islands, France, Germany, Jamaica, Japan, Kiribati, Korea, Nauru, Russia, Singapore, Tonga, UK & IOM - Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia = app 1.25 million km²
“Within all the nodule abundant ecosystems visited within the MiningImpact project, stalked biogenic structures have been abundant habitat components.”

Stalked structures provide key habitat resources for some larger mobile megafauna for periods of their lifecycle. Here, an octopod was observed brooding eggs on a stalk in the DISCOL area.

Sponge smothered by sediment, in close vicinity to a disturbance track.

Barnacle and ophiuroid utilising a sponge stalk in the DISCOL region.
Each ISA mining claim area in CCZ approximately 75,000 Km²

- Mining would occur in multiple areas within claim (black shapes) over 30 year period of contract – each CCZ mine would strip mine est 10-12,000 km² of seabed in 30-year license period (app 1/3 size of Belgium) to mine 3MT dry weight/year nodules (app 10K ton/day)

- Sediment plumes across seabed could “easily” cover another 10,000-30,000 km²; over all footprint estimated at 20-40,000 km² (Smith et al, 2020)

- Concentrations in the water column orders of magnitude higher than natural concentrations sediment/POC to which organisms are adopted (MIDAS; JPI Oceans;)

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(deepsea conservation coalition)
Mid-water plumes

Up to 1,400 km - Wastewater, sediment & mining fines discharged from ships could travel up to 1,400 km through mid-water in multiple directions before fully settling on bottom

(Muñoz-Royo et al., (2021) “Extent of impact of deep-sea nodule mining midwater plumes is influenced by sediment loading, turbulence and thresholds. COMMUNICATIONS EARTH & ENVIRONMENT | https://doi.org/10.1038/s43247-021-00213-8)

Impacts of sediment, wastewater, noise & light on fisheries (e.g. tuna fisheries in eastern & NW Pacific, western Indian Ocean, Mid Atlantic), migratory species (e.g. cetaceans, sea turtles, sharks, rays), & crucially – the biological carbon pump

Impact/Recovery?

Up to half of the larger animals in CCZ believed to be nodule dependent species (‘nodule obligate’ species). And about half of species sampled to date in CCZ are ‘singletons’ – not known if a result of undersampling, rarity, endemism. Many species new to science and only a small number of species likely to inhabit CCZ have yet been sampled/discovered.

“Nodules and nodule-dependent animals may take millions of years to recover from the impacts of mining, and even the partial recovery of the animals living in the sediment may take hundreds to thousands of years.”

Clarion Clipperton Zone REMP

- 9 APEIs covering app 1.44 million km² = app 32% of CCZ (4.5 million km²)

- BUT APEIs only designed to protect core area (200x200km) of each APEI = app 360,000 km² or app 8% of CCZ

- 4 new APEIs adopted in December 2021: total area app 44% of CCZ but only protecting app 11-12% from mining impacts

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UN 1st World Ocean Assessment 2016

“This truly vast deep-sea realm constitutes the largest source of species and ecosystem diversity on Earth... evidence that the richness and diversity of organisms in the deep sea exceeds all other known biomes... and supports the diverse ecosystem processes and functions necessary for the Earth’s natural systems to function”

Deep sea already under stress:

• Climate change related impacts: deoxygenation, acidification, temperature, reduced food (POC flux) (Sweetman et al 2017; Levin et al 2016)

• Pollution: plastics, POPs in DS fish (Jamieson et al 2017)

• DW Fisheries impacts 200-2000m+ (1st UN WOA; ICES, others)
Structural/political concerns re the ISA

• Use it or lose it incentives: mine or risk losing exploration claim/contract (15yr + multiple extensions?); ‘perverse’ incentive to mine

• All countries have equal opportunity to mine and/or become a Sponsoring State – noble idea in 1970s but can the ISA say no to any that apply today?

• Currently at least 25 of the 31 ISA exploration contracts in the hands of 7 countries - China, France, Germany, India, Japan, Korea, Russia - and 3 companies UKSR (UK), GSR (Belgium) Deep Green/The Metals Company (Canada) – Equity?
Structural & political concerns regarding the ISA

• Lack of transparency (contracts, LTC meetings) – decision to grant mining contracts heavily influenced by LTC

• Voting structure - A MAJOR PROBLEM: If 16 individuals (or less) on LTC recommend a country/company get a mining license, as few as 2 members of the ISA Council (on Groups A, B or C) can guarantee the country/company gets a license even if the other 34 Council members oppose

• 131 Members of the ISA have no vote in deciding whether to issue mining licenses or not
Benefit to humankind as a whole?

- Economics of CCZ mining (MIT): payout to ISA countries – a few hundred thousand dollars per country per year (if divided equally amongst 167 countries); less if discount rate/Net Present Value is taken into account.

- But potential very profitable for individual companies & Sponsoring States – corporate tax (but not all can/will share equally in benefits as sponsoring states unless all 167 apply for mining licenses)

- Economics likely to drive industry – if profitable, many countries & companies may want to join in the ‘gold rush’. The ISA not likely to be able to say no to (any?) applications to mine
So why Mine? The Hype

• “The green transition is going to require hundreds of millions of tonnes of nickel, copper and cobalt...”

Gerard Barron, CEO The Metals Company (TMC) formerly DeepGreen Metals

TMC has 3 ISA exploration contracts in the CCZ sponsored by Nauru, Tonga, Kiribati
<table>
<thead>
<tr>
<th>Main metals found in polymetallic nodules in the CCZ</th>
<th>Estimated annual metal production in tons for each mining license in CCZ based on mining 3MT nodules (dry wt) per year</th>
<th>Land-based mined production in 2018 in tons (USGS)</th>
<th>Est Number of CCZ mines needed per year to equal 2018 terrestrial mining production</th>
<th>Est total CCZ seabed area that would be directly mined per year in km²</th>
<th>Cumulative impact over 30-year license period in km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel (Ni)</td>
<td>37,050</td>
<td>2,300,000</td>
<td>62</td>
<td>18,600</td>
<td>558,000</td>
</tr>
<tr>
<td>Cobalt (Co)</td>
<td>6,375</td>
<td>140,000</td>
<td>22</td>
<td>6,600</td>
<td>198,000</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>32,400</td>
<td>21,000,000</td>
<td>648</td>
<td>194,000</td>
<td>5,832,000</td>
</tr>
<tr>
<td>Manganese (Mn)</td>
<td>760,000</td>
<td>18,000,000</td>
<td>24</td>
<td>7,200</td>
<td>216,000</td>
</tr>
</tbody>
</table>

Changing technologies: Batteries without CCZ metals planned/already in production – no nickel, no cobalt

Sulfur provides promising 'next-gen' battery alternative
Phys.org 16 June 2020

“Cobalt, nickel free electric car batteries are a runaway success”
Mining.com 11 March 2021

EV Battery Technology: The Road To A Breakthrough
April 2022

“Lithium-sulfur batteries... high energy density, low cost, abundance, nontoxicity and sustainability.”

Lithium-ion and lithium-iron phosphate (or LFP) dominate the current EV battery landscape.


These and other alternatives to LMNC/LNCA batteries exist:

LFP: Tesla (50%), BYD (100%), Ford, Volkswagen, others
Deep-sea mining not needed to transition to renewable energy economies

- Metal demands for renewable energy - Transition to 100% renewable energy economy by 2050 can be done without sourcing metals from deep-sea
- (alternative technologies, substitute materials, recycling, better product design etc.)

- Copper
- Cobalt
- Nickel
- Lithium
- Silver
- Specialty metals (Tellurium)
- Rare Earths (Neodymium, Dysprosium)

https://opus.lib.uts.edu.au/handle/10453/67336
Intergovernmental Conference (BBNJ): UNCLOS Implementing Agreement conservation and sustainable use of marine biodiversity in ABNJ
A Tale of Two Instruments under negotiation

• On the one hand, the BBNJ Agreement – an UNCLOS ‘implementing agreement’ for the conservation and sustainable use of marine biological diversity in ABNJ

• On the other hand, the ISA Mining Code/exploitation regulations – an instrument under UNCLOS likely to lead to large-scale biodiversity loss in deep-sea/open ocean ecosystems systems already under stress (climate change, pollution, plastics)
DSM: incompatible with 2030 Sustainable Development Goals

SDG 14, Target 14.2: “By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans”

CCZ mining: likely to cause significant adverse impacts on marine ecosystems; weaken their resilience (e.g. to climate change impacts); & cause damage from which they may never recover. Also lead to unsustainable patterns of production and consumption under SDG 12
Growing support for a moratorium

European Parliament: “...moratorium, including at the International Seabed Authority, on deep-seabed mining until such time as the effects of deep-sea mining on the marine environment, biodiversity and human activities at sea have been studied and researched sufficiently and deep seabed mining can be managed to ensure no marine biodiversity loss nor degradation of marine ecosystems” (June 2021)

Chilean Senate, Guam Senate, legislatures of Canary Islands, Galicia, others

Over 600 marine science & policy experts from 44 countries
https://www.seabedminingsciencestatement.org/

BMW Group, Volvo Group, Samsung SDI, Philips, Google, Volkswagen Group, Renault Group, Scania, Patagonia. Northvolt, Ford and Microsoft stated they will avoid DSM metals in supply chains. Banks: BBVA, Lloyd’s, NatWest ABN AMRO - More companies likely... EU’s Long Distance (fishing) Fleet Advisory Council and other EU Councils
http://www.savethehighseas.org/momentum-for-a-moratorium/
Moratorium/concern

- 44 government ministries/agencies from 37 countries, 530+ NGOs and indigenous peoples groups voted to support DSM moratorium resolution 069 at IUCN World Conservation Congress September 2021 https://www.iucncongress2020.org/motion/069
- Pacific Blue Line “ban” on DSM in the Pacific https://www.pacificblueline.org/
- UK House of Commons Environment Audit Committee: DSM - “catastrophic impacts on the seafloor”; ISA benefiting from revenues from mining “a clear conflict of interest” and “the case for [deep-sea] mining has not yet been made” (January 2019)
- High Level Panel for a Sustainable Ocean Economy: Ocean Solutions report (2020); UNEP Finance Initiative: Harmful Marine Extractives: Deep Sea Mining report (2022) – Deep Sea Mining is unsustainable, should not be financed nor considered a goal of any ‘sustainable’ blue economy
Moratorium on deep-sea mining

- Yes – possible, legally defensible, required under the precautionary approach, consistent with contemporary commitments to protecting biodiversity and implementing UN SDGs

- Future role for the ISA? Critical to maintain ISA as a multilateral, global regulatory body with Authority over activities in the Area / CHM (but need reform/transformed)

- Reform & transform ISA - instead of mining, ISA c/should promote, coordinate, and/or conduct marine science research on the deep-sea and open ocean and role in carbon sequestration and regulation of planetary climate processes (UN 1st World Ocean Assessment) – knowledge that would provide an incalculable benefit to humankind as a whole
The Anthropocene?

“Clearly we are in the midst of one of the great extinction spasms of geological history”
E.O. Wilson, The Diversity of Life (1992)

A million species at risk of extinction, many over the next few decades from direct exploitation/mortality, habitat loss, climate change...

IPBES report (May 2019)/UNEP February 2021
The ISA is now negotiating regulations to mine deep sea nodules in the central Pacific/CCZ

“It’s one of the most biodiverse areas that we’ve ever sampled on the abyssal plains”...“We’re about to make one of the biggest transformations that humans have ever made to the surface of the planet. We’re going to strip-mine a massive habitat, and once it’s gone, it isn’t coming back.” Jeff Drazen, University of Hawaii


“Once we destroy vast areas of deep seabed habitat, there will be no going back. These ecosystems will take millions of years to recover.” Craig Smith, University of Hawaii


A moratorium by/at the ISA is required
DSCC fact sheets on DSM & the ISA
http://www.savethehighseas.org/resources/publications/deep-sea-mining-factsheets/

• Deep-sea Mining an Introduction
  • Also available in: Spanish & French
• Deep-sea mining: the science and potential impacts
  • Also available in: Spanish
• Deep-sea mining: growing support for a moratorium
  • Also available in: Spanish
• Deep-sea mining: where are they seeking to mine first?
  • Also available in: Spanish
• Deep-sea mining: international commitments
  • Also available in: Spanish
• Deep-sea mining: who stands to benefit?
  • Also available in: Spanish
• Deep-sea mining: is the International Seabed Authority fit for purpose?
  • Also available in: Spanish
• Deep-sea mining and the transition economy
  • Also available in: Spanish
• Deep-sea mining: what are the alternatives?
  • Also available in: Spanish
Thank-you!

DSM in the news

http://geographical.co.uk/nature/oceans/item/4280-should-we-mine-the-deep-sea-floor-before-we-discover-its-true-treasures

https://chinadialogueocean.net/19878-deep-sea-mining-code-missing-from-the-agenda-at-first-isa-meeting-in-two-years/


https://www.theguardian.com/environment/2021/sep/28/false-choice-is-deep-sea-mining-required-for-an-electric-vehicle-revolution


https://www.newyorker.com/magazine/2022/01/03/mining-the-bottom-of-the-sea