1

Introduction

1.1 Background: Development of Deep Seabed Mining and the Legal Regime

It was in 1873, during the *HMS Challenger* expedition (1872–1876), that polymetallic nodules were first discovered on the seabed.[1] Yet, it was not until the 1960s that the economic value of these nodules became an issue of international interest.[2] Soon, exploration for and exploitation of the mineral resources on the seabed area beyond national jurisdiction (the 'Area') – that is, deep seabed mining (DSM) – appeared as a topic on the agenda of the United Nations General Assembly. From 1967, under the auspices of the UN, negotiations began for an international DSM legal regime. The final outcome of the long-lasting negotiations was Part XI of the 1982 United Nations Convention on the Law of the Sea (UNCLOS).[3] However, owing to the disapproval of industrial countries of the contents of Part XI of the UNCLOS, the Convention did not enter into force until Part XI was amended by the 1994 Agreement.[4]

[1] International Seabed Authority: Exploration Contracts. International Seabed Authority (isa.org.jm).

[2] In 1962, John Mero said that 'the nodules are indicated to be forming at an annual rate of 6×10^6 metric tons in [the Pacific] ocean'. The same estimation was repeated in his influential book *The Mineral Resources of the Sea*. According to this estimation, the potential economic value of manganese nodules would be huge. Although it turned out to be far too exaggerated, this estimation stimulated great international interest in deep seabed mining. John Mero, 'Ocean Floor Manganese Nodules' (1962) 57 *Economic Geology* 747, 756–758; John Mero, *The Mineral Resources of the Sea* (Elsevier 1965) 235.

[3] Adopted on 10 December 1982; entered into force on 16 November 1994.

[4] Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, adopted on 28 July 1994, entered into force 28 July 1996 (the '1994 Agreement'). States' divergent attitudes were exemplified in the unilateral national legislation of a group of industrialized countries, and in the mini-treaty arrangement between these states in the 1980s. See Yuwen Li, *Transfer of Technology for Deep Sea-Bed Mining: The 1982 Law of the Sea Convention and Beyond* (Martinus Nijhoff 1994) 87–90. The unilateralism movement created a crisis in the international DSM legal

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The International Seabed Authority (ISA) was established upon Part XI's entry into force in 1994, and came into operation in 1996. The ISA is empowered under the UNCLOS to 'organize and control activities in the Area, particularly with a view to administering the resources of the Area'.[5] It controls activities in the Area by granting permits in the form of contracts.[6] As of the 27th session of the ISA in July 2022, the ISA has signed 31 contracts for exploration in the Area.[7] Behind these 31 contracts, there are 22 contractors that fall within three categories: States, publicly funded companies or institutions and private companies.[8] Private companies were not involved in exploration in the Area until 2011 when Nauru Ocean Resources Inc. (sponsored by Nauru) signed a contract with ISA as the first private company. Thereafter, more private companies joined, which brought the total number of private contractors to ten. All these private companies are currently conducting exploration for polymetallic nodules in the Area.

regime. As a response, the then Secretary-General of the UN initiated a serial of informal consultations (1990–1994) which resulted in the amendment of Part XI of the UNCLOS. See ISA, *Secretary-General's Informal Consultations on Outstanding Issues Relating to the Deep Seabed Mining Provisions of the United Nations Convention on the Law of the Sea: Collected Documents* (Collected Documents, ISA, 2002) 1.

[5] Article 157, UNCLOS.

[6] Article 153(3), UNCLOS.

[7] The 2022 report of Secretary-General of the ISA, ISBA/27/A/2. The up-to-date data is available online at: https://isa.org.jm/exploration-contracts.

[8] There are four contractors in the first category: the governments of India, South Korea, Russia and Poland.

Eight contractors belong to the second category: Interoceanmetal Joint Organization (IGO); JSC Yuzhmorgeologiya; China Ocean Mineral Resources Research and Development Association (COMRA); Japan Oil, Gas and Metals National Corporation (JOGMC); Deep Ocean Resources Development Co., Ltd (DORD); Federal Institute for Geosciences and Natural Resources of the Federal Republic of Germany; Institut Français de Recherche pour l'Exploitation de la Mer; and Companhia De Pesquisa de Recursos Minerais.

Ten private contractors in the third category as follows: Nauru Ocean Resources Inc. (2011, sponsored by Nauru); Tonga Offshore Mining Limited (2012, sponsored by Tonga); G TEC Sea Mineral Resources NV (2013, sponsored by Belgium); UK Seabed Resources Ltd (2013, sponsored by the UK); Marawa Research and Exploration Ltd (2015, sponsored by Kiribati); Ocean Mineral Singapore Pte Ltd (2015, sponsored by Singapore); Cook Islands Investment Corporation (2016, sponsored by Cook Islands); China Minmetals Corporation (2017, sponsored by China); Beijing Pioneer Hi-Tech Development Corporation (2019, sponsored by China); and Blue Minerals Jamaica Ltd (2021, Jamaica).

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The involvement of private companies[9] resulted in diverse contractors. More importantly, private investment served as a strong impetus to bringing DSM into the exploitation stage. Unlike States or publicly funded companies or institutions that might have strategic goals and long-term plans for DSM, private companies are normally commerce-oriented. For them, the viability of making profits in a relatively short term is of significance. Along with private companies, there were also calls from some developing countries for progress in the exploitation stage.[10] The likely incentive underlying their suggestions was the potential benefits they might share in accordance with the principle of the common heritage of mankind (CHM). Additionally, the ISA itself was of the opinion that 'commercialization of marine minerals in the [Area] . . . [was] well within reach and could be attained in the foreseeable future'.[11] Thus, it seems that, in spite of the existence of obstacles such as gaps in marine scientific knowledge,[12] the nascency of technology,[13] fluctuations

[9] In Dingwall's opinion, 'the UNCLOS DSM regime is an unlikely hybrid of capitalist and communist values, embracing the role of private actors while enshrining principles of resource distribution'. Private companies' prioritizing the protection of investment and economic benefits would cause a sharp tension with the requirements of environmental protection and equitable share of benefits. See Joanna Dingwall, *International Law and Corporate Actors in Deep Seabed Mining* (OUP 2021).

[10] This position was vividly exhibited at the 22nd annual session of the ISA during a discussion of the Legal and Technical Commission's report on 'applications for extension of contracts for exploration of polymetallic nodules'. Brazil maintained that it was necessary that the draft decision pertaining to extensions be reworded to ensure that contractors proceed to the exploitation stage at the end of the five-year exploration stage. Cameroon, Chile, Kenya and South Africa supported the position of Brazil. See: ISA, 'Seabed Council Approves Plan of Work for Crusts Exploration by the Republic of Korea; Delays Approval of Five-Year Extension of Six Exploration Contracts' (Press Release, SB/22/8, 18 July 2016).

[11] ISA, 'Commercialization of Marine Minerals in Deep Seabed Well within Reach, International Seabed Authority Secretary-General States as he Introduces Annual Report' (Press Release, SB/22/11, 19 July 2016) 1.

[12] Reference to Section 2.4.2.

[13] Ecorys, 'Study to Investigate the State of Knowledge of Deep-Sea Mining' (Final Report, 28 August 2014) 55–71; Elaine Baker and Yannick Beaudoin (eds.), 'Sea-Floor Massive Sulphides — A Physical, Biological, Environmental, and Technical Review' (Review, Secretariat of the Pacific Community, 2013) 43–48. Available at: http://dsm.gsd.spc.int/public/files/meetings/TrainingWorkshop4/UNEP_vol1A.pdf; Elaine Baker and Yannick Beaudoin (eds.), 'Manganese Nodules: A Physical, Biological, Environmental, and Technical Review' (Review, Secretariat of the Pacific Community, 2013) 43–48. Available at: http://dsm.gsd.spc.int/public/files/meetings/TrainingWorkshop4/UNEP_vol1B.pdf; Elaine Baker and Yannick Beaudoin (eds.), 'Cobalt-Rich Ferromanganese Crusts: A Physical, Biological, Environmental, and Technical Review' (Review,

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in the metals market[14] and the absence of Exploitation Regulations (in the process of development),[15] DSM is in a crucial transitional period moving towards the exploitation stage.

In June 2021, Nauru requested the ISA to complete the framing and adoption of Exploitation Regulations within two years, thereby paving the way for granting permit for exploitation in the Area.[16] Such a request, dubbed as the trigger for the 'two-year deadline',[17] has provoked a storm of protest from those who are concerned with and would give priority to the protection of the marine environment. The concerned individuals and groups rallied and strong reactions followed. In September 2021, IUCN World Conservation Congress voted for 'Motion 069', calling for a moratorium on deep seabed mining.[18] For the very first time there were two diametrically opposing positions towards DSM. This abrupt change seems to indicate that DSM has come to a crossroads.

It merits noting that the conflicting positions with respect to DSM are by no means a new phenomenon. Since the environment became an international concern in the 1970s, the struggle between the 'development' camp and the 'conservation' camp has almost never failed to manifest itself in the political and legal contestation concerning the utilization of natural resources. Experience shows that mostly compromise between the two camps was reached in the end, but there were exceptions too. The bridled mineral resource and whaling activities in

Secretariat of the Pacific Community, 2013) 41–45. Available at: http://dsm.gsd.spc.int/public/files/meetings/TrainingWorkshop4/UNEP_vol1C.pdf.

[14] Ecorys, 'Study to Investigate the State of Knowledge of Deep-Sea Mining' (Final Report, 28 August 2014) 112–136.

[15] Reference to Section 3.5.1.

[16] By the letter dated 25 June 2021: https://isa.org.jm/files/files/documents/NauruLetter-Notification.pdf, 'Nauru requests the President of ISA Council to complete the adoption of rules, regulations and procedures necessary to facilitate the approval of plans of work for exploitation in the Area', ISA News: https://isa.org.jm/news/nauru-requests-president-isa-council-complete-adoption-rules-regulations-and-procedures.

[17] See Pradeep A. Singh, 'The Two-Year Deadline to Complete the International Seabed Authority's Mining Code: Key Outstanding Matters that Still Need to Be Resolved' (2021) 134 *Marine Policy* 104804. The trigger of the 'two-year deadline' has also provoked a strong reaction from international lawyers who are concerned with the readiness of Exploitation Regulations in such a rush.

[18] IUCN World Conservation Congress 'Motion 069': www.iucncongress2020.org/motion/069 for the voting record, see: www.savethehighseas.org/momentum-for-a-moratorium/. Later, on 14 December 2021, at the 26th session of the Assembly of the ISA, DSCC requested for a moratorium on DSM in its intervention: https://isa.org.jm/files/files/documents/DSCC_item9.pdf.

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Antarctica are two examples. Here, questions arise, 'Will the polarized positions towards DSM activities, as exemplified by Nauru's request and IUCN's call, respectively, bring a dreadful "either/or" question before all participants in DSM'? 'Can compromise be achieved'? 'Which way to take for DSM in the future'? One needs to wait and see what answers turn out to these questions. This book does not attempt to conduct systematic analyses of these questions of a contingent nature, but the position taken by this book is explained in the following paragraph.

This book does not favour a moratorium on DSM for the sake of marine environmental protection, nor does it favour a rush towards the exploitation stage. It rejects an environmentalist's proposition of moratorium because such a position gives priority to marine organisms, species, communities and ecosystems but fails to take human conditions and welfare into consideration. The deep seabed appears as a new source of mineral resources that has the potential to meet, to some extent, the growing demand for metals in general, and for certain critical metals for the development of innovative technologies necessary for tackling climate change in particular. True, DSM activities may have (significant) detrimental effects on the deep-sea environment, and historically, we human beings ourselves are causes for ecologic crisis, global warming and other environmental problems we are facing now.[19] To capture the pervasive human influence on nature, Crutzen coined the well-accepted concept 'Anthropocene'.[20] We should certainly learn lessons from history and protect the marine environment in DSM as possible as we can. Nonetheless, to impose a moratorium on DSM is to swing the pendulum to an extreme. In a 'risk society',[21] (environmental) risk cannot be avoided in its entirety but must be managed or regulated. Refusing to take any (environmental) risks would mean a denial of all chances for satisfying human needs. That is a price too high to afford. What is the human reality now? There is a huge and growing world population who are aspiring for a better life and there is a need to resort to innovative

[19] Lynn White Jr., 'The Historical Roots of Our Ecologic Crisis' (1967) 155(3767) *Science* 1203. White investigated the relationship between religion, particularly Christianity, and attitudes towards nature. In particular, he considered the Christian human-centred idea as a deep root reason accounting for the ecologic crisis.

[20] Paul Crutzen, 'Geology of Mankind' (2002) 415(6867) *Nature* 23. In Crutzen's opinion, we have entered into a new geological period of 'Anthropocene' since late eighteenth century when the curtain of industrialization era opened.

[21] Ulrich Beck, *Risk Society: Towards a New Modernity*, translated by Mark Ritter (Sage 1992). The book was originally published in German in 1986.

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technologies to fight climate change. If the world population is not to decrease, if people's aspiration for better life is not to be discouraged and if the transition from fossil fuels to clean energies is not to discontinue, then DSM is worth trying.[22] This book embraces the concept of 'conservation science' which recognizes 'the dynamics of coupled human-natural systems'.[23] On the other hand, it rejects the private contractors' commerce-oriented approach because such a position gives priority to investment and profits but disregards everything else of vital value to humanity and ecology. In a word, this book takes the position that DSM should proceed but with extreme care with respect to the protection of the deep-sea environment.

1.2 Research Questions and the Scope

Against this background, this book addresses two major research questions concerning all participants in DSM. First, what are the international environmental obligations of the participants in DSM? Second, what are the legal consequences for them when environmental damage occurs? (this is the international environmental liability issue). The scope of research of the book can be defined by the following three dimensions. First, it discusses the subject matter of DSM at the international level. Second, it deals only with the environmental aspects of DSM. Marine environmental protection constitutes an inherent restraint to the development of DSM. Yet, unlike other restraint elements such as mining technologies and the metals market, the environmental aspects are expected to become increasingly challenging and complex with the advancement of DSM. Third, it addresses the issue of protection of the

[22] Kim argued that 'more fundamental societal transformation should be sought after to cope with the foreseeable shortage of metals and guard them against future exhaustion'. He also argued that metal recycling and more efficient governance could be ways to tackle the problem of shortage of metals. See Rakhyun Kim, 'Should Deep Seabed Mining Be Allowed?' (2017) 82 *Marine Policy* 134–137, 135 and 136. Similar arguments were also raised by those who suggested or supported a moratorium on DSM. However, one would be reasonably dubious about the practicability of a fundamental change of the way of life of people as well as the extent to which recycling and more efficient governance would work in meeting the demand of metals. That said, it does not mean that these ways are not worth trying but that they cannot be sufficient reasons for excluding other ways, such as seeking for new sources of mineral resources in the seabed – DSM.

[23] Peter Kareiva and Michelle Marvier, 'What Is Conservation Science?' (2012) 62(11) *BioScience* 962–969, 962.

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marine environment in DSM from a legal perspective. And the legal analysis revolves around the two core concepts: obligation and liability.

1.3 Terminology

1.3.1 Obligation

As it is stated,

> The notion of a legal obligation is fundamental both for the understanding of the legal regulation of conduct and for the analysis of other concepts used in the description and exposition of the law, such as rights, powers and trusts, property, possession and conveyance.[24]

Indeed, the concept of 'legal obligation' is central to law, no matter which school of law one follows. However, there are different understandings of 'obligation'. For Pufendorf, a proponent of pure natural law, the concept of obligation is the key to turning the natural state into a moral sphere: Obligation has 'an operative moral quality' and 'it places a kind of moral bridle upon our liberty of action'.[25] For Bentham and his disciple Austin, obligation exists in both legal and moral contexts, and a key feature of a legal obligation is the probabilistic sanctions in case of disobedience.[26] However, in Hart's opinion, it is of utmost importance to perceive obligation from 'an internal point of view'.[27] A legal obligation necessarily implies the existence of a rule or law. 'Law', as per Hart's narrative, is not imperative order backed with threat, but 'a combination of primary rule of obligation and the secondary rules of recognition, change and adjudication'.[28]

Then, in what sense does this book employ the word 'obligation'? First of all, 'obligation' is not discussed in a moral but a legal context. Second, in general this book takes a positivist approach in the sense that the main source of obligation is found in positive international law. Third, this

[24] H. L. A. Hart, *Essays on Bentham: Jurisprudence and Political Philosophy* (OUP 1982) 127.

[25] Samuel Pufendorf, *Two Books on the Elements of Universal Jurisprudence*, translated by William Abbott Oldfather (Oxford: Clarendon Press 1931). Pufendorf used about one-quarter of Book I to clarify 'obligation' as one out of twenty-one important definitions.

[26] H. L. A. Hart, *Essays on Bentham* (OUP 1982).

[27] H. L. A. Hart, *The Concept of Law* (OUP 1961) 79–88.

[28] Ibid., 89–97. Please note that the terms of 'primary rule' and 'secondary rule' used by Hart in *The Concept of Law* should be distinguished from the same terms used by Ago in the ILC's work on 'State responsibility'.

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book aims at furthering the understanding of legal obligation seen from participants' perspective, which is an internal point of view. Namely, it elucidates the rules which the participants in DSM perceive as binding on them or the rules that constitute the reason for the participants to act in conformity with certain guidelines and other obligations. Additionally, it is noted that the terms 'duty', 'responsibility' and 'requirement' are used in some contexts which bear the same meaning as the term 'obligation'.

1.3.2 Liability

However, the very use of the concept of 'liability' invites confusion: at the national level, its legal meaning differs between States (particularly between States following common law and those following civil law traditions), and at the international level, it has an intricate relationship with the concept of 'State responsibility'. Considering the same concept of liability is used at both the national and international levels and in different contexts, the meaning of the concept is indeed very confusing.[29] For this reason, it is necessary to define the concept of 'liability'. In this book, the concept of 'liability' is employed and used in the same sense as the International Law Commission (ILC) in its work on the topic of 'international liability for injurious consequences arising out of acts not prohibited by international law' ('international liability') because DSM is a specific kind of 'activity not prohibited by international law'. The remainder of this subsection will elaborate on the conceptual evolution of 'international liability' in the work of the ILC, which automatically explains the meaning of the term used in this book.

1.3.2.1 State Liability *Sine Delicto* as Primary Obligation under International Law

The topic of international liability emerged out of State responsibility. In 1970, the then special rapporteur Roberto Ago emphasized that the issue of 'responsibility for risk' should be treated separately from State responsibility.[30] His explanation for doing this was that since the basis of responsibility for risk is totally different from that of State responsibility,

[29] Nathalie Horbach in her dissertation examines the various meanings of the concept of liability in different contexts in great detail. See Nathalie Horbach, *Liability versus Responsibility under International Law, Defending Strict State Responsibility for Transboundary Damage* (S.l.: s.n. 1996) [Proefschrift Rijksuniversiteit te Leiden].

[30] The 1970 report on State responsibility of Ago, UN. Doc. A/CN.4/233.

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the nature, content and forms of the rules governing them should also be different. A joint examination of them would create confusion. In his opinion, responsibility for risk arises out of 'the exercise of an activity which is in itself lawful', while State responsibility relates to 'the breach of a legal obligation'.[31]

In 1978, the ILC approved the new topic on international liability and appointed Quentin-Baxter as the first special rapporteur. Yet, doubts about the autonomous status of the new topic existed from the very moment of its inception. Hence Quentin-Baxter was faced with the challenge of defending the autonomy of international liability. In his first three reports,[32] he addressed the conceptual basis of international liability. He found that

> [t]he regime of liability in respect of acts not prohibited does not detract from the universality of the regime of responsibility for wrongful acts, because the two regimes exist upon different planes. Obligations arising in respect of acts not prohibited are the product of particular 'primary' rules: the violation of these or any other 'primary' rules brings into play the 'secondary' rules of State responsibility for wrongful acts.[33]

Identifying international liability as primary rules provided Quentin-Baxter with 'an iron-clad' separation wall[34] to prevent international liability from 'trespassing into the Commission's topic of responsibility'[35] which dealt exclusively with the secondary rules. In this manner, Quentin-Baxter defended the autonomous status of the topic of international liability *vis-à-vis* that of State responsibility.

Despite its structural advantages, this approach had its Achilles' heel. Quentin-Baxter argued for international liability as primary rules that did not require a wrongful act, that is, State liability *sine delicto*. It meant that States were liable in the event damage occurred. However, States resisted this proposition during the negotiations within the Commission. Treaty practice as well as international judicial practice did not support this idea either.[36] The resistance of States during the negotiation and a paucity of

[31] Ibid., para. 6.

[32] The preliminary report, 1980 (UN. Doc. A/CN.4/334); the second report, 1981(UN. Doc. A/CN.4/346); and the third report, 1982 (UN. Doc. A/CN.4/360 and Corr.1).

[33] The preliminary report of Quentin-Baxter, 1980 (UN. Doc. A/CN.4/334), para. 21.

[34] The second report of Quentin-Baxter, 1981(UN. Doc. A/CN.4/346), para. 15.

[35] Julio Barboza, *The Environment, Risk, and Liability in International Law* (Martinus Nijhoff 2011) 78.

[36] See especially the two surveys of State practice relevant to international liability prepared by the Secretariat in 1985 (UN. Doc. A/CN.4/384) and in 1995 (UN. Doc. A/CN.4/471).

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treaty and judicial practice eventually prompted the second special rapporteur Barboza to completely abandon the effort to codify or progressively develop a general rule on State liability *sine delicto*. Barboza further developed the concept of international liability along two different paths. On the one hand, State liability *sine delicto* gave way to State liability *ex delicto* which requires a breach of the obligation of prevention and is triggered by environmental damage. As a consequence, State liability *ex delicto* fell within the scope of State responsibility. On the other hand, State liability was substituted with what is known as the civil liability system, which imposed liability primarily on the operators; this latter path was afterwards further developed into a notion of 'allocation of loss'.

1.3.2.2 State Liability *Ex Delicto*'s Falling within the Scope of State Responsibility

The understanding of State liability changed within the Commission; the ILC moved from State liability *sine delicto* to State liability *ex delicto*.[37] That change was mainly due to the different views on the relationship between prevention and liability among the three special rapporteurs. As described by Barbazo,[38] Quentin-Baxter did not want the topic of international liability to be assimilated into State responsibility. He therefore broadened its scope to include obligations of prevention from the very beginning. As to the relationship between prevention and liability, Quentin-Baxter saw them as 'compound primary obligations'. He envisioned State liability as 'a continuum' that started with prevention and minimization and then ended with compensation. In addition, Quentin-Baxter adopted a 'soft approach' with respect to the legal effect of the obligations of prevention and international liability (the obligation of reparation).[39] In his view, failure to take preventive measures, such as providing information, 'shall not in itself give rise to any right of action'.[40] In other words, the prevention obligations were just 'soft' obligations. Consequently, no legal consequence ensued from their

[37] The phrase 'liability for wrongful acts' appeared in the tenth report of Barboza,1994 (UN. Doc. A/CN.4/459) for the first time.

[38] Julio Barboza, *The Environment, Risk, and Liability in International Law* (Martinus Nijhoff 2011) 78; see also the fourth report of Quentin-Baxter, 1983 (UN. Doc. A/CN.4/373 and Corr.1 and 2.), para. 39.

[39] The fourth report of Quentin-Baxter, 1983 (UN. Doc. A/CN.4/373 and Corr.1 and 2.), para. 43.

[40] The third report of Quentin-Baxter, 1982 (UN. Doc. A/CN.4/360 and Corr.1), para. 8 and section 2 of the schematic outline.

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breach. Similarly, reparations should be negotiated between States in accordance with their 'shared expectations'.[41] Quentin-Baxter's approach attracted criticism. La Fayette stated that the rule prescribing prevention obligations is not soft but hard law.[42] Graefrath contended that the consequence of a breach of prevention obligations by States fell under the law of State responsibility. For him, 'it seems clear that with the growing precision of preventive rules, i.e. specifying international obligations of States, the whole subject comes closer and closer to international responsibility'.[43]

Like his predecessor, Barboza also envisaged a proper role for prevention within an overall scheme of liability.[44] Yet he disagreed on the effect of a failure to fulfil those obligations. He acknowledged that the consequences of a breach of the obligations of prevention fell within the field of State responsibility:

> Having established the State's obligations of prevention in the ninth report, we must now consider the potential consequences of its failure to fulfil those obligations. Normally, they would be the consequences laid down for a breach in part two of the draft articles on State responsibility [. . .].[45]

With this understanding, Barboza changed from State liability *sine delicto* governed by primary rules to the 'State liability for wrongful acts' governed by secondary rules in his tenth report in 1994.[46] In so doing, the 'iron-clad' separation wall which segregated the topic of international liability from responsibility was demolished. Immediately, doubt about the autonomy of the topic of international liability were revitalized; members of the ILC debated whether it was necessary to separate State

[41] Ibid., section 4 of the schematic outline.

[42] Louise de la Fayette, 'The ILC and International Liability: A Commentary' (1997) 6(3) *RECIEL*, 328.

[43] Bernhard Graefrath, 'Responsibility and Damages Caused: Relationship between Responsibility and Damages' (1984) 185 *RdC*.

[44] See Part II of the 1996 working group commended draft articles. UN Doc. A/CN.4/L.533 and Add. 1. The articles on prevention constitute the main contents of that draft articles. See also the first report of Rao, 1998, UN. Doc. A/CN.4/487 and Add. 1.

[45] The tenth report of Barboza, 1994 (UN. Doc. A/CN.4/459), para. 31. He also said, 'Once consideration of the issue of prevention has been completed, the two types of liability to which our articles would give rise must be considered: State liability for the failure to fulfil obligations of prevention, which constitutes liability for a wrongful act, and the liability in principle of the private operator.' It seems that Barboza used the phrases 'State liability for wrongful acts' and 'State responsibility' interchangeably.

[46] The tenth report of Barboza, 1994 (UN. Doc. A/CN.4/459), para. 5.

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liability from responsibility if both deal with the legal consequence of internationally wrongful acts – the breach of primary obligations.

When the third special rapporteur Rao took on the topic in 1998, he started with the work on the subtopic of obligations of prevention and completed it with the 'Draft articles on Prevention of Transboundary Harm from Hazardous Activities' in 2001 ('the 2001 ILC Draft Articles on Prevention'). Yet the work on State liability was never resumed. Actually, both Rao and States saw State liability as a wrong path undertaken.[47] It is ironic to recall that by extending the scope to include the obligations of prevention, the first special rapporteur intended to reinforce the autonomous status of the topic of international liability, yet, eventually it was exactly due to the development of the obligations of prevention which made State liability as an autonomous concept redundant. Ultimately, the ILC reached no conclusion about the rule of State liability in general terms, be it *sine delicto* or *ex delicto* or as a whole. After more than thirty years, the work on the liability aspect of the topic seems to have gone back to its point of departure.

1.3.2.3 From State Liability to Liability of the Operator and Further to 'Allocation of Loss'

Until the sixth report of Barboza in 1990, States were the only subject of international liability in the discourse of the ILC. From then on, international liability of the private operator coexisted with State liability in the ILC's reports on the topic. The sixth report introduced a significant change, by including for the first time a new chapter titled 'Civil Liability'. It split the avenues for obtaining remedy for international environmental damage between the domestic and international levels.[48] In doing so, the ILC established a two-track international liability system, namely civil liability and state liability. The line of civil liability eventually evolved into a new concept of 'allocation of loss', as set out in the 2006 Draft Principles on the Allocation of Loss in the case of

[47] The first report (subtopic on international liability) of Rao, 2003 (UN. Doc. A/CN.4/531), paras. 16–19.

[48] To illustrate these two levels' remedy mechanism, see chapter III of the ILC's draft articles on international liability proposed by the 1996 Working Group (UN. Doc. A/CN.4/L.533 and Add. 1): Article 20 (non-discrimination) set out the minimum requirement of the State of origin to secure domestic means for remedies for transboundary harm, while Articles 21 (nature and extent of compensation or other relief) and 22 (factors for negotiations) pinned down the inter-state negotiations.

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Transboundary Harm Arising Out of Hazardous Activities (the '2006 ILC Draft Principles').

Instead of setting model rules on civil liability at the international level that call for harmonization of liability rules at the national level, the 2006 ILC Draft Principles allocate loss among different actors involved in the operations. These rules represent a new way of thinking. The core of this new idea of 'allocation of loss' embraces one objective and two essential elements. The objective of ensuring prompt and adequate compensation for innocent victims serves as the justification for the ILC's turning away from liability and moving towards the concept of allocation of loss. The two essential elements are: First, 'any scheme of allocation of loss should place the duty of compensation first on the operator'.[49] Second, States still play an important role in the allocation of loss scheme, even when no internationally wrongful act is attributable to them. Principle 4 of the 2006 ILC Draft Principles reflects this idea and sets out a model of allocation of loss. This provision suggests that a State regime for ensuring prompt and adequate compensation for victims should include the imposition of liability on the operator, the requirement of financial security of the operator and the establishment of industry-wide funds. In addition, the State should ensure the availability of additional financial resources. However, neither the idea of allocation of loss nor the model depicted in Principle 4 was completely new in the 2006 ILC Draft Principles. In effect, Principle 4 of the 2006 Draft Principles is based on the models of allocation of loss in the existing civil liability treaties.[50]

In essence, the 2006 Draft Principles promulgate a regime on allocation of loss consisting of civil liability of the operator, which is reinforced by a financial security mechanism and supplemented by additional financial sources. Therefore, the concept of allocation of loss does not contradict the notion of liability of the operator. On the contrary, the latter serves as the fundamental element of the former. However, the

[49] The second report (subtopic on international liability) of Rao, 2004 (UN. Doc. A/CN.4/540), para. 36(5). It is noted that this position was first established in the Working Group on International Liability for Injurious Consequences Arising out of Acts Not Prohibited by International Law, 2002 (UN. Doc. A/CN.4/L.627), para. 10. It was stated that 'the operator, having direct control over the operations, should bear the primary liability in any regime of allocation of loss'.

[50] Rao conducted a sectoral and regional analysis of the existing civil liability treaties in his first report, and based on that analysis he discerned some common features of the models of allocation of loss.

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newly added dimensions – financial security and other supplementary financial source mechanisms that enable the involvement of other actors including the State – signal a conceptual evolution from civil liability to allocation of loss. With this concept of allocation of loss adopted in the 2006 Draft Principles, the conceptual evolution of 'international liability' during a period of nearly three decades (1978–2006) finally came to an end.

However, Principle 2 of the 2006 Draft Principles, which defines environment broadly, opens possibilities for further developments of environmental liability regimes.[51] Indeed, three related provisions of the 2006 Draft Principles – Principle 2, paragraph (a)(iv) and (v), Principle 3, paragraph (b) and Principle 5 entitled 'response measures' – hint at a new approach to environmental liability. Differing from the regimes on civil liability or allocation of loss where focus is on the compensation of the victim, the promising new approach would deal specifically with the damages to the environment *per se*, where the emphasis is on the restoration or reinstatement of the damaged environment.

1.3.2.4 Conclusions

In summary, while the initial objective of the work by the ILC on the topic of international liability was to codify and progressively develop general rules on State liability *sine delicto*, most of the work focused on obligations of prevention. The development of rules concerning obligations of prevention in turn played a critical role in transforming State liability *sine delicto* into State liability *ex delicto*, which however fell within the scope of State responsibility. Simultaneously, it is considered that the operator should primarily assume liability. From there, a further conceptual evolution was made as a result of a new way of thinking. The concept of 'allocation of loss', which centred on the liability of the operator but was reinforced by financial securities and supplemented by additional financial sources, was accepted in the final result of the work on the topic of international liability, namely the 2006 ILC Draft Principles.

Through historical reflection on the work of the ILC as explained earlier, the meaning of the concept of international liability is clearer. Strictly speaking, international liability is not a specific but a generic concept that

[51] The third report (subtopic on international liability) of Rao, 2006 (UN. Doc. A/CN.4/566), para. 14.

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embodies both primary and secondary rules and covers both States and private entities. When referring to international liability, it could mean either State liability *sine delicto* or State liability *ex delicto* or liability of the operator in light of specific civil liability treaties. Firstly, State liability *sine delicto* governed by primary rules does exist in international law. Yet State liability *sine delicto* in international law is more an exception than a rule. The Convention on International Liability for Damage Caused by Space Objects is the only example of this kind.[52] Secondly, owing to its entry into the field of the secondary rules, State liability *ex delicto* falls under the scope of State responsibility. However, there are subtle differences between these two concepts in the field of international environmental law. This point will be clarified in Section 8.2.2. Thirdly, civil liability under international law is imposed on operators by specific treaties, which normally is implemented within national judicial systems. Treaty practice, however, shows that liability of the operator is normally reinforced and supplemented by other compensation mechanisms such as compulsory insurance and compensation funds. This helps to transform the civil liability regime to a regime on allocation of loss.

1.3.3 Participants in DSM

Participants in DSM can be categorized differently according to different criteria. Based on the nature of the subjects, the participants in DSM can be grouped as: ISA, State and private entities. Yet, based on the roles the subjects play, participants in DSM can be grouped as: ISA as the regulator at the international level, the sponsoring State as the regulator at the national level and as an assistant to ISA at the international level and the contractor, which includes ISA as the contractor (the Enterprise), State as the contractor and the private contractor. The two methods of categorization of the participants in DSM can be combined and illustrated as follows:

I. The ISA:

- I (a) The ISA as the regulator at the international level
- I (b) The ISA as the contractor (the Enterprise)

[52] Adoption on 29 November 1971, entry into force on 1 September 1972. Controversially, the *ex gratia* payment by States in environmental accidents might also be considered as State practice of State liability *sine delicto* in this respect.

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II. State:

  II (a) The sponsoring State as the regulator at the national level and as an assistant to the ISA at the international level
  II (b) State as the contractor

III. Private entity as the contractor

This book adopts the second method of categorization, namely, to group the participants in DSM into three subcategories on the basis of their different roles. They are: the ISA as the regulator, the sponsoring State as the regulator and the contractor. In this book, the first two categories are referred to as the ISA and the sponsoring State, respectively.

1.3.4 International DSM Legal Regime

As indicated earlier, this book takes a positivist approach. Thus, it is important to identify clearly the positive laws as the sources of obligations and the legal bases for establishing and implementing liabilities of the participants in DSM. These laws are referred to under a broad label of 'international DSM legal regime'. Thus far, the DSM legal regime at the international level is composed of:

(a) The UNCLOS, including particularly Annex III (basic conditions of prospecting, exploration and exploitation), IV (Statute of the Enterprise) and VI (Statute of the International Tribunal for the Law of the Sea);
(b) The 1994 Agreement;
(c) The rules, regulations and procedures of the ISA adopted in accordance with the UNCLOS, including: Exploration Regulations, Recommendation of Guideline issued by the LTC;[53] and
(d) The Exploration Contracts.[54]

Beyond the international DSM legal regime identified earlier, customary international law and the general principles of law compatible with the UNCLOS could also serve as legal bases for the international environmental obligations and liabilities of the sponsoring State and the ISA.[55] Moreover, considering that the contents of legal sources (c) and (d) keep

[53] Article 38, Annex VI to the UNCLOS.
[54] The terms of contracts are applicable concerning activities in the Area in matters relating to those contracts. Ibid.
[55] Article 293(1), UNCLOS.

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changing, the international DSM legal regime is thus of an evolving character. In addition, the Seabed Disputes Chamber of the International Tribunal for the Law of the Sea (SDC) can provide authoritative interpretation of the international DSM legal regime through delivering advisory opinions. To date, there has been one such case: Advisory Opinion of 1 February 2011 on 'Responsibilities and Obligations of States Sponsoring Persons and Entities with respect to Activities in the Area' (the '2011 Advisory Opinion of the SDC').

1.4 Validity and Limits of the Book

This is qualitative research. It aims at identifying the applicable legal rules concerning the marine environmental protection of participants in DSM and interpreting their meanings. The book is valid on the condition that DSM is considered as lawful activities under both the DSM legal regime and general international law. Suppose that either general international law or the DSM legal regime were to impose a prohibition or moratorium on DSM in the future, this book would no longer be valid. As to the limits of this book, there are mainly three. First, considering that the subject matter of the marine environmental protection in DSM is very much a scientific issue, and that one main theme of this book is that the legal regime for the marine environmental protection in DSM should be based on sound marine scientific knowledge, the survey of scientific documents concerning marine environmental protection in DSM is very limited. Secondly, this book relies heavily on the ISA for documents, data and information. Thirdly, owing to the fact that commercial exploitation in the Area is yet to commence, practice concerning the topic of environmental protection in DSM is scarce. In spite of these limits, this book is of both theoretical and practical significance because it detects and clarifies the fundamental legal bases for the discussion about the issue of 'marine environmental protection in DSM'.

1.5 Structure and Outline of the Book

The next chapter of the book elaborates on the principle of common heritage of mankind (CHM): the fundamental theoretical basis upon which the current and future DSM legal regime is built. To begin with, it identifies eight elements of the principle of CHM in DSM. Then, the principle is compared with related concepts in other contexts. Thereafter, it zooms in the environmental aspects of the principle, deliberating over

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the *erga omnes* nature of international environmental obligations at the conceptual level and the critical role played by marine sciences at the operational level of environmental protection in DSM. The remaining chapters can be grouped into two parts: Chapters 3 and 4 are the obligation part while Chapters 5–8 the liability part.

Chapter 3 enquires into the nature, composition and environmental mandates of ISA. It gives an overview of the functioning of the ISA since its operation in 1996, in particular, it identifies the problems faced by its organs in practice. Thereafter, it reveals how the ISA discharges its environmental mandates by exercising powers and fulfilling obligations: it analyses its powers to adopt regulations, issue recommendations on environmental impact assessments (EIAs) and safeguard the marine environment when administering activities and its obligations to apply the precautionary approach, respond to environmental emergency and promote and encourage marine scientific research. Finally, it singles out the main features in the drafting process of Exploitation Regulations and suggests possible ways for the ISA to overcome the fundamental obstacle for the making and implementation of environmental regulations and standards – gaps in marine scientific knowledge.

Chapter 4 continues to examine international environmental obligations in DSM of other participants. At the beginning, it explains about the sponsoring State's legal status and roles in the DSM legal regime. Then, Section 4.2 elaborates on international environmental obligations of the sponsoring State: it focuses on its obligation of prevention, the obligation to apply the precautionary approach, the obligation concerning environmental impact assessment and the obligation to cooperate. Analyses in this section draw on legal bases of both the *lex specialis* of DSM regime and general international (environmental) law. The examination shows in what circumstances and how obligations under the *lex specialis* of DSM regime are consistent with or deviate from those under general international (environmental) law. Mostly, discussions over relevant general international (environmental) law in this section could apply by analogy to the ISA and also serve as a reference point for the contractor. Section 4.3 investigates international environmental obligations of the contractor. It covers the obligations to conduct EIA, prepare and respond to environmental emergency, environmental monitoring and management and apply the highest environmental standards. In contrast with Section 4.2, analysis in this section is based only on the *lex specialis* of DSM regime. Additionally, it refers frequently to draft Exploitation Regulations and Standards and Guidelines to be adopted by the ISA.

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As to the liability part, it is noted that the reflection on the work of the ILC on the topic 'international liability' in this Introduction chapter provides a conceptual background against which the international environmental liability regimes in DSM are analyzed. The scope of the analysis includes the following three dimensions. First, the analysis covers only DSM activities; activities other than DSM in the Area are excluded. DSM activities by their nature are 'hazardous activities not prohibited by international law', which falls into the coverage in the ILC's work on international liability. Secondly, the analysis deals in general with situations where the environmental effects of DSM activities take place in the Area or the high seas which are regarded as global commons. The situation that DSM activities conducted in the Area (threaten to) cause damage to a coastal State is excluded.[56] Thirdly, the analysis focuses primarily on damage to the marine environment *per se*. It is noted that, initially, international environmental liability regimes provide remedies only to victims who suffer damages through the impairment of the environment; damages to the environment *per se* are included alongside the traditional forms of damage at a later stage,[57] and examples where environmental damage refers exclusively to damage to the environment *per se* are rare. A comparative reading of the definitions of damage in those environment-related liability instruments will reveal this point. In this respect, La Fayette made a keen observation:

[56] This is however an exceptional situation merits special note. Pursuant to Article 142(3) of the UNCLOS, that coastal State is entitled to take measures consistent with the relevant provisions of Part XII as may be necessary to prevent, mitigate or eliminate grave and imminent danger. However, Article 142(3) does not indicate whether that coastal State is entitled to seek remedies when damages have been incurred, and if so from whom. The contractor? the sponsoring State? or the ISA? A further question is: Should this situation fall into a transboundary context? Or a global commons context?

[57] Examples of international instruments which cover damages to the environment itself include: Article 2(7)(c) and (d) of the 1993 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (Lugano); Article 2(c)(iv) and (v) of the Basel Protocol on Liability and Compensation for Damage resulting from Transboundary Movements of Hazardous Wastes and their Disposal (adopted at the Fifth Conference of Parties (COP-5) on 10 December 1999); Article 1(6) of the 1992 Protocol to the Civil Liability Convention and the IOPC Fund Convention; Article 23 of the1998 ILC Resolution 67(2) on Responsibility and Liability under International Law for Environmental Damage ('environmental regimes should separately from or in addition to the reparation of damage relating to death, personal injury or loss of property or economic value'.); Article 2(b) of the 2001 Draft Articles on Prevention ('harm' means harm caused to persons, property or the environment); Article 2(a)(iv) and (v) of the 2006 Draft Principles by the ILC.

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> It appears that definition of "environmental harm" or "pollution damage" fall into two main categories: (i) those that focus on the traditional heads of damage in national tort law, such as personal injury, property damage, and economic loss; and (ii) those that focus on damage to the environment *per se*.[58]

She further indicated that most international liability regimes fall into category (i) and the regimes for Antarctica and deep seabed mining fall into category (ii). Therefore, in reality, the term environmental damage is used in two different senses: 'damages through the environment' and 'damages to the environment'. This book discusses 'environmental damage' in the latter sense.

Chapter 5 is dedicated to the definition and measure of 'environmental damage' which are related to the issues of environmental obligations and liabilities. Indeed, this book revolves around 'environmental damage' as the principal objective of environmental obligations is to prevent environmental damage, while that of environmental liabilities is to provide remedies to environmental damage. In particular, Chapter 5 is an integral part of Chapters 6 and 8 since environmental damage is a common triggering element for the establishment of international environmental liabilities of the contractor, the sponsoring State and the ISA. Following the line of the ILC's work on international liability, it is believed that primary liability should be imposed on the operator who has the direct control over the DSM activities. Thus, the international environmental liability of the contractor is dealt with first.

Chapter 6 examines the theoretical basis, establishment and invocation of international environmental liability of the contractor. It also covers remediation of environmental damage and special issues of the Enterprise as contractor and States as contractors. Furthermore, as the reflection on the ILC's work on international liability has also shown, schemes on allocation of loss function as reinforcement or supplementary mechanisms to the liability of the operator. Thus, Chapter 7 discusses compulsory insurance or financial security and trust fund for marine environmental damage as the possible schemes on allocation of loss in the context of DSM. These are two alternatives to liability of the contractor. In addition, Chapter 7 considers a third alternative – the administrative approach to the liability of the contractor.

[58] Louise de La Fayette, 'The Concept of Environmental Damage in International Liability Regimes', in Michael Bowman & Alan Boyle (eds.), *Environmental Damage in International and Comparative Law* (OUP 2002) 181.

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Chapter 8 scrutinizes international environmental liabilities of the sponsoring State and ISA. With respect to the liability of the sponsoring State, as has been explained in the reflection on the ILC's work, once entering into the field of secondary rules, State liability falls within the scope of State responsibility. For this reason, the general rules on State responsibility as reflected in the 2001 ILC Articles on State Responsibility (ASR) are employed in analysing the establishment, content and invocation of the liability of the sponsoring State. Nevertheless, the subtle differences between the notions of 'State liability' and 'State responsibility' will also be displayed. With respect to international environmental liability of the ISA, the establishment of the international environmental liability of the sponsoring State can be applicable *mutatis mutandis* to the ISA by analogy. Yet, a special liability issue that is involved concerning the ISA but not the sponsoring State will be discussed in detail. This is the question of attributing liability to member States. Finally, Chapter 8 also touches on the problem of invocation of liability of the ISA.

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