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MINING THE BOTTOM OF THE SEA

Potential future disputes and the role of the International Tribunal for the Law of the Sea

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Introduction

The seabed beyond national jurisdiction (the Area)[1] which as noted by scholars covers approximately half of the planet,[2] contains deposits of valuable minerals such as cobalt, manganese, copper, zinc, nickel and rare earth elements, particularly sought after by green technologies (including electric vehicles, wind turbines and solar cells) and tech-oriented industries such as the industry of smartphones.[3] The International Seabed Authority (ISA) has awarded 31 exploration contracts involving 22 contractors[4] so far. Exploration, however, may soon give way to exploitation. In June 2021, Nauru notified the ISA of the intention of Nauru Ocean Resources Inc (NORI), a subsidiary of a Canadian company called DeepGreen Mineral Corp., to apply for approval to begin mining in two years in the Clarion-Clipperton Zone in the North Pacific Ocean between Hawaii and Mexico.[5] As noted by Treves in Chapter V.1 of this book, it is precisely 'the exploitation stage which is the most likely to produce disputes'.[6] Faced with that reality, the topic of deep-sea mining is one of the areas which doubtlessly will feature in the International Tribunal for the Law of the Sea's (ITLOS) dispute settlement mechanisms and, possibly, be the subject of further advisory functions.

1 For a definition of 'the Area' see N. Oral, 'The common heritage of mankind under international law: An overview', in V. Tassin Campanella (ed.), *Routledge handbook of seabed mining and the law of the sea*, London: Routledge, 2023, chapter I.2. For more information about the various mineral resources, see also in this book W. Roest, M.R. Clark and H. Brekke, 'The scientific challenges of deep-sea mining', in V. Tassin Campanella (ed.), idem, chapter I.1.

2 J. Dingwall, 'Commercial mining activities in the deep seabed beyond national jurisdiction: The international legal framework', in C. Banet (ed.), *The law of the seabed*, Leiden: Brill Nijhoff, 2020, p. 137.

3 US Government Accountability Office (GAO), 'Science and tech spotlight: Deep-sea mining', 15 December 2021. Available online < https://www.gao.gov/products/gao-22-105507> (accessed 12 April 2022).

4 For the full list of exploration contractors, see the website of the International Seabed Authority. Available online <https://isa.org.jm/exploration-contracts> (accessed 1 June 2022).

5 H. Reid, 'Pacific Island of Nauru sets two year deadline for U.N. deep-sea mining rules', *Reuters*, 29 June 2021. Available online <https://www.reuters.com/business/environment/pacific-island-nauru-sets-two-year-deadline-deep-sea-mining-rules-2021-06-29/> (accessed 29 September 2021).

6 T. Treves, 'Dispute settlement and seabed mining in the Area', in V. Tassin Campanella (ed.), *Routledge handbook of seabed mining and the law of the sea*, op. cit., chapter V.1.

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But the role of ITLOS in addressing deep-sea mining[7] may precede any exploitation stage.

The current tension between commercial interests for deep-sea exploitation (driven by the expanding world demand for raw materials) and environmental considerations is reflected in the recent demand for a moratorium on deep-sea mining in areas beyond national jurisdiction by the International Union for Conservation of Nature (IUCN)[8] (which emphasized the adoption of precautionary and ecosystem approaches, including the precautionary principle with regard to deep-sea mining), and in the different (sometimes contradictory) stances regional organs[9] and States are taking in relation to deep-sea and, more broadly, seabed mining.[10] The conflicting interests (between seabed exploitation or economic development considerations and environmental protection) have also reached national courts, albeit in relation to seabed mining within an exclusive economic zone (EEZ). In September 2021, New Zealand's Supreme Court denied seabed miners Trans Tasman Resources permission to mine the South Taranaki Bight based on a precautionary approach.[11]

For Gjerde, the current challenges regarding seabed mining in the Area arise from paradigms or assumptions about life in the deep sea – underlying part XI of UNCLOS – which have turned out to be incorrect: the assumption that life in the deep sea was dull, distant, of little interest, and that seabed mining therein could occur without much environmental disturbance; that the resources for exploration/exploitation were easily accessible, that the technology was right and that 'we just needed to develop some potato-harvesting-type machines to enable this new regime to go

7 By deep-sea mining we mean the process of retrieving mineral deposits from the deep sea, that is, the Area of the ocean below 200 meter depth, beyond national jurisdiction.

8 IUCN, WCC Motion 069, 'Protection of deep-ocean ecosystems and biodiversity through a moratorium on seabed mining', 29 September 2021. Available online < https://www.iucncongress2020.org/motion/069> (accessed 20 June 2022).

9 See for example the case of the European Union. While the European Commission's '2021 Strategic Foresight Report' (see in particular 4. Securing and diversifying supply of critical raw materials) takes a pro-seabed mining stance, the EU Biodiversity Strategy (see in particular 4.2.1. International Ocean Governance, of the European Commission, 'EU Biodiversity Strategy for 2030: Bringing nature back into our lives', COM (2020) 380 final, 20 May 2020) reflects a precautionary and ecosystem-based approach. For a discussion on this see *Sea at risk*, 'European Commission announces plans to step up deep-sea mining exploration on same day as IUCN adopts moratorium motion', 16 September 2021. Available online <https://seas-at-risk.org/general-news/european-commission-announces-plans-to-step-up-deep-sea-mining-exploration-on-same-day-as-iucn-adopts-moratorium-motion/> (accessed 1 June 2022). See also P.A. Singh, V. Tassin Campanella and F. Maes stating that 'the scope of [a] moratorium has fluctuated at the EU between the one proposed by the Commission under the EU Biodiversity Strategy, which is limited to the Area, and the one recently adopted by the Parliament, again covering both the continental shelf and the Area. Consequently, there seems to be inconsistencies within EU institutions on the position that should advocate on seabed mining on the continental shelf, although the position on the need for a moratorium on commercial-scale exploitation in the Area has always been clear'. P.A. Singh, V. Tassin Campanella and F. Maes, 'The European Union and seabed mining', in V. Tassin Campanella (ed.), *Routledge handbook of seabed mining and the law of the sea*, op. cit., chapter VI.1.4.

10 By way of example, for a discussion on the different positions State Parties to the EU are taking on this, see Singh, Tassin Campanella and Maes, ibid., p. 21.

11 *Trans-Tasman Resources Limited v Taranaki-Whanganui Conservation Board* [2021] NZSC 127 [30 September 2021]. Available online <https://www.courtsofnz.govt.nz/assets/cases/2021/2021-NZSC-127.pdf> (accessed 3 May 2022). For a discussion on the principles held in the case by the New Zealand's Supreme Court see R. Makgill, A. Jaeckel and K. MacMaster, 'Implementing the precautionary approach for seabed mining: A review of state practice', in V. Tassin Campanella (ed.), *Routledge handbook of seabed mining and the law of the sea*, op. cit., chapter I.3. For an earlier analysis of the New Zealand's Court of Appeal decision in the same case see R. Makgill, J.D. Gardner-Hopkins and N.R. Coates, 'Trans-Tasman Resources Limited v. Taranaki-Whanganui Conservation Board', *The International Journal of Marine and Coastal Law* 35 (4), 2020, 835–845.

forward'.[12] But at the same time, she suggests, in 1967, the drafters of UNCLOS launched a revolution in our approach to the law of the sea: a vision that all people could benefit from new-found resources of the deep sea (understood as the Area), where all nations and all peoples could come together through an international institution dedicated as a kind of trustee to operate on behalf of humankind as a whole; a regime dedicated to equity, encouraging and enabling participation by all States, and also a regime where you would be sharing any benefits of scientific discoveries as well as resource exploitation, all built on the premise that this legal regime would be able to ensure effective protection of the marine environment.[13] The critical gap was in what Gjerde calls a 'disconnection between science and law': the drafters of UNCLOS part XI were 'operating in the dark' for example, in ignorance of the significance of hydrothermal vents in the ocean, which were only discovered in 1977.[14] In other words, she suggests that the drafters of UNCLOS developed a whole regime based on the misapprehension that seabed mineral resources were easy to harvest and would not cause significant harm.[15]

This chapter explores what role if any the International Tribunal for the Law of the Sea (in particular the Seabed Disputes Chamber) may play in addressing the most urgent issues raised by deep-sea mining and clarification of the relevant legal notions under UNCLOS. It identifies some of the possible contentious issues and advisory requests that may arise in relation to deep-sea mining and the manner in which they may come under its jurisdiction: namely (1) ISA's possible request for an Advisory Opinion; (2) a possible contentious case against ISA before ITLOS; (3) the potential role of ITLOS in clarifying issues concerning the alignment between the deep-sea mining regime applicable to the Area with the regime governing seabed mining on the Continental Shelf, and other potential conflicts; and (4) substantive areas potentially giving rise to disputes, in particular, (i) the regulation of gas hydrates exploration/exploitation; (ii) sub-sea permafrost in the Arctic; (iii) deep-sea mining and climate change; and (iv) loss of biodiversity.

The International Seabed Authority's possible request for an Advisory Opinion

Section 1(15) of the Annex to the 1994 *Agreement Relating to the Implementation of part XI of the UN Convention on the Law of the Sea* (Annex to the 1994 Agreement) provides that the ISA 'shall elaborate and adopt [...] rules, regulations and procedures necessary to facilitate the approval of plans of work for exploration or exploitation' in the Area.[16] If a request is made by a State (as in the case of Nauru) it is provided that 'the Council shall, in accordance with article 162, paragraph 2(o), of the Convention,[17] complete the adoption of such rules, regulations and procedures within two years of the request' (section 1, paragraph 15 (b), of the Annex to the 1994 Agreement). The two-year period is to end by July 2023. Critically, Section 1, paragraph 15 (c) of the Annex to the

12 K.M Gjerde, *Current challenges regarding deep-sea mining and protection of ocean life beyond national boundaries*, Lauterpacht Centre for International Law, Public Lecture, 11 February 2022.

13 Ibid. For the evolution of rights and obligations of States on the continental shelf and the Area and related challenges, see V. Tassin Campanella, Y. Cissé and D. Tladi, 'State rights and obligations of States on the continental shelf and the Area', in V. Tassin Campanella (ed.), *Routledge handbook of seabed mining and the law of the sea*, op. cit., 2023, chapter II.1.

14 *National Geographic* (Resource Library), 'Deep sea hydrothermal vents'. Available online <https://www.nationalgeographic.org/media/deep-sea-hydrothermal-vents/> (accessed 20 June 2022).

15 Gjerde, op. cit.

16 Annex to the *Agreement relating to the Implementation of part XI of the United Nations Convention on the Law of the Sea of 10 December 1982*.

17 Article 162 (referring to powers and functions of the ISA Council) 2 (o), of UNCLOS.

1994 Agreement provides – in case the elaboration of the rules, regulations and procedures are not completed by the required term – the following:

> (c) If the Council has not completed the elaboration of the rules, regulations and procedures relating to exploitation within the prescribed time and an application for approval of a plan of work for exploitation is pending, it shall none the less consider and provisionally approve such plan of work based on the provisions of the Convention and any rules, regulations and procedures that the Council may have adopted provisionally, or on the basis of the norms, contained in the Convention and the terms and principles contained in this Annex as well as the principle of non-discrimination among contractors.

Now, under article 145 of UNCLOS, the ISA is also the entity responsible for adopting 'appropriate rules, regulations and procedures' for ensuring the effective protection of the marine environment from harmful effects in the Area. The only technical body within ISA which could provide environmental expertise at present is the Legal Technical Commission, which, commentators point out, is rather a small unit with 'little technical environmental expertise'.[18] Faced with these limitations but with the formidable task the ISA has before it, it may be possible for ISA to resort to the Seabed Disputes Chambers of ITLOS, for an Advisory Opinion on legal issues that would assist its task as a regulator (developing rules and procedures relating to deep-sea mining), while meeting its obligations of ensuring effective protection of the marine environment from harmful effects in the Area.[19] The request must contain a precise statement of the question to be submitted to the Chamber and must be signed by the Authority's duly qualified representative. The request also must specify the name of the person who is to represent the Authority during the advisory proceedings.

The word 'shall' contained in article 191 would appear to suggest that the Seabed Disputes Chamber is obliged to give the advisory opinion requested. However, the Chamber might be entitled to decline to reply to a request for an opinion if the request relates to a question which is not legal or if the question does not fall within the Authority's sphere of activity.[20]

A potential advisory opinion to be requested by the ISA could for example address 'the interpretation and application of section 1 paragraph 15' resolving the uncertainties surrounding the implications and consequences arising out of the invocation section 1(15) and guide the Council (the executive branch of the ISA) as it moves forward, as suggested by Singh.[21] But a potential

18 Gjerde, op. cit.

19 Article 191 of UNCLOS. The Council is the Executive organ of the ISA. For a discussion on the role of the Council see A. Jaeckel, 'The Area and the role of the International Seabed Authority', in V. Tassin Campanella (ed.), *Routledge handbook of seabed mining and the law of the sea*, op. cit., chapter IV.1. For further reading on the role of ISA and the UNCLOS Deep Seabed Mining Regime, see J. Dingwall, 'Commercial mining activities in the deep seabed beyond national jurisdiction: The international legal framework', in C. Banet (ed.), *The law of the seabed*, Leiden: Brill Nijhoff, 2020, p. 141.

20 By way of analogy see the basis in which the International Court of Justice has declined rendering an Opinion. See (the question is not a legal one), *Certain expenses of the United Nations (Article 17, paragraph 2, of the Charter)*, Advisory Opinion, ICJ Reports 1962, p. 155 or (the question does not fall within the sphere or competence of the requesting institution), *Legality of the Use by a State of Nuclear Weapons in Armed Conflict*, Advisory Opinion, ICJ Reports 1996 (I), p. 78, paragraph 25.

21 P. Singh, 'Can the invocation of the "two-year rule" at the International Seabed Authority be challenged?', *Deep-sea Mining Observer, Deep Sea-Mining News and Resources Blog*, 30 September 2021, Available online <https://

advisory opinion could also be addressed (i) to clarify notions such as the meaning of 'serious harm' (as differentiated from 'harmful effects')[22] in the context of deep-seabed mining (including what are the key factors or parameters to measure, to inform the decision about whether an impact constitutes serious harm or not);[23] (ii) what is required to meet the notion of 'effective protection' under UNCLOS; or (iii) what amounts to national 'effective control'[24] of an entity.

An ISA state member could also trigger the request for an Advisory Opinion by the ISA as was the case with Nauru in March 2010, when it requested the ISA Secretary-General to seek an advisory opinion from the ITLOS Seabed Disputes Chamber.[25]

A possible contentious case against the International Seabed Authority?

Potentially, State Parties to UNCLOS could also file a case against the ISA itself, for example, on the basis that it is failing in its obligations to ensure effective protection of the marine environment from harmful effects in the Area (by failing to regulate exploitation in accordance to UNCLOS) as required.[26] Article 187 of UNCLOS sets out the jurisdiction of the Seabed Disputes Chamber relating to 'disputes with respect to activities in the Area' including:

> (b) disputes between a State Party and the Authority concerning,
>
> (i) *acts or omissions of the Authority* or of a State Party alleged to be in violation of this Part of the Annexes relating thereto or of rules, regulations and procedures of the Authority adopted in accordance therewith; or

dsmobserver.com/2021/09/commentary-can-the-invocation-of-the-two-year-rule-at-the-international-seabed-authority-be-challenged/> (accessed 12 April 2022).

22 While article 145 of UNCLOS requires both States and the ISA to ensure 'effective protection' of the marine environment from 'harmful effects' which may arise from seabed mining activities, existing ISA regulations for seabed mineral exploration of manganese nodules, SMS and cobalt-rich crusts provide only a definition of 'serious harm' as aptly noted by L.A. Levin et al., 'Defining "serious harm" to the marine environment in the context of deep-seabed mining', *Marine Policy* 74, 2016, 245–259.

23 See for example L.A. Levin et al., arguing that defining 'serious harm' is critical to effective regulation of mining activities, including addressing the thresholds and indicators that can reflect 'significant adverse change'. Ibid.

24 For a discussion on the lack of clarity relating to how 'effective control' should be interpreted see K. Willaert and P. Singh, 'Deep sea mining partnerships with developing states: Favourable collaborations or opportunistic endeavours?', *The International Journal of Marine and Coastal Law* 36 (2), 2021, 199–217. See also A. Rojas and F. Philips, 'Effective control and deep seabed mining: Toward a definition', *Liability Issues for Deep Sebed Mining Series*, Paper No. 7, February 2019, arguing how the concept of effective control as used in UNCLOS 'has the potential to be defined as regulatory or economic control', p. 9.

25 *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, Advisory Opinion ('*Responsibilities and Obligations of Sponsoring States*'), 1 February 2011, ITLOS Reports 2011, p. 10.

26 At the time of the drafting of this chapter, the ISA was meeting at its council headquarters in Kingston, Jamaica, to develop regulations for deep-sea mining amidst growing concerns about alleged failings of transparency. Reportedly, 'Some states, including Germany, are also concerned that the ISA is developing its mining standards and guidelines behind closed doors, and that current knowledge of deep-sea ecosystems and the potential effects of mining on the marine environment are insufficient to allow it to go ahead'. See K. McVeigh, 'Sea regulator accused of deciding deep sea's future "behind closed doors"', *The Guardian*, 1 April 2022. Available online <https://www.theguardian.com/environment/2022/apr/01/worlds-seabed-regulator-accused-of-reckless-failings-over-deep-sea-mining> (accessed 1 April 2022).

(ii) acts of the Authority alleged to be in excess of jurisdiction or a misuse of power.[27] (emphasis added)

As noted by leading commentary, 'Per Art. 187 (b) (ii), a State Party may also make a complaint in circumstances when an act of the Authority was "in excess of jurisdiction or a misuse of power" '.[28]

The potential role of ITLOS in clarifying issues concerning the alignment between the deep-sea mining regime applicable to the Area with the regime governing seabed mining on the continental shelf, and other potential conflicts

There are also potential contentious issues that could arise from what Willaert has called 'the multitude of legal frameworks relevant to deep sea mining and their interactions'.[29] Bourrel et al. note for their part that the Common Heritage of Mankind principle

> has relevance in a number of ways for adjacent spaces, which are: the extended continental shelf of nations between 200 and 350 nautical miles; the seabed areas within national exclusive economic zones (EEZs); the water column above the Area; the living resources of the deep seabed, and in particular their marine genetic resources.[30]

A potential problematic issue in particular, as identified by Willaert, is for example, 'whether the deep sea mining regime applicable to the Area is well-aligned with the one governing the same activities on the continental shelf'.[31] He explains that activities similar to deep-sea mining are developing within areas under national jurisdiction (seabed mining), and argues that 'prominent mismatches between the two regimes might cause problems and concerns'.[32] One such problem is, as Willaert notes, the fact that exploration and exploitation operations on the continental shelf are governed by the national laws of coastal states which leads to various regulatory frameworks. He points out that it would be 'important that these domestic laws complement the efforts of the international community to protect deep sea ecosystems by including adequate environmental standards and conditions'.[33] He underlines, '[a]fter all, the various species living in and near the seabed or in the water column above do not take these legal boundaries into account and will not confine themselves to one or the other zone'.[34] Moreover, Willaert rightly points out that activities on the continental shelf of a coastal state 'may have a transboundary environmental impact'.[35] As a consequence he stresses that it would be very important that 'deep sea mining activities within national jurisdiction are adequately regulated and supervised, avoiding any legal gaps'.[36]

27 Article 187 b (i) and (ii), UNCLOS.
28 C. Burke, p. 1260 § 13, in A. Proelss (ed.), *United Nations Convention on the Law of the Sea, A commentary*, C.H. Beck, Hart, Nomos, 2017.
29 See K. Willaert, *Regulating deep sea mining: A myriad of legal frameworks*, Switzerland: Springer, 2021, p. 19.
30 M. Bourrel, T. Thiele and D. Currie, 'The common heritage of mankind as a means to assess and advance equity in deep sea mining', *Marine Policy*, July 2016, p. 6.
31 See K. Willaert, *Regulating deep sea mining: A myriad of legal frameworks*, op. cit., p. 19.
32 Ibid., p. 20.
33 Ibid.
34 Ibid.
35 Ibid.
36 Ibid.

To the extent that the meaning of 'effective control' (as noted earlier) in this context may not yet be sufficiently clear, it would appear that there is also a need for clarification of what the rules concerning transboundary harm would be. Further, the extended continental shelf regime, as aptly noted by Willaert, would raise additional questions regarding the way in which harmonization of the different regimes for seabed mining in the different areas should be achieved.[37]

To Verlaan it is '[UNCLOS'] own fragmented approach to the Area (defined as "the seabed and ocean floor, and subsoil thereof, beyond the limits of national jurisdiction")' which would 'not facilitate the task of ISA, because UNCLOS does not limit its marine environmental protection requirements to the Area'.[38] She argues that in the context of deep-sea mining, the scope of the ISA's marine environmental responsibilities in that sense, extends to 'the coastline', i.e. well beyond the Area and far into water within national jurisdiction, and must include 'prevention, reduction and control of interference with the ecological balance of the marine environment'.[39]

The above is further problematized if one is to consider non-State Parties to UNCLOS, raising the need for an assessment of 'the precise impact of non-ratification' on the deep-sea mining plans of said states.[40] As put by Willaert, this would involve determining the question, under international law, 'whether or not – and at what cost – non-states parties can exploit the abundant mineral resources on the ocean floor'.[41] He questions: 'Does non-ratification lead to free and unbridled access to the deep seabed, without any regard to the rules and conditions of the international regime, or does this preclude states from pursuing their deep sea mining ambitions?'[42]

ITLOS can potentially play a role in ensuring that the different legal frameworks relevant to deep-sea mining are harmonized.

Substantive areas potentially giving rise to disputes

In addition, the challenges regulating deep-sea mining include the interface with areas upon which very little was known in the past. Some of the areas that need to be considered in assessing deep-sea mining include (1) the regulation of gas hydrates; (2) the sub-sea permafrost in the Artic; and (3) the potential global impact of deep-sea mining on biodiversity loss and climate change. These all can potentially give rise to new types of disputes before ITLOS.

The regulation of gas hydrates exploration and exploitation

Gas hydrates are 'a crystalline solid formed of water and gas'.[43] Looking and acting much like ice, they contain huge amounts of methane.[44] They exist in huge quantities in marine sediments in a

37 Ibid., p. 26.

38 P. Verlaan, 'Environmental issues of deep-sea mining: A law of the sea perspective', in R. Sharma (ed.), *Environmental Issues of Deep-Sea Mining, Impacts, Consequences and Policy Perspective*, op. cit., p. 23, relying on article 145 of UNCLOS, 'which is the governing article applicable specifically to "activities in the Area"; other marine environmental protection requirements for these activities are found elsewhere [in UNCLOS], including Part XII, which is dedicated to marine environment'. Verlaan, ibid., p. 25, footnote 16.

39 Ibid., p. 25 citing UNCLOS, article 145(b).

40 See for example, the United States of America. K. Willaert, *Regulating deep sea mining: A myriad of legal frameworks*, op. cit., p. 26.

41 Ibid.

42 Ibid., p. 27.

43 United States Geological Survey ('USGS'), 'What are gas hydrates?' Official Website of the US Government. Available online <https://www.usgs.gov/faqs/what-are-gas-hydrates> (accessed 5 September 2021).

44 Ibid.

layer several hundred meters thick directly below the sea floor and in association with permafrost in the Arctic. Methane hydrate is believed to be 'the world's largest natural gas resource' and can be found in the shallow sediments of many deep ocean areas.[45] Scientific scholars note that enormous amounts of methane hydrate have been found beneath Arctic permafrost, beneath Antarctic ice and in sedimentary deposits along continental margins worldwide.[46] To the extent that deep-sea mining may tap into resources which would potentially release vast quantities of methane into the atmosphere, the question is what would the legal consequences be under UNCLOS? What would be the implications of this for the regulation of deep-sea mining? So far, the impacts of methane hydrate mining have not been examined under the prism of the UNCLOS by ITLOS. Admittedly, however, this new potential activity, the exploitation of gas hydrates, may give rise – as noted by former President of ITLOS Vladimir Golitsyn – to 'new types of disputes before the Tribunal in the years to come'.[47]

Scientists warn that 'hydrate mining could generate sub-marine landslides', and that 'dissociating the methane hydrates would destabilize the sea floor', and in the worst-case scenario that 'huge packages of sediments could slide downhill, triggering powerful tsunamis along coastal areas'.[48] Yan et al. suggest that the current legal framework is not adequately prepared to address transboundary harm triggered by the exploitation of offshore methane hydrates, in particular because 'the technology of such extraction is still at an experimental state, and potential risks remain uncertain – and even untraceable – for cross-jurisdictional claims'.[49] While Yan et al.'s focus is the Deep Seabed Mining Law of China, which the authors identify as a predominant nation exploring offshore methane hydrate extraction, their observations also consider UNCLOS.[50] What would 'the responsibility to ensure' by States, under article 139 paragraph 2 of UNCLOS entail in methane hydrate exploration? As noted by Vöneky and Höfelmeier, the scope of such a 'responsibility to ensure' is of an obligation of conduct or due diligence, not of result.[51] The obligation does not

45 H. M. King, 'Methane hydrate'; *Geoscience News and Information*. Available online <https://geology.com/articles/methane-hydrates/> (accessed 2 January 2022).

46 Ibid.

47 V. Golitsyn, 'The potential role of the Tribunal in light of its experience after 20 years' judicial activity' in *ITLOS at 20: Looking into the Future*, Symposium, 18 March 2017, pp. 5 and 6.

48 World Ocean Review, 'Methane hydrate', *WOR 3 Marine Resources – Opportunities and Risks 2014*. Available online <https://worldoceanreview.com/en/wor-3/methane-hydrate/mining-impacts/> (accessed 2 January 2022).

49 D. Yan et al., 'Governing the transboundary risks of offshore methane hydrate exploration in the seabed and ocean floor – an analysis on international provisions on chinese law', *Journal of World Energy Law and Business* 13, 2020, 185–203, p. 186.

50 While they refer to a number of relevant provisions of UNCLOS, they wrongly conclude that state responsibility for potential environmental harm caused by methane hydrate exploration is 'strict'. D. Yan, et al., 'Governing the transboundary risks of offshore methane hydrate exploration in the seabed and ocean floor – an analysis on international provisions on chinese law', *Journal of World Energy Law and Business* 13, 2020, 185–203, p. 191. It is pertinent to observe that article 139 of UNCLOS differentiates between responsibility and liability. In its 2011 Advisory Opinion, ITLOS held that under article 139 'the term "responsibility" refers to the primary obligation whereas the term "liability" refers to the secondary obligation, namely the consequences of a breach of the primary obligation'. *Responsibilities and Obligations of Sponsoring States*, para. 66. See also the discussion on article 139 in N. Bernaz and I. Pietropaoli, 'Developing a business and a human rights treaty: Lessons from the deep seabed mining regime under the United Nations Convention on the Law of the Sea', *Business and Human Rights Journal* 5 (2), pp. 214–215.

51 S. Vöneky and A. Höfelmeier, p. 972 §11, in A. Proelss (ed.), *United Nations Convention on the Law of the Sea, A commentary*, op. cit.

impose strict liability.[52] In international law – as they observe – the formulation has especially been used in connection with the general obligations of States to prevent transboundary harm stemming from activities conducted in their territory.[53] Yan et al. observe, in addition, that there is a need for outlining the scope of liability in the context of methane hydrate exploration, and the particular obligations coming from both sponsorship and application with a plan of exploration and exploitation.[54] The Seabed Disputes Chamber has already held that the precautionary approach is part of the due diligence obligation itself.[55] But what would that entail in the context of methane hydrate exploration or even exploitation?

A question is also raised on whether the 'Draft Articles on the Prevention of Transboundary Harm from Hazardous Activities' ('Draft Articles on the Prevention of Transboundary Harm')[56] and 'Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities'[57] ('Principles on the Allocation of Loss' or 'The Principles') provide approaches and principles that could be useful to regulate methane hydrate exploration and exploitation.[58] For example, how is one to ensure the victim of transboundary damage in a case of methane hydrate exploration/exploitation access to prompt and adequate compensation? The commentary of Principle 1 of The Principles on the Allocation of Loss observes that hazardous activities coming within the scope of the draft principles are those not prohibited by international law and involving the 'risk of causing significant transboundary harm through their physical consequences'.[59] The Principles recognize that 'harm could occur despite implementation of the duties of prevention':

> Transboundary harm could occur for several other reasons not involving State responsibility. For instance, there could be a situation where the preventive measures were followed but actually proved inadequate, or where the particular risk that cause transboundary harm could not be identified at the time of initial authorization and hence appropriate preventive measures are not envisaged. In other words, transboundary harm could occur accidentally or it may take place in circumstances not originally anticipated. Further, harm could occur because of gradually accumulated adverse effects over a period of time.[60]

Indeed, for the purposes of the Principles it is assumed that duties of due diligence under the obligations of prevention have been fulfilled.[61] Yan et al. observe therefore that the Principles adopt a

52 Ibid.
53 Ibid.
54 Yan et al., op. cit., p. 191.
55 *Responsibilities and Obligations of Sponsoring States*, para. 130 *et seq.*
56 Draft articles on the Prevention of Transboundary Harm for Hazardous Activities with commentaries, 2001. Text adopted by the International Law Commission at its fifty-third session, in 2001, and submitted to the General Assembly as a part of the Commission's report covering the work of that session (A/56/10). Available online <https://legal.un.org/ilc/texts/instruments/english/commentaries/9_7_2001.pdf> (accessed 12 April 2022).
57 UN General Assembly Resolution 61/36 Annex, UN Doc A/Res/61/36, 18 December, 2006. See also Draft principles on the allocation of loss in the case of transboundary harm arising out hazardous activities, with commentaries, 2006, *Yearbook of the International Law Commission, 2006*, vol. II, Part Two.
58 Yan et al., op. cit., p. 199. See pp. 199–201 for an analysis of the approach of the Draft Articles on the Prevention of Transboundary Harm and its usefulness in the contest of methane hydrate extraction.
59 *Draft principles on the allocation of loss in the case of transboundary harm arising of hazardous activities, with commentaries*, 2006, Commentary (2) to Principle 1, p. 62.
60 Ibid., Commentary (7) to Principle 1, p. 63.
61 Ibid., Commentary (8) to Principle 1, p. 63.

strict-liability-'polluter pays' principle to ensure the victim of transboundary damage has access to prompt and adequate compensation.[62] Would this be important to consider in cases of harm arising from the extraction of methane hydrate, which fits the element of raising a 'risk of causing significant transboundary harm through their physical consequences'? Yan et al. see the benefits of following that approach. Applying strict liability, regardless of fault, could undoubtedly, suggest the same authors, pressure operators into being more careful when it comes to applying untested prospecting methods, therefore being beneficial for the environment, as well as in compliance with the general precautionary principles.[63] Note in that sense that the Principles would go further than article 22 of Annex III of UNCLOS where it is stated:

> The contractor shall have responsibility or liability for any damage *arising out of wrongful acts* in the conduct of its operations, account being taken of contributory acts or omissions by the Authority. Similarly, the Authority shall have responsibility or liability for any damage arising out of wrongful acts in the exercise of its powers and functions, including violations under article 168, paragraph 2, account being taken of contributory acts or omissions by the contractor. Liability in every case shall be for the actual amount of damage. (emphasis added)

Is there room for using such an approach reflected in the Principles within the interpretation of UNCLOS article 304?[64] More generally, there is also the question of what measures in the event of both national and international regulatory breaches by involved parties (the sponsoring States, the enterprises) should be put in place?[65] As posited by Yan et al.: Should monetary penalties be instituted? Should the ISA wield the authority to deliver such penalties?[66] The above questions can well be the subject of a further Advisory Opinion by the Seabed Disputes Chambers if prompted to do so.

Lastly, there are also warnings in scientific studies that 'an increased release of methane from the oceans could accelerate climate change'.[67] To date climate change has not yet come to the consideration of ITLOS. As Boyle noted, UNCLOS 'was negotiated at a time when climate change was not yet part of the international agenda'.[68] At the same time, he argues, UNCLOS was never meant to be a 'static or immutable legal regime'.[69] It would appear therefore, that the potential impacts of hydrate mining and correlative issues of climate change are matters likely to necessitate legal clarification under UNCLOS. Former President of ITLOS Vladimir Golitsyn would agree. In his opening Address to the Symposium *ITLOS at 20: Looking into the Future*, he observed: 'The

62 Yan et al., op. cit., p. 201.

63 Ibid.

64 Article 304 (Responsibility and liability for damage) of UNCLOS reads: 'The provisions of this Convention regarding responsibility and liability for damage are without prejudice to the application of existing rules and the development of further rules regarding responsibility and liability under international law'. As the commentary observes, this applies also to article 139. As Tams and Devaney note, 'The Convention's regime is not "self-contained" but can be complemented by external rules'. Tams and Devaney, in A. Proelss (ed.), *United Nations Convention on the Law of the Sea, A commentary*, op. cit., p. 1962, para. 1.

65 Yan et al., op. cit., p. 192.

66 Ibid.

67 World Ocean Review, 'Methane hydrate', op. cit.

68 A. Boyle, 'Protecting the marine environment from climate change', in E. Johansen et al. (eds), *The law of the sea and climate change*, Cambridge: Cambridge University Press, 2021, p. 83.

69 Ibid.

exploitation of gas hydrates has the potential to inflict significant harm on the marine environment and negatively affect the earth's climate' as there is 'the risk of methane escape into the atmosphere, which could further intensify the greenhouse effect'. [70]

Sub-sea permafrost in the Arctic

Sub-sea permafrost in the Arctic is 'generally relict terrestrial permafrost inundated after the last glaciation and now degrading under the overlying shelf sea'.[71] As with terrestrial permafrost, sub-sea permafrost 'is a substantial reservoir and/or a confining layer for gas and for gas hydrates'.[72] As explained by Portnov et al., 'permafrost and gas hydrates have been melting and releasing massive quantities of methane into the ocean and atmosphere'.[73] Chen et al. observe that Arctic sub-sea permafrost contains more organic carbon than the terrestrial counterpart and is undergoing fast degradation in response to climate warming.[74] In addition, scientists appear to have found evidence that the topology of the sea-floor might be changing, undergoing massive upheaval, in particular that the sub-sea permafrost would have thawed and collapsed.[75] It is suggested that this process could accelerate because the Arctic is now warming so quickly.[76]

The implications of these processes and the impact seabed mining could have in those processes constitute an additional area for consideration.

As noted by Golitsyn, the exploitation of gas hydrates contained in permafrost on land in the Arctic and which are primarily found in the continental slope of the ocean floor in the sea areas, is likely to take place in areas within the national jurisdiction of coastal States.[77] He observes as a consequence 'that the potential global impact raises the question of whether the regulation of the exploitation of gas hydrates [in such instances] should be solely a matter for the coastal State to regulate or whether it requires international regulation'.[78] He points out that as a result ITLOS 'may be faced with questions concerning the regulation of the exploitation of gas hydrates in future, for example in the context of compliance by coastal States concerned with general obligation of all State Parties to the Convention under article 192 'to protect and preserve the marine environment'.[79]

Deep-sea mining and climate change

Boyle suggests that as far as climate change mitigation strategies are concerned, UNCLOS, part XII (which he argues must be interpreted and applied with subsequent developments in interna-

70 Golitsyn, op. cit., p. 6.
71 Alfred-Wegener Institute Helmholtz-Zentrum Für Polar- und Meeresforschung, 'Submarine permafrost'. Available online <https://www.awi.de/en/science/geosciences/permafrost-research/research-focus/submarine-permafrost.html> (accessed 1 January 2022).
72 Ibid.
73 A. Portnov et al., 'Offshore permafrost decay and massive seabed methane escape in water depths', *Geophysical Research Letters*, Vol. 2013, 3962–3967, p. 3962.
74 M. Chen et al., 'Subsea permafrost as a potential major source of dissolved organic matter to the east siberian arctic shelf', *Science of the Total Environment* 777, 10 July 2021, 146100.
75 M. Simon, 'Underwater permafrost is a big, gassy wild card for the climate', *Wired*, 21 March 2022.
76 Ibid.
77 Golitsyn, op. cit., p. 6.
78 Ibid.
79 Ibid.

tional law and policy in mind) requires States to take the measures necessary to protect the marine environment from the harmful effects of anthropogenic climate change.[80] Prip likewise argues that while part XII does not refer to climate change-related impacts, 'this however does not imply that climate change induced harmful impacts cannot be considered'.[81]

Former ITLOS Judge Rüdiger Wolfrum would agree with that. In his view, the Convention is 'flexible enough to accommodate the issues which will confront us' including 'climate change'.[82]

Boyle notes that anthropogenic greenhouse gas emissions have already caused marine pollution as per scientific evidence.[83] This would amount, he posits, to an introduction of 'substances or energy' to the marine environment and a likelihood of the 'deleterious effect' required by article 1(1)(4) of UNCLOS.[84] From this perspective, the requirement of states to 'protect and preserve the marine environment' in article 192 would include preventing and combating climate change.[85] Prip suggests, further, that article 194 of UNCLOS which requires states to take all measures necessary to prevent pollution from any source, including from or through the atmosphere, should be interpreted to include prevention of greenhouse gas emissions.[86] This is an area which would certainly benefit from a legal pronouncement by ITLOS by way of an Advisory Opinion. Considering that 'nearly half a billion tonnes of carbon (the equivalent of more than 1.5 billion tonnes of carbon dioxide) are captured and stored by high seas ecosystems annually',[87] deep-sea mining effects on the climate is a matter that may well come under the jurisdiction of the Seabed Disputes Chamber. It is to be noted that while organizations such as Greenpeace International argue that deep-sea mining will disrupt the ocean's sequestration of carbon and make climate change worse,[88] companies wanting to exploit the deep sea, such as DeepGreen, deny this.[89]

There are also elsewhere arguments advanced to the effect that article 207 of UNCLOS requiring States to adopt laws and regulations to prevent, reduce and control pollution from land-based sources is relevant for greenhouse gas emissions and applicable to areas beyond national jurisdiction.[90]

It has been observed that since the adoption of UNCLOS in 1982, 'human activities in areas beyond national jurisdiction (ABNJ) have increased considerably, and climate change with its main stressors, ocean warming deoxygenation and ocean acidification, are expected to compound the impacts on high sea environment'.[91] Besides the main climate stressors, it has been noted,

80 A. Boyle, 'Protecting the marine environment from climate change', op. cit., p. 84.
81 C. Prip, 'Integrating climate change in the governance of areas beyond national jurisdiction', in E. Johansen et al. (eds), *The law of the sea and climate change*, op. cit., p 337.
82 Wolfrum intervention in *ITLOS at 20: Looking into the Future*, op. cit., p. 85.
83 A. Boyle, 'Protecting the Marine Environment from Climate Change', op. cit., p. 84.
84 Ibid.
85 Prip, op. cit.
86 Ibid.
87 Ibid.
88 See Greenpeace International, *In deep water: The emerging threat of deep sea mining*, Report, June 2019. Available online < https://oursharedseas.com/wp-content/uploads/2019/11/Greenpeace_In_Deep_Water-1.pdf> (accessed 17 May 2022), pp. 3 and 5.
89 DeepGreen, *DeepGreen responds to Greenpeace seabed mining report*, 31 July 2019. Available online https://www.maritime-executive.com/editorials/deepgreen-responds-to-greenpeace-seabed-mining-report (accessed 16 May 2022).
90 Prip, op. cit., p. 338.
91 Ibid., p. 337.

'there is evidence of large amounts of the strong greenhouse gas, methane, trapped in the seabed which may be released by human activities'.[92]

Loss of biodiversity

It is said that more than 80 percent of the ocean remains 'unmapped, unobserved and unexplored'.[93] As commentators observe, 'recent research has shown that the remote deep and open oceans host a major part of the world's biodiversity'.[94] Faced with this, the scientific community is calling for the facilitation of the adoption of precautionary and ecosystem approaches, including the precautionary principles with respect to deep-sea mining.[95] Rare earth elements in the deep sea, seen today as highly desirable commodities,[96] have a flip side, we are told: the potential loss of biodiversity and ecosystems as a consequence of deep-sea mining. A recent study by academics at Queen's University Belfast found that 'almost two-thirds of the hundreds of mollusc species that live in the deep sea are at risk of extinction'.[97]As noted above, the IUCN issued pronouncement 069 on protection of deep-ocean ecosystems and biodiversity through a moratorium on seabed mining.[98] This placed ensuring the effective protection of the marine environment from harmful effects of seabed mining activities in areas beyond national jurisdiction at the heart of the discussion on deep-sea mining.[99] The pronouncement emphasized 'the need to ensure sufficient scientific information on deep-sea biodiversity and ecosystems and an appropriate and transparent institutional structure prior to adopting [deep-sea mining] regulations'.[100] The pronouncement also recalled article 5 of the Convention on Biological Diversity and the commitments of States to the 2030 Agenda for Sustainable Development including sustainable development goals 12 and 14.[101] These references bring the topic of deep-sea mining within a larger context and raise the need to interpret UNCLOS (in particular deep-sea mining) in unity with other treaty regimes such as the Convention on Biological Diversity.[102] ITLOS can certainly play an important role as an interpreter of UNCLOS, including in its relation with the Convention on Biological Diversity. Such perspective would also need to integrate a harmonic relationship with new treaty regimes such as the Biodiversity Beyond National Jurisdiction (BBNJ) which will actually cover the seabed in the Area, albeit the BBNJ will contain its own mechanisms for settling disputes.[103]

92 Ibid.
93 Editorial, 'Our oceans'. *Newsroom*, 20 August 2020. https://rhinoreview.org/our-oceans-80-percent-unmapped-unobserved-and-unexplored-and-nearly-95-percent-unprotected/ (accessed 5 January 2022).
94 C. Prip, op. cit., p. 336.
95 IUCN World Conservation Congress, 069-Protection of deep-ocean ecosystems and biodiversity through a moratorium on seabed mining, op. cit.
96 Dingwall, op. cit., p. 158.
97 ITV, 'Almost two thirds of deep-sea species at risk of extinction', 10 December 2021.
98 IUCN World Conservation Congress, 069-Protection of deep-ocean ecosystems and biodiversity through a moratorium on seabed mining, op. cit.
99 Ibid.
100 Ibid.
101 Ibid.
102 For a discussion on conservation of biodiversity on the seabed, see F. Armas-Pfirter, 'The International Seabed Authority and the protection on biodiversity', in A. de Paiva and V. Tassin (eds), *Guide to the navigation of marine biodiversity beyond national jurisdiction*, D'Plácido Editora: Belo Horizonte, 2018, pp. 223–248.
103 On the discussions on said possible mechanisms see Y. Shi, 'Settlement of disputes in a BBNJ agreement: Opinions and analysis', *Marine Policy* 122, December 2020, 104156. For a discussion on – as referred by Gautier – 'the delicate questions of jurisdiction' raised by the 'juxtaposition of two different dispute resolution systems', see P.

Conclusion

Young's 1968 remark that 'uses of ocean space undreamed of in the past are in the making, and all the patterns that will eventually emerge cannot now be foreseen',[104] appears to have anticipated a world in which deep-sea mining would be potentially possible. To Gjerde, however, part XI of UNCLOS was built on several paradigms or assumptions about life in the deep sea that have turned out to be incorrect: 'It assumed that life in the deep-sea was dull, distant, of little interest to us, as human beings; that seabed mining could occur without much environmental disturbance; it assumed that these resources of the deep are easily accessible (...) and it assumed that the technology was right and we just needed to develop some potato-harvesting-type machines to enable this new regime to go forward'.[105]

In the quest to fill the gap of what Gjerde calls a disconnection between 'science and law', doubtlessly, ITLOS would play an increasing role. This chapter has explored what role if any ITLOS (in particular the Seabed Disputes Chamber) may play in addressing the most urgent issues raised by deep-sea mining and in the clarification of the relevant legal notions under UNCLOS. While, as noted by Treves, it is 'the exploitation stage which is the most likely to produce disputes'[106] this chapter posits that the role of ITLOS in addressing deep-sea mining issues may precede any exploitation stage. This chapter thus considers possible advisory opinions and contentious cases involving ISA as well as broader topics that could come to the jurisdiction of the Seabed Disputes Chamber. It also suggests that ITLOS could play an important role in harmonizing what Willaert has called 'the multitude of legal frameworks relevant to deep-sea mining and their interactions' ensuring cohesion of the law. ITLOS may also be key in providing legal clarity on various topics such as the regulation of gas hydrates, deep-sea mining and climate change by interpreting UNCLOS within the framework of broader international law. To some, urgent regulation of deep-sea mining may follow a bottom-up approach with examples such as New Zealand whose Supreme Court recently decided against a giant seabed mining proposal in the south Taranaki Bight.[107] However, the top-to-bottom approach appears equally needed in the current context in which Nauru has notified the ISA of the intention of Nauru Ocean Resources Inc (NORI), a subsidiary of a Canadian company called DeepGreen Mineral Corp., to apply for approval to begin mining in two years in the Clarion-Clipperton Zone in the North Pacific Ocean between Hawaii and Mexico.[108] But it is not only urgency, but also principle. Ensuring the unity of international law advocates for the importance of a top-to-bottom approach. What is certain is that the future docket of ITLOS will be dealing with increasing matters relating to the interpretation of UNCLOS in relation to deep-sea mining as this chapter proposes.

Gautier, 'Le règlement des différends' (Partie 3: 'Observations sur le règlement des différends relatifs au nouvel instrument sur la conservation et l'utilisation durable de la biodiversité marine des zones ne relevant pas de la jurisdiction nationale'), in A. de Paiva and V. Tassin (eds), op. cit., p. 690.

104 R. Young, 'The legal regime of the deep-sea floor', *American Journal of International Law* 62 (3), July 1968, 642–653.

105 Gjerde, op. cit.

106 Treves, op. cit.

107 *Trans-Tasman Resources Limited and Taranaki-Whanganui et al.*, SC 228/2022 [2021] NZSC 127. Available online <https://www.courtsofnz.govt.nz/assets/cases/2021/2021-NZSC-127.pdf> (accessed 1 February 2022).

108 'Pacific Island of Nauru sets two year deadline for U.N. deep-sea mining rules', op. cit.

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