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author:

Maria Wodzińska

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The aim of this text is to address the topic of deep-sea mining, or the extraction of raw materials from beneath the ocean floor, one of the most radical and least known mining practices used in the current phase of capitalism, often referred to as extractivism. This practice is used to extract rare elements and rare-earth elements at great depths, in total darkness, making it difficult if not impossible to analyse the extraction methods and the ecological effects that deep-sea mining can cause. The impossibility of empirical investigation of the scale and consequences of this practice triggers various catastrophic visions and fosters black scenarios of the future, and at the same hinders factual data analysis. The involvement of states and corporations in this practice prompts questions about the ethical dimension of underwater extractivism. Discourse that justifies the need to conquer new areas in order to prevent climate catastrophe through the development of green technologies is 'the ethical gloom' that shrouds this practice.

Maria Wodzińska - She holds a bachelor's and master's degree (2014-2019) from the Faculty of "Artes Liberales" at the University of Warsaw. She received her Ph.D. degree in Humanities (discipline of Culture and Religion Studies) in 2023 based on her dissertation „Geontopolitics characterised through concept, image, and evidence. Possible ways to include nature in biopolitical and necropolitical reflection" which was written under the supervision of Professor Szymon Wróbel. At the center of her research interests are, on the one hand, biopolitical and necropolitical structures of power, and on the other, forensic research and the whole spectrum of relations between nature and the environment, and extractivism. She recently published a text „Prawo jako spekulacja", (in: "Hakowanie antropocenu. Nowe koncepcje wspólnot więcej-niż-ludzkich w ekologicznych fabulacjach spekulatywnych", ed. Małgorzata Sugiera, Jagiellonian University Press, Kraków 2023) and the article „How to Inscribe Nature and the Environment Into the Philosophy of Politics" (in „Philosophy Study", March 2023, Vol. 13, No. 3).

Real Darkness, Grim Visions of the Future, and "Ethical Gloom": Spaces, Effects, and Visualizations of Deep-Sea Extractivism

1. Extractivism

> "I wish to God these calculations had been executed by steam!" said Charles Babbage and developed his plans for the Difference Engine in summer 1814. More than 200 years later, the engines of new extractivism are still running on burning coal and human sweat. Every click or swipe we make online creates one little hole in the ground, filled with toxic waste and toxic clouds. Every movement of materials and data within the planetary scale factory has its own hidden price. Supply chains are optimized towards maximizing profit for a few, while the real costs of the destruction that follows are shared among all the living entities on the planet in the present and the future. In the words of Mckenzie Wark, "The Anthropocene is a series of metabolic rifts, where one molecule after another is extracted by labor and technique to make things for humans, but the waste products don't return so that the cycle can renew itself. The soils deplete, the seas recede, the climate alters, the gyre widens: a world on fire."[1]

In his essay titled "New Extractivism: An Assemblage of Concepts and Allegories," Vladan Joler, the above-quoted author, technology researcher, and professor at the University of Novi Sad, states that extractivism—or extractivist capitalism—can exploit, use, and incorporate everything into its logic. This includes natural resources on the earth, underground, beneath the water surface, below the seabed, or in space; analog and digital data; and all human activity, including work and leisure. Extraction processes continually transform, resulting in depleted, abandoned resources and newly annexed areas. In *The Cost of Connection*, new media theorists Nick Couldry and

Ulises A. Mejias[2] note that contemporary capitalism still relies on colonial assumptions and schemes despite using the latest technologies. Resource plundering, almost unlimited territorial conquest, and control over bodies—so characteristic of earlier forms of colonialism—now extend to data colonialism, where technological monopolies appropriate digital resources.

Natural resource extraction accompanied the advancement of both capitalism and the colonial economy. In his book, *Open Veins of Latin America*, Uruguayan writer Eduardo Galeano poignantly describes the process of silver and gold extraction in sixteenth- and seventeenth-century South America.[3] He demonstrates how this process constituted "the main motivating force in the Conquest"[4] and reshaped the Spanish and Portuguese economic models. In particular, the enslavement of local indigenous communities enabled making a profit from natural resource extraction. As examples of mining practices in Cyprus and the Congo show, the British, French, Dutch, and Belgian colonial economy models—common in the eighteenth and nineteenth centuries in Africa, Central America, the Middle East, and Southeast Asia—depended on copper extraction, among other things. These models created labor organization patterns also for Europe. In turn, in the twentieth century, industrial capitalism could develop through coal, natural gas, and oil exploitation, annexing reserves below the seabed on an industrial scale for the first time.

The rising global financial capitalism gained dominance in the late twentieth century. This led to another systemic mutation, minimizing the importance of industrial production and simultaneously strengthening the economic role of financial operations. Securities trading and stock market speculation became the basis of the economic system. The infrastructure for transmitting information about global financial market transactions constituted a critical component because the fast information delivery to investors provided a competitive edge.

The transition from industrial manufacturing to financial operations and creating transmission infrastructure—for example cables, fiber optics (including on the seabed), industrial buses, and computer networks—initiated natural resource extraction processes. These processes involved resources that had been previously unextracted or used for other purposes and on a much smaller scale. They included rare-earth metals such as coltan or gadolinium, necessary for the production of electronic components, for instance liquid crystal displays.

Global financial capitalism paved the way for digital capitalism, with the latest technological solutions as its tools: social media, digital platforms, computational systems, and artificial intelligence. Progress in this area directly influenced not only the scale and methods of extraction but also the proper selection of natural resources. With rare-earth metal extraction, the extraction of rare-earth elements, such as europium used as a phosphor in cathode-ray tubes, intensified as well. Moreover, the increasing extraction of rare-earth metals and elements results from the shift toward "green technologies," designed to achieve the so-called climate neutrality in the near future. However, this idea, strongly advocated in the Global North, masks a range of brutal extraction practices both in the Global South and in places outside the sphere of visibility.

The ocean is such a place. It represents one of the last areas on Earth that people have not yet fully colonized. Furthermore, under the United Nations Convention on the Law of the Sea, it constitutes the common heritage of mankind, with a significant part, the so-called high seas, comprising international waters. Underwater extractivism—also known as deep-sea mining or the extraction of natural resources from beneath the seabed—resembles the practices of the first colonial period. At the time, conquistadors dispossessed[5] indigenous communities and captured natural resources in a way that proved difficult to see, describe, or control due to the distance between colonies

and the center. These processes remained invisible to European societies. For deposits under the ocean floor, dispossession consists in claiming those that belong to all humanity, which deprives everyone of co-ownership of the ocean and its resources. In the first colonial period, the distance between the Americas and Europe contributed to the invisibility of such actions; today, the ocean depths have a similar function. Nonetheless, the real darkness caused by a lack of light beneath the water surface is not the only factor that obscures the dimensions and effects of deep-sea extractivism. Catastrophic scenarios and grim visions of the future also hinder data analysis. The same applies to "ethical obscurity," a discourse that justifies extraction and the development of green technologies to avoid climate catastrophe.

Therefore, acquiring real, evidence-based knowledge proves essential to verify information about the relationship between technology and deep-sea mining and understand the effects of extraction processes. In this text, I examine underwater extraction practices near Papua New Guinea (the Solwara 1 project), in the Pacific Ocean (Clarion–Clipperton Fracture Zone), and in the North Sea (Norway's government actions). Moreover, I reference research, investigative, activist, advocacy, and political efforts that aim to confront underwater extractivism in these areas. These efforts stem from a desire to break the deadlock and reclaim political agency, which, in the case of the ocean, means protecting its most valuable resources, including biodiversity, both in legal and material terms. By describing these phenomena, verifying data, protesting, and opposing extraction practices, individuals, communities, organizations, and political groups side with the invisible and the nonhuman. We can say that in doing so, they illuminate the darkness that surrounds deep-sea mining.

In my opinion, forensic methodologies used in advocacy projects are similar to activist and political activities. These

methodologies can serve as a model for studying and describing what remains invisible to the naked eye and beyond the human sphere of visibility. As far as possible, they allow for a nuanced and comprehensive presentation of information about places that people cannot access.

Forensics,[6] or forensic research, emerged from scholarly, investigative, activist, and artistic practices. Forensic Architecture, the international investigative group, coined this term, viewing forensics as a specific research program to redefine the idea of evidence with digital technologies and tools. Forensic research analyzes various forms of evidence and testimony, often obtained through open-source intelligence (OSINT) and remote sensing methods. The collected data are then visualized and presented publicly thanks to technologies such as 3D mapping, architectural software, video, or animation. The resulting interdisciplinary projects feature in art institutions and online spaces but sometimes find application in legal proceedings and political negotiations. This usually happens in the case of documenting military actions, war crimes, political assassinations, migration deterrence strategies, border violence, or environmental contamination. Many research groups employ this methodology. In recent years, numerous organizations inspired by Forensic Architecture have emerged, including INTERPRT, Border Forensic, INDEX, Geocinema, or Open Weather. They explore social, political, and ecological issues, for instance migration and cases of ecocide. The research–investigative collective INTERPRT addresses the problem of the ocean and underwater extraction.

To effectively describe deep-sea mining, one must use digital technologies, also as part of investigative practices based on analog materials. A democratic tool accessible to all, forensics reveals and documents what remains invisible on the surface. In the case of oceans, it enables a leap into the abyss, where

multiple layers of darkness prevail. Forensic research visualizes and describes spaces that are or can become inaccessible, for example temporarily. This approach allows for mapping and "illuminating" such spaces. Using a poetic metaphor, one might call forensics a "methodology of clarity."

2. Spaces of Deep-Sea Extractivism

> Global capitalism is a seaborne phenomenon. This simple fact gives us multiple reasons for thinking about the relationship between capitalism and the sea today. The global ocean still serves as a trade route, strategic space, fish bank and supply chain as it has since the advent of capitalism (and indeed long before then). Seabeds continue to be drilled for their fossil fuels and minerals, and coastlines developed for real estate and leisure.[7]

Decisions to extract rare-earth metals and elements from beneath the seabed stem from the growing production demands in the technology sector and China's monopolization of land deposits containing these resources.[8] Nautilus Minerals, a Canadian company established in 1997, studied the seas around Papua New Guinea from its very beginning. Furthermore, it organized the first attempt at seabed mining—essentially a pilot or experimental initiative. As a result of the company's research, the Solwara 1 underwater mining project emerged in the Bismarck Sea, also known as the New Guinea Sea, in the Pacific Ocean. The project aimed to seize seafloor massive sulfide (SMS) deposits, which abounded with gold, silver, copper, zinc, manganese, and cobalt. The name "Solwara 1" stood for both the deposit and the entire project conducted on the slopes of the Suzette submarine volcano, situated at an average depth of 1,520 meters below sea level.[9] In 2012, Nautilus Minerals received the world's first permit from the Papua New Guinea government to exploit these deposits, permitting the extraction of 130,000 cubic meters of unconsolidated sediment over thirty

months. To extract resources from hydrothermal vents[10] and obtain polymetallic nodules,[11] the company employed three robotic terrestrial machines and mining equipment adapted for underwater conditions.[12] The next stage involved collecting slurry from the seabed and pumping it through pipes to a vessel on the surface, where minerals were retrieved and water was returned near the seabed.

From the start, Nautilus Minerals's activities provoked controversy and opposition from indigenous communities living along the coasts of the Bismarck and Solomon Seas. The planned mining site overlapped with fishing areas for residents of New Ireland and East New Britain Provinces. The Papua New Guinea government's permit for deposit usage in the Bismarck Sea intensified resistance toward deep-sea mining in the region. Community representatives, together with social organizations such as the Deep Sea Mining Campaign, began their efforts to raise awareness about the ocean ecosystem and consequences of extraction activities. Moreover, they collected 24,000 signatures under a petition against the Canadian company's operations, which highlighted the ocean's central position in the environmental and cultural heritage of indigenous communities.

Banners encouraging people to join the Alliance of the Solwara Warriors, source: Alliance of the Solwara Warriors , July 19, 2016.

Communities responded to Nautilus Minerals's practices with activism and political engagement, mainly of an educational and legal nature. Between late 2016 and early 2017, the Alliance of the Solwara Warriors emerged as a non-governmental organization operating across several provinces in the country. Deep-sea mining disrupted fishing zones and harmed groups of fauna while also negatively impacting the economy, environment, and public health. At the end of 2017, the Alliance of the Solwara Warriors

decided to file a lawsuit against the Papua New Guinea government in a local court.[13] This led one of the Solwara 1 project's key investors to withdraw a year later. As a consequence, in 2019, Nautilus Minerals declared bankruptcy, leaving the Papua New Guinea government with a debt of USD 120 million.[14] This marked the first significant success for the Solwara Warriors.

The Alliance's efforts continue. With other organizations, it is currently fighting for the cancellation of all permits for the exploitation of resources below the ocean floor granted by Papua New Guinea's authorities. The Alliance is also trying to regulate deep-sea mining in the region by implementing a ten-year extraction ban, ultimately aiming for a permanent one on extracting resources from beneath the seabed across the entire Pacific Ocean. According to Jonathan Mesulam, a member of the Alliance of the Solwara Warriors, a guarantee that no other mining companies[15] or legal successors carry on with Nautilus Minerals's project is at stake here. Indeed, following its bankruptcy, the company underwent restructuring. In 2019, Deep Sea Mining Finance Limited (DSMF)—a joint venture of an international holding company, USM Holdings Limited, and MB Holding Company LLC from Oman—acquired Nautilus Minerals. DSMF now has all rights to the Solwara 1 mining project, including assets and intellectual property rights.

The second site of extraction practices lies in the Clarion–Clipperton Fracture Zone in the Pacific Ocean, representing the next stage in the development of underwater extractivism. This submarine geological fracture zone spans 4.5 million square kilometers between Mexico, Hawaii, and Kiribati. It contains valuable deposits of elements such as copper, cobalt, lithium, molybdenum, and manganese. The International Seabed Authority (ISA) oversees this underwater zone. The Authority "is an autonomous international organization established under the 1982 United Nations Convention on the Law of the Sea

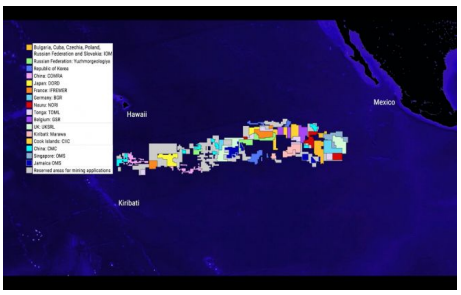
(UNCLOS) and the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea (1994 Agreement)."[16]

The issues of ownership of the Clarion–Clipperton Fracture Zone plots and methods used for extraction works remained unclear for a while. As the zone lies in the middle of the ocean outside the local jurisdiction, INTERPRT,[17] an international investigative–research group supported by various non-governmental organizations and global activist groups, engaged in the matter. INTERPRT is a collective founded by Nabil Ahmed, a researcher formerly associated with the Goldsmiths' College and Forensic Architecture. Unlike Forensic Architecture, this group concentrates exclusively on investigating ecocide, or crimes against nature and the environment, and advocacy activity, including in environmental justice proceedings before international courts and tribunals. To this end, INTERPRT employs forensic and visual methodologies, presenting its findings in galleries and museums, just like Forensic Architecture does.

The problem of underwater infrastructure, methods, and effects of submarine resource extraction in the Clarion–Clipperton Fracture Zone became the subject of a video work titled *Blue Peril*, created through the collaboration of INTERPRT, Deep Sea Mining Campaign,[18] and Ozeanien-Dialog.[19] The investigation depicted in the video aimed to grasp the colonial approach to seas and oceans and demonstrate how the seabed has transformed into a space for resource speculation related to energy transition during extractivist capitalism. A significant aspect involves showing what remains invisible due to the zone's remoteness and depth, including the ownership structure of ocean-floor plots, extraction practices, and their consequences for ecosystems. The *Blue Peril* video summarizes the research and investigative activities. One might call this work an advocacy project for at least two reasons. First, community

representatives of the Pacific states participated in the initiative to speak for those communities and their environment. Second, the video was shown at events with a strictly political agenda, for example during the United Nations Ocean Conference in Lisbon on June 30, 2022.

The *Blue Peril* authors note that the Clarion–Clipperton Fracture Zone consists of sixteen mining areas, which cover approximately one million square kilometers. The designated "underwater plots" fall under the administration of specific countries, which may conduct experimental extraction activities under exploratory leases for deep-sea mining. This process occurs in the absence of any international systemic regulations.[20] Besides countries located near this zone in the Pacific Ocean, such as Kiribati, the Cook Islands, and Tonga, important geopolitical players like the United Kingdom, Germany, and France also control underwater land. A plot in the *Blue Peril* still below seems the most significant one from a Polish perspective. It belongs to a consortium of Bulgaria, Cuba, the Czech Republic, Poland, Russia, and Slovakia, with the Szczecin-based Interoceanmetal Joint Organization acting as the plot manager.



Blue Peril
still showing the division of the Clarion–Clipperton Fracture Zone into mining areas.

The "plots" marked in gray deserve particular attention as they represent areas reserved for private entities seeking permission to extract resources in this zone. Returning to Nautilus Minerals that I already mentioned in the context of the Solwara 1 project, it is worth noting that in 2013, the company presented its plans for commercial development of the specific Clarion–Clipperton zone segments[21] to the International Seabed Authority. This indicates the supralocal nature of deep-sea extraction practices.

What makes the Clarion–Clipperton Fracture Zone unique?

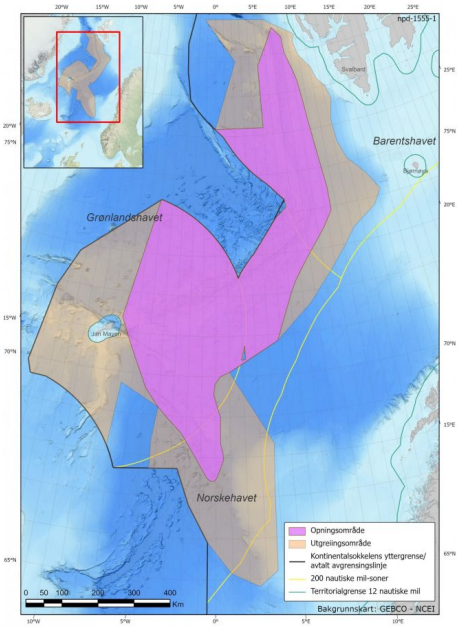
The zone lies near so-called hydrothermal vents—fissures through which warm water escapes. These vents host complex communities of living organisms and function as crucial links in marine food chains. Water flow disruption or outright destruction of the vents with heavy mining equipment threatens not only the local ecosystem but also multiple interconnected ecosystems. The consequences of such actions remain unknown. Advocacy activity aims to help the global community realize how today's decisions about the oceans are made without examining the effects or recognizing the processes that they may trigger. For the Clarion–Clipperton Fracture Zone, the issue goes beyond the economic and ecological safety of local fishing communities, which constituted the main concern in the case of Solwara 1. It also involves preventing an ecological disaster that no one talks about, justifying underwater extractivism with the necessary development of "green technologies."

A key event and another step toward the legal and political sanctioning of underwater mining occurred on January 9, 2024, when Stortinget, the Norwegian Parliament, voted on the government's decision to authorize exploration and resource extraction on Norway's continental shelf to obtain critical raw materials.[22] The decision specified the territorial framework—an area of 281,200 square kilometers—where works could commence after adopting additional laws and issuing permits to private companies. The map below outlines this territory. The pink shade indicates the region where deep-sea mining will be authorized in the first stage. The peach color represents the target area.

Stortinget's decision resulted from the wish to achieve resource independence for Norway and maintain a pro-development trajectory for the economy. According to the report "Norway to Mine Part of the Arctic Seabed," prepared for the European Parliament by the European Parliamentary Research

Service,

> This decision follows a government-sponsored survey, which found substantial amounts of metals and minerals, including iron, copper (>14%), zinc (3%) and cobalt (<1%), but also rare earth elements (e.g. lithium and scandium) in the deep seabed. Those minerals were found in polymetallic sulphides, some 3 000 meters deep. Extraction of minerals from the seabed in Norway would likely involve cutting and crushing the rocks before bringing them to the surface. Norway's decision to mine the deep seabed is believed to stem from two factors: (I) reducing the country's dependence on China for the supply of critical minerals needed to build electric vehicle batteries, wind turbines and solar panels; (II) developing new exportable commodities, given that its top export, offshore oil and gas, is expected to decline gradually.[23]



Map showing the permissible deep-sea mining area; source

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The Norwegian Parliament made the decision despite warnings from researchers who emphasized the potential environmental harm caused by this kind of resource extraction. As the Parliament disregarded voices from activist, research, investigative, and advocacy groups, the next phase of action emerged from the political bodies of the European Union, which opposed Norway's decision. At the European Parliament's plenary session held on January 17, 2024, EU Commissioner Janusz Wojciechowski presented the position of the Committee on Agriculture and Rural Development. Wojciechowski argued against initiating deep-sea mining attempts until all the

consequences had been assessed. Furthermore, he also noted that in November 2023, the Committee sent a letter to the Norwegian Parliament members,[24] urging them to oppose the government proposals. The European Union's stance in this respect seems naive. The Union repeats the arguments of activist and advocacy groups, noting the lack of knowledge on extraction consequences. Norway's decision demonstrates that its authorities recognize the environmental impact and legal regulations adopted in the country. Still, Norwegian politicians have chosen to proceed to maintain a competitive edge. This decision marks the beginning of real underwater extractivism, supported by the state's authority and power.

The above three cases—the Solwara 1 project near Papua New Guinea, seabed resource extraction in the Clarion–Clipperton Fracture Zone in the Pacific Ocean, and mining permits issued by the Norwegian government for the North Sea—show that the scope and scale of deep-sea mining are constantly increasing. This applies to the extraction area, the intensity of practices, and the number of participating entities. Despite its controversies, this phenomenon continues to gain authorities' acceptance and social legitimacy. Two primary arguments are mentioned in favor of this activity: resource independence and technological development.

3. Effects of Deep-Sea Extractivism and "Ethical Gloom"

> The ocean is a sensorium: it records the transformations of the Earth in its complex dynamics, and it inscribes its own cycles back into the forms of life.[25]

At present, deep-sea mining does not constitute a common practice. For now, it remains an experimental, speculative extraction project. Though still in the experimental phase, the Norwegian example demonstrates how fast the transition to

industrial mining can be, even when groups representing indigenous and local communities, environmental activists, as well as advocacy and political organizations emphasize the lack of analyses on the long-term consequences of such activities.

The dark ocean depths make it difficult to curb these extractivist inclinations. Resource extraction beneath the ocean floor occurs in unknown, unexplored locations with little or no light. The darkness hinders analysis and complicates extraction processes. On the other hand, it facilitates the concealment of negative phenomena, such as the destruction of hydrothermal vents, a possible side effect of deep-sea mining. The darkness enables the most extreme mining practices, including the use of equipment prohibited on the surface. No one sees rock blasting, and few can investigate its consequences. The ocean floor and its conditions allow for the emergence of an underwater version of extractivist capitalism grounded in resource extraction. Operating in secrecy, this form of capitalism becomes a more radicalized variation of the system that functions on land.

Because of the underwater darkness, the image of ocean-floor processes relies on imagination, which has more to do with literature than empirical research, and stems from speculations and post-apocalyptic visions of worldwide destruction rather than hard data. Paradoxically, cultural "grim visions" of the future do not cause the international community to change anything. Instead, they evoke a sense of helplessness, demotivate people, and help perpetuate harmful practices. Perhaps change is possible if a data-driven, complex, and cruel vision of the oceanic apocalypse terrifies authorities and forces them to make immediate political decisions. Biodiversity loss constitutes one of the fundamental risks posed by extracting resources from the seabed and ocean floor. This threat goes beyond the extinction of known and documented species. The deep sea remains largely unexplored. It probably hosts a range of poorly understood and undiscovered endemic species. Other

dangers include the destruction of natural landforms, seabed compaction, the creation of sediment plumes, and altered flows,[26] which ultimately lead to species extinction and food chain disruption. There are many more examples. One must assess deep-sea mining at the microbiological level as well. As researchers in a team led by Beth N. Orcutt state in their article titled "Impacts of Deep-Sea Mining on Microbial Ecosystem Services,"[27] oceanic extraction might increase the number of microbes that metabolize heavy metals, causing radical changes to element cycles. This, in turn, can heighten water toxicity. If public debate offered reports about increased water toxicity due to altered element cycles or the projected extinction of endemic species, research and activist communities would gain additional arguments in the fight to preserve marine and oceanic ecosystems.

Real darkness and grim visions of the future accompany a phenomenon that I call "ethical gloom." The conquest of underwater abysses not only attempts to dispossess mankind of its common property but also resembles the colonization of nonhuman spaces. The ocean is humanity's last unconquered territory on Earth. People often treat it as no man's land. Therefore, deep-sea mining replicates many "dark" colonial practices. It operates in this way also because, at first glance, its consequences seem to have little impact on humanity. So far, no countries have adopted any ethical norms or legal regulations that would protect the shared underwater world, which enables even the most controversial actions. Norway's parliamentary decision shows how the goal of achieving a competitive edge in the new technology sector can justify far-reaching environmental changes. The ocean floor appears as a no-holds-barred space, and consequences blur into the all-encompassing darkness. Moreover, this present moment becomes a time of clashing arguments and propaganda messages, easily constructed through moral blackmail of entire societies. As we know, the

production of so-called green technologies requires rare-earth elements and metals. These resources can be extracted on land, as in today's Congo, or from beneath the ocean floor, which seems like a much more ethical and less brutal solution for sector workers. The narrative about green technologies' benefits for the climate serves as discursive smoke and mirrors that cover resource extraction, legitimizing it with such arguments. What makes this narrative dangerous? First, history shows that new forms of extractivist capitalist economies do not automatically eliminate their earlier variants, especially if the latter prove more profitable. In the late nineteenth century, advanced factories in city centers operated alongside peripheral plantations that relied on slave labor in almost premodern ways. The rise of conditions for underwater extractivism does not equal the end of land extractivism. Deep-sea mining only expands the pool of extractable resources. Second, the need to change the energy balance—the understandable desire to move away from coal and increase the use of green technologies—stems from the necessity to stop the increase of average temperatures. Nonetheless, the potential loss of ocean biodiversity due to mining, particularly the destruction of algae clusters that absorb carbon dioxide, involves increasing average temperatures. No field exists where exploitation does not entail radical environmental consequences. Thus, life on Earth would benefit more from a scientific, data-, and research-based approach than from peddling arguments about green transformation. Such an approach can provide a balanced understanding of this issue and a real assessment of underwater extraction's profit and loss.

1 Vladan Joler, "New Extractivism: An Assemblage of Concepts and Allegories," extractivism.online, 2020, accessed May 24, 2024.

2 See Nick Couldry and Ulises A. Mejias, *The Cost of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism* (Stanford: Stanford University Press, 2019).

3 See Eduardo Galeano, *Open Veins of Latin America: Five Centuries of the Pillage of a Continent*, trans. Cedric Belfrage (New York: Monthly Review Press, 1997).

4 Galeano, *Open Veins of Latin America*, 59.

5 David Harvey writes about accumulation by dispossession. See David Harvey, *Spaces of Global Capitalism: Towards a Theory of Uneven Geographical Development* (London: Verso, 2006), 41–64.

6 Leszek Kordylewski introduced the terms *forensyka* (forensics) and *forensyczny* (forensic) to Polish. As Ewa Domańska writes, "according to experts, the terms 'forensic' and 'forensic science / sciences' do not have relevant equivalents in Polish. They are usually translated as 'medycyna sądowa' [forensic medicine] and 'nauki sądowe' or 'nauki sądownicze' [forensic sciences]; however, this translation does not reflect their complexity. In fact, the Latin etymology indicates 'forum' and 'forēnsis,' denoting both court and a space for public debate (presentation of a case on a public forum). Therefore, Leszek Kordylewski, a member of the American Academy of Forensic Scientists who works at the State Crime Laboratory in Chicago, suggested that 'forensyka' and 'forensyczny' be introduced to contemporary Polish language." See Ewa Domańska, *Nekros. Wprowadzenie do ontologii martwego ciała* (Warszawa: Wydawnictwo Naukowe PWN, 2017), 130.

7 Liam Campling and Alejandro Colás, *Capitalism and the Sea* (London: Verso, 2021), 1.

8 See Siddharth Kara, *Cobalt Red: How the Blood of the Congo Powers Our Lives* (New York: St. Martin's Press, 2023).

9 "Solwara 1," Mining Intelligence and News, accessed May 24, 2024, https://miningdataonline.com/property/3285/Solwara-1-Project.aspx.

10 A hydrothermal vent is a fissure in the Earth's surface that releases heated water with various minerals. These vents are primarily located in volcanically active regions and areas where tectonic plates are spreading on the ocean floor. See European Commission, "How Hydrothermal Vents Support Life," CORDIS, last modified January 20, 2015, accessed August 6, 2024, https://cordis.europa.eu/article/id/151623-how-hydrothermal-vents-support-life/en

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11 A polymetallic nodule is a conglomerate of various elements found on the ocean floor. Its composition depends on the location where it forms. It develops around a nucleus, which can constitute organic debris or a fragment of another nodule. See European Commission, "Deep-Sea Mining System for Polymetallic Nodules in the Oceanic Abyss," CORDIS, last modified September 18, 2020, accessed August 6, 2024.

12 Ben Doherty, "Collapse of PNG Deep-Sea Mining Venture Sparks Calls For Moratorium," The Guardian, September 15, 2019, accessed May 24, 2024.

13 Tom Lodewyke, "World-First Mining Case Launched in PNG," Lawyers Weekly, December 14, 2017, accessed August 7, 2024.

14 "Alliance of the Solwara Warriors: Our Culture, Our Heritage, Our Future," Friends of the Earth Australia, June 24, 2022, accessed May 24, 2024.

15 Ben Doherty, "Collapse of PNG Deep-Sea Mining Venture Sparks Calls For Moratorium," *The Guardian*, September 15, 2019, accessed May 25, 2024.

16 International Seabed Authority, "About ISA," ISA, accessed May 24, 2024.

17 See INTERPRT, accessed August 7, 2024.

18 A consortium that unites non-governmental organizations from Australia, Papua New Guinea, and Canada to counteract deep-sea mining in the Pacific Ocean.

19 A German alliance of organizations that focus primarily on the effects of extracting resources from beneath the ocean floor and engage in various acts of resistance against this extractivist practice.

20 Local authorities typically establish permissible resource extraction ranges. Such regulations do not apply in international waters.

21 International Seabed Authority, "Nautilus Minerals Propose Joint Venture with the Enterprise," ISA, April 12, 2013, accessed May 24, 2024.

22 Guillaume Ragonnaud, "Critical Raw Materials Act," European Parliamentary Research Service, June 2024, accessed May 24, 2024.

23 Angelos Delivorias, "Norway to Mine Part of the Arctic Seabed," European Parliamentary Research Service, January 2024, accessed May 24, 2024.

24 Caroline Roose, "Letter to the Norwegian Parliament: Act to Prevent Deep Sea Mining from Happening in Norwegian Waters," November 9, 2023, accessed May 24, 2024.

25 Daniela Zyman, ed., *Oceans Rising: A Companion to "Territorial Agency: Oceans in Transformation"* (London: Sternberg Press, 2021), 46.

26 All these phenomena result from the mechanical disruption of the seabed surface. Seabed compaction can occur due to the use of heavy equipment or the discharge of mining waste near the seabed. This waste, known as wastewater slurry, comprises sediment, rock fragments, and animal remains. Sediment plumes are underwater sandstorms that arise from the extraction of polymetallic nodules; they impact water columns and flows, with effects that can reach up to 1,400 kilometers. Sediment plumes can also transport mining waste and harmful substances.

27 B.N. Orcutt et al. "Impacts of Deep-Sea Mining on Microbial Ecosystem Services," *Limnology and Oceanography* 65, no. 7 (2020): 1498, accessed December 6, 2024, doi: https://doi.org/10.1002/lno.11403.

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