

International Environmental Legal Rules for Regulating the REY-Rich Mud Development by Japan

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Abstract

Leading the way in seabed mining, Japan is now funding the creation of a methodology to mine the newly discovered mineral resources in the deep-seabed, REY-rich mud. It appears that there are no international rules and standards that govern how REY-rich mud develops on the seafloor of coastal states. This does not imply, however, that international law does not regulate these types of activities in any way. Certain international legal rules, particularly those pertaining to the protection of the marine environment, may be relevant and/or serve as a pertinent regulatory benchmark. For instance, Article 208 of UNCLOS, which establishes basic guidelines for environmental protection against activities on the seabed that are under national jurisdiction, may be crucial in preventing the development of REY-rich mud from causing marine environment pollution. Furthermore, it is anticipated that the exploitation regulations that the International Seabed Authority is now developing will serve as a regulatory benchmark even though they are not directly relevant to the area within national jurisdiction. Furthermore, rules of Environmental Impact Assessment, provided in Article 206 and elaborated in the BBNJ (biodiversity beyond national jurisdiction) Agreement, aid coastal states in striking a balance between preserving the maritime environment and exploiting natural resources.

Introduction

Deep-seabed mining is currently attracting increasing attention. One of the reasons is that 30 years after the United Nations Convention on the Law of the Sea (UNCLOS) entered into force, technology has advanced to the extent that deep-seabed mining is commercially feasible. Another reason is that the public awareness of the protection of the marine environment has increased and, as a result, deep-seabed mining, which could cause tremendous damage to the environment, has started to be criticized. There is much scientific indeterminacy regarding deep-sea ecosystems, but it is said that the plume caused by seabed mining inevitably changes deep-sea ecosystems, thereby causing irreversible losses or long-lasting effects.¹

This movement has now appeared in the International Seabed Authority (ISA), the leading international organization of seabed mining. The ISA was established by UNCLOS to develop resources in seabed areas beyond national jurisdiction (the Area). However, 32 states have

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¹ Erik Simon-Lledó, Brian J. Bett, Veerle A. I. Huvenne, Kevin Köser, Timm Schoening, Jens Greinert and Daniel O. B. Jones, "Biological effects 26 years after simulated deep-sea mining," *Scientific Reports*, Vol. 9 (2019), p. 7, available at <<https://www.nature.com/articles/s41598-019-44492-w>>.

requested a moratorium to proceed with development.² Their opinions differ slightly,³ but their main idea is that seabed mining should be restrained until its impact is scientifically proven.⁴ Furthermore, some governments have decided to prohibit or introduce a moratorium on seabed mining within their waters.⁵

Meanwhile, some States and corporations have devoted themselves to developing exploration and exploitation technologies to make seabed mining economically feasible. Some have already concluded contracts with the ISA and found deposits of mineral resources, such as polymetallic nodules, polymetallic sulphides, and cobalt-rich ferromanganese crust.⁶ The Metals Company, a Canadian private corporation, has concluded the contract with three governments,⁷ and has led the development by establishing NORI, a Nauru subsidiary, in cooperation with Nauru as a sponsoring State, and plans to start its exploitation in 2026.⁸ From their perspective, it is not reasonable to suspend activities that would be the fruit of a long-term effort.

Japan is another leading country in terms of seabed mining. In addition to developing existing resources, Japan is also trying to find and create new resources, such as offshore methane hydrate.⁹ As Japan regards itself as a poor-resource State,¹⁰ the natural resources within its maritime zone are one of the targets the State seeks to develop.¹¹ As of 2024, the Japanese government seems to consider REY-rich mud as one of the most promising resources for future development.¹² Although a concrete schedule for commercial development has not yet been proposed, the government strongly supports the development of a methodology to exploit this

² As for the activities for calling moratorium, see <<https://deep-sea-conservation.org/solutions/no-deep-sea-mining/momentum-for-a-moratorium/>>.

³ For example, France looks to take the radical approach to request the ban (not moratorium) of the seabed mining; see <<https://www.lesechos.fr/monde/enjeux-internationaux/cop-27-emmanuel-macron-veut-interdire-lexploitation-des-fonds-marins-1876783>>.

⁴ Zachary Douglas *et al.*, In the Matter of a Proposed Moratorium or Precautionary Pause on Deep-Sea Mining Beyond National Jurisdiction, para. 11, *available at* <<https://www.pewtrusts.org/-/media/assets/2023/03/deep-sea-mining-moratorium.pdf>>.

⁵ For example, on 8 July 2024, the Governor of the State of Hawaii signed bill SB 2575 (Hawaii Seabed Mining Prevention Act.), which prohibits seabed mining in Hawaii's State water for the marine environment protection; the full text of the bill is *available at* <https://www.capitol.hawaii.gov/sessions/session2024/bills/SB2575_CD1_.pdf>; on 24 July 2024, the Governor of American Samoa issued an executive order to place a moratorium on seabed mining in its waters (An order Implementing a Moratorium on Deep Seabed Mining Exploration and Exploitation); the full text of the order is *available at* <<https://www.americansamoa.gov/executiveorders>>.

⁶ As for the list of exploration contracts between the ISA and contractors, see Exploration Contracts - International Seabed Authority, *available at* <<https://www.isa.org/jm/exploration-contracts/>>.

⁷ The Metals Company, "Sponsoring States," *available at* <<https://metals.co/sponsoring-states/>>.

⁸ The Metals Company "NORI-D Project – Nauru Ocean Resources Inc.," *available at* <<https://metals.co/nori/>>.

⁹ Regarding the development of offshore methane hydrate and the Japanese domestic legislation, see Offshore Methane Hydrates in Japan: Prospects, Challenges and the Law, *available at* <https://www.biicl.org/documents/77_omh_in_japan_web_file-compressed.pdf>.

¹⁰ Liberating Japan's resources, *The Japan Times* (June 25, 2012), *available at* <<https://www.japantimes.co.jp/opinion/2012/06/25/commentary/japan-commentary/liberating-japans-resources/>>.

¹¹ Ministry of Economy, Trade and Industry of Japan, *Plan for the Development of Marine Energy and Mineral Resources*, (March 22, 2024) (in Japanese), *available at* <<https://www.meti.go.jp/press/2023/03/20240322001/20240322001-1rr.pdf>>.

¹² Headquarter for Ocean Policy of Japan, *Ocean Development Strategy (Draft)*, (April 26, 2024) (in Japanese), *available at* <<https://www.kantei.go.jp/jp/singi/kaiyou/dai22/02shiryu1-2.pdf>>.

resource.¹³

Against this background, this study attempts to clarify the rules of international law aimed at protecting the marine environment when a coastal State engages in the development of REY-rich mud. For this purpose, Section I explains the current developmental status of REY-rich mud. The subsequent two sections examine the rules of international law for protecting the marine environment and apply them to mining REY-rich mud. The final section draws conclusions and provides a brief proposal for the future development of REY-rich mud by Japan.

I. REY-Rich Mud and the Current Status of Its Development

(1) Potential Impact of REY-Rich Mud

REY in REY-rich mud represents rare earth elements (REE) and yttrium (chemical element with atomic number 39). REE consist of 17 elements, including Sc and lanthanoids La–Lu.¹⁴ These chemical elements are essential for many technologies, such as hybrid vehicles, rechargeable batteries, and wind turbines.¹⁵ They have recently received attention because they are used in the renewable energy industry.¹⁶

REY-rich mud is regarded as the fourth most abundant seafloor mineral resource, following these three advanced resources. REY-rich mud exists at a depth of 4,000–6,000 m depth and is located on a flat deep-sea floor,¹⁷ whereas polymetallic nodules exist at 4,000–6,000 m depth, polymetallic sulphides are at 350–5,000 m depth, and cobalt-rich ferromanganese crusts are at 400–4,000 m depth.¹⁸ The most distinct aspect of REY-rich mud is its nature. The other three resources are in the form of soil and look like either stone (polymetallic nodules and cobalt-rich ferromanganese crusts) or soil (polymetallic sulphides), while REY-rich mud is a clayey material.

Compared to the other three materials, the exploration of REY-rich mud has not been conducted globally; therefore, such resources have not been identified so far. Recent research has demonstrated that REY-rich mud is widely distributed on the deep-sea floors of the Pacific and

¹³ As for the recent Japanese policy for the seabed mining, see Alison McCook, “The Challenge of Regulating Japan’s Deep-sea Mining Experiment,” *The Diplomat*, (June 19, 2024), available at <<https://thediplomat.com/2024/06/the-challenge-of-regulating-japans-deep-sea-mining-experiment/>>.

¹⁴ Frances Wall, “Rare Earth Elements,” in David Alderton and Scott A. Elias eds., *Encyclopedia of Geology* (2nd. ed., 2021), pp. 680–681.

¹⁵ Sophie Theresia Huber and Karl W. Steininger, “Critical sustainability issues in the production of wind and solar electricity generation as well as storage facilities and possible solutions,” *Journal of Cleaner Production*, Vol. 339 (2022) p. 1, available at <<https://doi.org/10.1016/j.jclepro.2022.130720>>.

¹⁶ Lisa Depraiter and Stephane Goutte, “The role and challenges of rare earths in the energy transition,” *Resources Policy*, Vol. 86 (2023) p. 12, available at <<https://doi.org/10.1016/j.resourpol.2023.104137>>.

¹⁷ Kentaro Nakamura, Koichiro Fujinaga, Kazutaka Yasukawa, Yutaro Takaya, Junichiro Ohta, Shiki Machida, Satoru Haraguchi and Yasuhiro Kato, “REY-Rich Mud: A Deep-Sea Mineral Resource for Rare Earths and Yttrium,” in *Handbook on the Physics and Chemistry of Rare Earths* (2015), p. 85.

¹⁸ Japan Organization for Metals and Energy Security (JOGMEC), “Outline of the Seabed Mineral Resources” (in Japanese), available at <https://www.jogmec.go.jp/metal/metal_10_000002.html> ; See also Balaram Vysetti, “Deep-sea mineral deposits as a future source of critical metals, and environmental issues - a brief review,” *Miner Miner Mater* (2023), available at <<http://dx.doi.org/10.20517/mmm.2022.12>>.

Indian Oceans.¹⁹ In Japanese waters, it is primarily found on the continental shelf surrounding Minamitori Island.²⁰

(2) Current Status of the Development of REY-Rich Mud

Hitherto, Japan appears to be the only country that strongly supports the development of REY-rich mud. Therefore, the developmental status of REY-rich mud can be confirmed by elaborating on Japanese practices. Japanese development activities have been led by the Cross-Ministerial Strategic Innovation Promotion Program (SIP). The cabinet office manages the SIP itself, and the Maritime Project, which focuses on maritime security for resources, is led by Japan Agency for Marine-Earth Science and Technology (JAMSTEC) in collaboration with The National Institute of Advanced Industrial Science and Technology (AIST), Kyoto University, and Kochi University,²¹ together with the research led by Tokyo University.²² Although the SIP focused on the development of seabed mineral resources from its first session, the second and third sessions gradually strengthened the focus on REY-rich mud.

After identifying the REY-rich mud surrounding Minamitori Island, Japanese researchers have been extensively engaged in exploring REY-rich mud and have confirmed the widespread existence of these resources on the Japanese continental shelf.²³ Based on this information, the SIP also attempts to develop a method to explore and exploit REY-rich mud. In particular, the third term project of the SIP, named “National Platform for Innovative Ocean Developments,” has one theme that mainly focuses on REY-rich mud, named “Development of Production Technology for REE.”²⁴

The methodology employed for the development of natural resources may vary by resources. For example, in the case of polymetallic sulphides, one of the technologies planned to be used to dig resources is a drum cutter working in water.²⁵ If such a method is used, a huge plume

¹⁹ Yasuhiro Kato, Koichiro Fujinaga, Kentaro Nakamura, Yutaro Takaya, Kenichi Kitamura, Junichiro Ohta, Ryuichi Toda, Takuya Nakashima and Hikaru Iwamori, “Deep-sea mud in the Pacific Ocean as a potential resource for rare-earth elements,” *Nature Geoscience*, Vol. 4 (2011), pp. 535–539; Junichiro Ohta, Kazutaka Yasukawa, Kentaro Nakamura, Koichiro Fujinaga, Koichi Iijima and Yasuhiro Kato, “Geological features and resource potential of deep-sea mud highly enriched in rare-earth elements in the Central Pacific Basin and the Penrhyn Basin,” *Ore Geology Reviews*, Vol. 139 (2021), available at <<https://doi.org/10.1016/j.oregeorev.2021.104440>>; Kazutaka Yasukawa, Kentaro Nakamura, Koichiro Fujinaga, Shiki Machida, Junichiro Ohta, Yutaro Takaya and Yasuhiro Kato, “Rare-earth, major, and trace element geochemistry of deep-sea sediments in the Indian Ocean: Implications for the potential distribution of REY-rich mud in the Indian Ocean,” *GEOCHEMICAL JOURNAL*, Vol. 49 Issue 6 (2015).

²⁰ Tetsuo Yamazaki, Naoki Nakatani, Rei Arai, Tsunehiro Sekimoto and Hiroyuki Katayama, “Combined Mining and Pulp-Lifting of Ferromanganese Nodules and Rare-Earth Element-Rich Mud around Minamitorishima Island in the Western North Pacific: A Prefeasibility Study,” *Minerals* Vol. 11(3) (2021).

²¹ Organizational structure of National Platform for Innovative Ocean Developments, available at <<https://www.jamstec.go.jp/sip3/e/structure/index.html>>.

²² Department of Systems Innovation, School of Engineering, The University of Tokyo Kato, Nakamura, and Yasukawa Laboratory, available at <<https://en.kato-nakamura-yasukawa-lab.jp/research/detail/19>>.

²³ Yutaro Takaya and Kazutaka Yasukawa *et al.*, “The tremendous potential of deep-sea mud as a source of rare-earth elements,” *Scientific Reports*, Vol. 8 (2018), p. 2, available at <<https://www.nature.com/articles/s41598-018-23948-5>>.

²⁴ Cross-ministerial Strategic Innovation Promotion Program (SIP): National Platform for Innovative Ocean Developments, “Main Research and Development Themes,” available at <<https://www.jamstec.go.jp/sip3/e/theme/index.html>>.

²⁵ David Heydon, “Exploration for and Pre-feasibility of mining Polymetallic Sulphides: a commercial case study,” (2004), available at <https://www.isa.org.jm/wp-content/uploads/2022/12/ISA_Heydon1.pdf>.

will inevitably arise and the marine environment will be heavily damaged.²⁶ The development of mineral resources causes more severe environmental damage than the development of oil and gas. Therefore, it is essential to mitigate environmental damage, particularly to prevent plume formation.

To consider these aspects, a methodology for REY-rich mud was developed. Based on a paper published in 2018, to reduce lifting costs, a plan for a hydrocyclone separator that selectively separates biogenic calcium phosphate grains with a high REE content and can operate on a deep seabed floor was considered.²⁷ However, these activities can result in the formation of large sediment clouds. At this point, the methodologies developed in 2022 would be more environmentally friendly because the drilling point is enclosed by a double cover to prevent it from causing a plume and mud is lifted up through such a closure system.²⁸ Therefore, the methodology for extracting REY-rich mud could be similar to the exploitation of oil and gas that spontaneously flow from the well.

II. Obligations to Protect the Marine Environment from the Seabed Activities

(1) UNCLOS Provisions

UNCLOS provides comprehensive rules to prevent pollution of the marine environment (Article 194), as well as detailed regulations based on the sources of pollution.²⁹ Specifically, it distinguishes between pollution from seabed activities in areas within national jurisdiction (Article 208) and within the Area (Article 209). Although the ISA plays an important role in the regulation of seabed activities in the Area,³⁰ coastal States have several obligations to regulate such activities within their national jurisdictions.

As a prerequisite for applying Article 208, any activities must fall within the scope of “seabed activities.” These terms are not defined in the UNCLOS, and both the literal interpretation and travaux préparatoires support the idea that the development of REY-rich mud can be regarded as a seabed activity.³¹ It is pointed out that pollution from bottom-fixed turbines anchored to the seabed can be considered pollution “in connection with” seabed activities.³² Moreover, during UNCLOS III, several States considered this provision is mainly applied to the seabed mining

²⁶ Jeffrey C. Drazen and Craig R. Smith *et al.*, “Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining,” *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*, Vol. 117 No. 30 (2020), pp. 17457–17458, available at <<https://doi.org/10.1073/pnas.2011914117>>.

²⁷ Takaya and Yasukawa, *supra* note 23, p. 5.

²⁸ JAMSTEC, Press Releases (18 October 2022) (in Japanese), available at <https://www.jamstec.go.jp/j/about/press_release/20221018/> ; JAMSTEC, News Letter (29 November 2022) (in Japanese), available at <https://www.jamstec.go.jp/sip2/j/newsletter/pdf/sip2_newsletter031.pdf> .

²⁹ Robin Churchill, Vaughan Lowe and Amy Sander, *The Law of the Sea*, (4th ed. 2022), p. 622.

³⁰ Catherine Blanchard, Ellycia Harrould-Kolieb, Emily Jones and Michelle L. Taylor, “The current status of deep-sea mining governance at the International Seabed Authority,” *Marine Policy*, Vol. 147 (2023), available at <<https://doi.org/10.1016/j.marpol.2022.105396>>.

³¹ Watson Farley & Williams, “Seabed Activities in Domestic Jurisdictions: Why Coastal States should pay attention to the work of the International Seabed Authority,” (May 9, 2024), available at <https://www.wfw.com/articles/seabed-activities-in-domestic-jurisdictions/?utm_source=linkedin&utm_medium=organic_social&utm_campaign=article_disputeresolution_global>.

³² Dawoon Jung, *The 1982 Law of the Sea Convention and the Regulation of Offshore Renewable Energy Activities within National Jurisdiction*, (Brill, 2023) p. 74; James Harrison, *Saving the Oceans through Law* (OUP, 2017), p. 212.

of mineral resources in the continental shelf.³³ Given such facts, both the exploration and exploitation of REY-rich mud qualify as seabed activities according to Article 208. Therefore, coastal States must fulfil their obligations when developing REY-rich mud.

Article 208(1) requires coastal States to establish domestic laws regulating marine environmental pollution from seabed activities. Therefore, when developing REY-rich mud, coastal States must establish legal rules not only for development but also for protecting the marine environment from development. Moreover, in accordance with Article 208(3), such rules “shall be no less effective than” international rules and standards. When there are no such international rules and standards, Article 208(5) requests the establishment of global rules and standards through either competent international organizations or diplomatic conferences.

To facilitate the development of REY-rich mud, the Japanese government amended its Mining Act in 2022 to incorporate rare earth minerals into its mineral list.³⁴ However, as the Mining Act focuses on mining rights and how to exercise it, environmental protection does not need to be covered. Some environmental legal rules, including the Basic Act on the Environment (Act No. 91 of 1993),³⁵ refer to marine environment protection. However, these rules seem insufficient to balance the development and protection of marine environments. Therefore, from a legal perspective, Japan does not seem ready to develop REY-rich mud with adequate protection of the marine environment.

Many coastal States engage in oil and gas development on their continental shelves. However, the international rules and standards required under Article 208(5) have not yet been established. A study report published by the United Nations Environment Programme (UNEP) is sometimes referred to;³⁶ however, given that it is not a publication by the UNEP itself, it might not be regarded as an international rule or standard in the sense of Article 208.³⁷ Therefore, global rules and standards that primarily focus on pollution from seabed activities have not been established.³⁸ Under such circumstances, it is extremely difficult to determine whether the municipal law of a coastal state is more effective than international rules and standards, that is, whether a coastal State violates Article 208(3).

(2) Implications of the ISA Mining Code

The ISA has a mandate to act on behalf of mankind as a whole and explore and exploit the resources of the Area (Article 137(2)). In Part XI, resources are all solid, liquid, or gaseous mineral resources (Article 133(a)) that cover REY-rich mud; therefore, the ISA has the competence to regulate the exploration and exploitation activities of REY-rich mud in the Area.

³³ Myron H. Nordquist, Neal R. Grandy, Shabtai Rosenne and Alexander Yankov eds., *United Nations Convention on the Law of the Sea 1982: A Commentary*, Volume IV (1990), pp. 137–138.

³⁴ The Mining Act (Act No. 84 of 2011), *available at* <<https://www.isa.org.jm/wp-content/uploads/2022/05/JapMiningAct.pdf>>; Yoshiaki Ohtsuki, *IN-DEPTH: Mining Law JAPAN* (2023), *available at* <https://www.amt-law.com/asset/res/news_2024_pdf/publication_0027689_ja_001.pdf>.

³⁵ Basic Act on the Environment (Act No. 91 of 1993), *available at* <<https://www.env.go.jp/en/laws/policy/basic/index.html>>.

³⁶ “Conclusions of the study of legal aspects concerning the environment related to offshore mining and drilling within the limits of national jurisdiction : decision 10/14/VI of the Governing Council of UNEP, of 31 May 1982,” reproduced in Peter H. Sand, *Marine Environment Law in the United Nations Environment Programme: An Emergent Eco-Regime* (1988), pp. 226–235.

³⁷ International rules and standards can be understood in four ways; see, Makoto Seta, “The Contribution of the International Organization for Standardization to Ocean Governance,” *Review of European, Comparative and International Environmental Law*, Vol. 28 Issue. 3 (2019), pp. 307–309.

³⁸ Frank Wacht, “Article 208: Pollution from seabed activities subject to national jurisdiction,” in Alexander Proelss ed., *The United Nations Convention on the Law of the Sea: A Commentary* (2017), p. 1938.

However, the seabed activities that the ISA is in charge of are distinguished from those within the national jurisdiction. Therefore, even if the ISA had established international rules and standards, they would not be international rules and standards in the context of Article 208. In fact, when UN Division for Ocean Affairs and the Law of the Sea (DOALOS) published a list of international organizations relevant for making international rules and standards provided in multiple UNCLOS provisions, it did not list the ISA as an organization that may establish rules and standards under Article 208.³⁹ Furthermore, the rules and standards that the ISA can establish and apply based on Article 145 must be stricter than those of Article 208, because while the damage to the marine environment within the continental shelf is basically damage to coastal States,⁴⁰ the damage to the marine environment in the Area is damage to the international community as a whole.⁴¹ This interpretation also supports the idea that the rules and standards established by the ISA cannot be considered international rules and standards under Article 208.

However, this does not mean that ISA standards are not relevant for the obligations under Article 208. If the ISA has successfully elaborated rules and standards for development with sufficient consideration of the protection of the marine environment, it will be easier for States to establish their own rules with reference to the ISA rules and standards. For conserving the marine environment, the distinction between the ABNJ and areas within national jurisdiction does not matter. On this point, Friedman aptly noted that, because of two constituencies, namely, other States and the citizens of coastal States, coastal States feel pressure to adopt ISA regulations as a “regulatory benchmark.”⁴² This may be especially true for States which have strong fishery industries, because the water column above the continental shelf up to 200 nautical miles from the baseline is their EEZ, where fishermen in coastal States mainly engage in fishing activities.⁴³ Given the possible negative impact the development of seabed resources could have, fishermen would not accept environmental regulations which are less stricter than the ISA regulations applicable to the Area.

One of the tasks that the ISA has engaged in is the development of mining codes. Regarding exploration regulations, the ISA has developed various regulations for different resources. For example, an exploration regulation for polymetallic nodules was developed in 2000 and revised in 2013. The regulation of polymetallic sulphides was developed in 2010 and that of cobalt-rich ferromanganese crusts was developed in 2012.⁴⁴ However, these exploration regulations have not yet been adopted for REY-rich mud. Moreover, exploitation regulations have not yet been

³⁹ DOALOS, *Law of the Sea bulletin*, No. 31 (1996), p. 86; at that time, abbreviation of ISA had not been established, and ISBA was used. But, Article 208 does not include ISA, but it includes the International Hydrographic Organization, the International Labour Organization, the IMO, the Intergovernmental Oceanographic Commission of UNESCO, UNEP and the United Nations Industrial Development Organization. Wacht also supports this non-exhaustive list. See, Wacht, *supra* note 38, p. 1938.

⁴⁰ Andrew Friedman, “Article 208 of UNCLOS and National Regulation of Seabed Mining,” in Lawrence Martin, Constantinos Salonidis and Christina Hioureas eds., *Natural Resources and the Law of the Sea: Exploration, Allocation, Exploitation of Natural Resources in Areas under National Jurisdiction and Beyond* (2017), p. 279.

⁴¹ As for the outlines of Article 145, see Linlin Sun, *International Environmental Obligations and Liabilities in Deep Seabed Mining* (2023), pp. 31–33.

⁴² Friedman, *supra* note 40, pp. 285–286.

⁴³ Within the EEZ, sovereign states have sovereign rights over living resources under some conditions provided by the UNCLOS. For details, see for example, Gemma Andreone, “The Exclusive Economic Zone,” in Donald Rothwell *et al.* eds., *The Oxford Handbook of the Law of the Sea* (2015), pp. 166–169.

⁴⁴ ISA, The Mining Code - International Seabed Authority, available at <<https://www.isa.org.jm/the-mining-code/>>.

established, but are currently being developed under the ISA.⁴⁵ By examining the draft stage of such regulations, the exploitation regulation would be a single instrument and not different instruments for different types of mineral resources.⁴⁶ Therefore, once a draft is adopted, it is highly likely that it can also be applied to REY-rich mud. Nevertheless, the draft regulation does not refer to REY-rich mud, although it manifestly refers to three other mineral resources.⁴⁷

Therefore, as of July 2024, no ISA regulations are directly applicable to the development of REY-rich mud in Areas. This indicates that coastal States attempting to develop REY-rich mud do not have regulatory benchmarks. What they can do at this stage, is to consult the newest draft of the exploitation regulations.

III. Obligations to Conduct an Environmental Impact Assessment When Developing REY-Rich Mud Development

(1) Article 206

UNCLOS also provides for procedural obligations applicable to all maritime areas, including Article 206, which provides for an obligation to conduct an environmental impact assessment (EIA).⁴⁸ In environmental law, procedural obligations, such as EIA, “may, indeed, be of equal or even greater importance than the substantive standards existing in international law.”⁴⁹ Article 206 stipulates “(w)hen States have reasonable grounds for believing that activities may cause substantial pollution of or significant and harmful changes to the marine environment,” they shall conduct the EIA procedure.

ITLOS explores this provision in detail in the *Climate Change Advisory Opinions* in 2024. According to the ITLOS, as the arbitral tribunal in the South China Sea interprets,⁵⁰ the expression “reasonable grounds for believing” gives the States discretion.⁵¹ However, such discretion is limited by the requirements of causing “substantial pollution of or significant and harmful changes to the marine environment,” which can be objectively determined by facts and scientific knowledge.⁵² From this perspective, if many States conduct EIA for an activity, that activity could be regarded as causing the pollution or changes provided in Article 206, thereby triggering the EIA process.

All ISA regulations for the exploration of polymetallic nodules, polymetallic sulphides, and

⁴⁵ ISA, The Mining Code: Draft Exploitation Regulations - International Seabed Authority, *available at* <<https://www.isa.org.jm/the-mining-code/draft-exploitation-regulations-2/>>.

⁴⁶ Draft resolution employs and defines the term “resources,” which is “means all solid, liquid or gaseous mineral resources in situ in the Area at or beneath the seabed” in the Schedule named “Use of terms and scope”; Draft regulations on exploitation of mineral resources in the Area. Prepared by the Legal and Technical Commission. 22 March 2019, (ISBA/25/C/WP.1), p. 116.

⁴⁷ The definition of “resources” also clearly mentions polymetallic nodules, polymetallic sulphides and cobalt-rich ferromanganese as an example; *Ibid.*

⁴⁸ *Request for an Advisory Opinion Submitted by the Sub-Regional Fisheries Commission (SRFC), Advisory Opinion of 2 April 2015, ITLOS Reports 2015*, para. 120; *South China Sea Arbitration (Philippines v China), Award of 12 July 2016, XXXIII Reports of International Arbitral Awards*, p. 519, para. 940.

⁴⁹ *Arbitration regarding the Chagos Marine Protected Area between Mauritius and the United Kingdom of Great Britain and Northern Ireland, Award of 18 March 2015, RIAA, Vol. XXXI, p. 359, at p. 500, para. 322.*

⁵⁰ *The South China Sea Arbitration between the Republic of the Philippines and the People’s Republic of China, Award of 12 July 2016, RIAA, Vol. XXXIII, p. 153, at p. 523, para. 948.*

⁵¹ *Request for an Advisory Opinion submitted by the Commission of Small Island States on Climate Change and International Law (Request for Advisory Opinion submitted to the Tribunal) , Advisory Opinion of 21 May 2024*, para. 361.

⁵² *Ibid.*, para. 361.

cobalt-rich ferromanganese crusts provide rules for EIA.⁵³ Moreover, the latest draft for the exploitation of all mineral resources provides detailed rules for EIA.⁵⁴ As such, although the development methodology of the REY-rich mud would be more environmentally friendly than those of the other three materials, if drilling the seabed floor, which may cause a plume, is included, States shall conduct EIA as indicated by Klein.⁵⁵

Moreover, according to the advisory opinion on climate change by the ITLOS, compliance with such obligations is important to fulfil the general obligations provided under Article 194 of the UNCLOS.⁵⁶ Furthermore, Article 194 can be strengthened by Article 208. Therefore, if a coastal State of the continental shelf fails to conduct an EIA, as required by Article 206, that State could also violate Article 208.

(2) Implications of the BBNJ Agreement

While Article 206 itself does not stipulate a concrete procedure for the EIA, the newly adopted BBNJ Agreement elaborates on this procedure. According to Article 31 of the BBNJ Agreement, the EIA consists of the following processes: (a) screening; (b) scoping; (c) impact assessment and evaluation; (d) prevention, mitigation, and management of potential adverse effects; (e) public notification and consultation; and (f) preparation and publication of an EIA Report. Articles 32–36 elaborate on each step. However, as its name shows, according to Article 3, the BBNJ Agreement “applies to areas beyond national jurisdiction” and, therefore, the activities conducted within coastal States’ maritime areas are not regulated by the BBNJ Agreement.

On the other hand, given the fact that the BBNJ Agreement was drafted in a manner “fully consistent with” the UNCLOS provisions, as requested by the GA Resolution 72/249,⁵⁷ the BBNJ can be understood to clarify and concretize the rights and obligations provided under the UNCLOS. Based on this understanding, the EIA, under Article 206, should incorporate the steps provided in the BBNJ Agreement. Although it has not been mentioned, ITLOS also notes that the BBNJ Agreement elaborates on the steps of the EIA, which Article 206 needs, but is not equipped with.⁵⁸

In addition, Article 5 requires that the BBNJ Agreement be interpreted and applied in a manner that is harmonized with existing bodies and instruments, including the ISA and its

⁵³ Para 24(b) of the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area (ISBA/19/C/17), Regulations on prospecting and exploration for polymetallic sulphides in the Area (ISBA/16/A/12/Rev.1) and Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area (ISBA/18/A/11).

⁵⁴ Section 2 (Preparation of the Environmental Impact Statement and the Environmental Management and Monitoring Plan) of the Part IV (Protection and preservation of the Marine Environment) provides the rules of EIA, together with Annex IV; Draft regulations on exploitation of mineral resources in the Area. Prepared by the Legal and Technical Commission. 22 March 2019, (ISBA/25/C/WP.1), p. 37.

⁵⁵ Natalie Klein, “REY-Rich Mud: An Ocean Resource in Want of Regulation,” *EJIL Talk!* March 30, 2023, available at <<https://www.ejiltalk.org/rey-rich-mud-an-ocean-resource-in-want-of-regulation/>> ; It should be noted that as shown in the I(2), current methodology of the exploitation of REY-rich mud (provided in footnote 23) is more environmentally friendly than one adopted in the article which Klein relies (footnote 28). Such improvement should be recommended and also taken into account, but in any event, if the causing of the plume is inevitable, the process of the EIA is strongly recommended.

⁵⁶ *Obligations of States in respect of Climate Change, Advisory Opinion*, *supra* note 51, para. 345.

⁵⁷ Paragraph 6 of the Preamble, UN Doc. A/RES/72/249 (19 January 2018).

⁵⁸ *Obligations of States in respect of Climate Change, Advisory Opinion*, *supra* note 51, para. 366.

regulations.⁵⁹ Therefore, if the ISA successfully establishes rules and standards to regulate seabed mining activities, they should be met within the framework of the BBNJ agreement. Given the vital role of the ISA in making rules for deep-seabed mining, some provisions of the BBNJ Agreement, together with ISA's rules and standards, can be expected to regulate seabed activities within national jurisdiction.

For example, Article 28(2), which provides the rules of the EIA for activities in areas within a national jurisdiction, might play an important role.⁶⁰ According to this paragraph, "if the activity may cause substantial pollution or significant and harmful changes to the marine environment in areas beyond national jurisdiction, States shall ensure that an EIA is conducted in accordance with this Part or that an EIA is conducted under the Party's national process." Moreover, if a party chooses the national process, there are minimum requirements such as sharing information, including EIA reports through the clearing-house mechanism, and ensuring the monitoring activities in question.⁶¹

Furthermore, Article 30, which provides thresholds and factors for conducting EIAs, is relevant. According to this provision, "(w)hen a planned activity may have more than a minor or transitory effect on the marine environment, or the effects of the activity are unknown or poorly understood," the party shall conduct a screening. Screening is the first step of an EIA, under which it decides whether a full EIA process is needed. This provision might be directly applied only to areas beyond national jurisdiction but can be linked to Article 28(2); namely, the impact on the marine environment in the ABNJ is also unknown. Under such circumstances, it would be better for States to conduct screening to avoid violations of this provision.

Conclusion

If the standard provided in Article 30 of the BBNJ Agreement is applied, States should conduct a screening process when developing REY-rich mud, because the effects of the development of REY-rich mud are unknown or poorly understood. Furthermore, given its nature, it is highly likely that the development of REY-rich mud requires a complete EIA process. Certainly, some members of the Japanese government show a willingness to protect the marine environment when conducting seabed mining.⁶² Actually, in the trial to lift up REY-rich mud, the three methodologies in accordance with the ISO standards were employed for monitoring the marine environment.⁶³ However, to date, Japanese EIA legislation has not included seabed activities within its applicable scope.⁶⁴

⁵⁹ Diane Desierto, "Development, Marine Biodiversity, and the Common Heritage of Mankind: The ISA's Deep Seabed Mining Quandary and Complying with the High Seas BBNJ Convention," *EJIL Talk!*, July 10, 2023, available at <<https://www.ejiltalk.org/development-marine-biodiversity-and-the-common-heritage-of-mankind-the-isas-deep-seabed-mining-quandary-and-complying-with-the-high-seas-bbnj-convention/>>.

⁶⁰ Virginie Tassin Campanella, Yacouba Cissé and Dire Tladi, "State rights and obligations of States on the continental shelf and the Area," in Virginie Tassin Campanella ed., *Routledge Handbook of Seabed Mining and the Law of the Sea* (2024), p. 97.

⁶¹ Subparagraphs (a) to (c) of Article 28(2) provide the minimum requirements of the national process.

⁶² Annelise Giseburt, "Japan prepares to mine its deep seabed by decade's end," *Mongabay* (21 March 2024), available at <<https://news.mongabay.com/2024/03/japan-prepares-to-mine-its-deep-seabed-by-decades-end/#:~:text=Japan%20is%20one%20among%20just,to%20exploit%20the%20deep%20sea>>.

⁶³ JAMSTEC, Press Releases, *supra* note 28.

⁶⁴ As for the development of the Japanese EIA system, see, for example, Tetsuya Kamijo, "EIA in Japan: the benefits of early public participation," in Alberto Fonseca ed., *Handbook of Environmental Impact Assessment* (Edward Elgar, 2022), pp. 367–368.

The Japanese EIA Act (Act No. 81) was adopted in 1997⁶⁵ and has been occasionally amended. Regarding the scope of the EIA process, Article 2 of the Act provides for activities which require an EIA process, such as establishing highways, dams, and power plants.⁶⁶ In other words, the activities not listed in Article 2 are not subject to EIA procedures. The EIA was amended in 2012 to incorporate wind farms as an additional type of power plant. Therefore, the establishment of an offshore wind farm is subject to an EIA process. If Japan intends to develop seabed mineral resources consistent with environmental regulations under international law, the EIA process should be made mandatory for the development of such resources, including REY-rich mud, either by amending the EIA Act or by establishing a new act for maritime EIA.⁶⁷

Balancing the development and protection of marine environments is essential. Protecting the marine environment must be taken into account when developing new technologies and/or initiating new activities. In this context, conducting an EIA is important for seeking an appropriate balance with the relevant stakeholders.

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⁶⁵ The English translation of the full text is *available at* <http://assess.env.go.jp/files/5_global/EIA%20Act.pdf>.

⁶⁶ Ministry of the Environment of Japan, *Environmental Impact Assessment in Japan*, (2023) pp. 3–4, *available at* <http://assess.env.go.jp/files/1_seido/pamph_e.pdf>.

⁶⁷ A simple way is to amend the EIA Act and add seabed mining activities in the Article 2 of the Act. However, given the weak points of the Japanese EIA Act, it might be better for the Japanese government to establish new laws that exclusively focus on the protection of the marine environment. Regarding the weak points, see Yoko Masuzawa and Mari Koyano *et al.*, “Strength and weakness of Japanese EIA law,” *available at* <<https://conferences.iaia.org/2019/uploads/edited-presentations/Strength%20and%20weakness%20of%20Japanese%20EIA%20law.pdf>>. pp. 2–3.