International environmental obligations and liabilities in deep seabed mining

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Conclusions

Like the 2011 Advisory Opinion of the SDC, this research interpreted the international environmental obligations and liability of the sponsoring State.[1] For the most part, the author concurs with the SDC's opinions, but is critical of a few. Beyond the 2011 Advisory Opinion of the SDC, this research also enquired into the international environmental obligations and liabilities of two other categories of participants in DSM, namely the ISA and the contractor. The main points of this research are highlighted below.

1 The principle of CHM and roles of the participants in DSM

The principle of CHM is the basic tenet of the DSM legal regime which requires that DSM serve community interests. One specific manifestation of this idea is environmental protection in DSM as a community interest (Chapter 1). The author argues that the principle of CHM is not and will not become outdated not only because of Article 311(6) UNCLOS, but more importantly because of the discernible continuous trend of community interests in international law and the global value of environmental protection. This proposition means that the overall objective of this research is to ascertain how the participants in DSM operationalize the principle of CHM by exercising powers and rights, complying with obligations, and assuming liabilities. It also means that political as well as legal discourses over the future development of the DSM legal regime in all aspects must be subject to the community interest test.

The ISA is an institutional arrangement for safeguarding the common heritage of mankind. Broad regulatory powers have been conferred on the ISA, with particular regard to protection of the marine environment. The analysis in Chapter 2 demonstrates that the ISA is empowered to lay down regulations, grant licences for DSM, review the implementation of plans of work, issue orders in the event of an environmental emergency, conduct inspections, impose a penalty on the contractor, and institute legal proceedings before the SDC. It also shows that the ISA is entitled to issue recommendations by way of guidance and promote marine scientific

1 Although the questions submitted to the SDC were not confined to environmental aspects, the SDC dealt predominantly with the environmental obligations and liability of the sponsoring State.

research. These powers can be employed by the ISA to discharge its function concerning environmental protection in DSM. On the basis of these findings, the author argues that the regulatory system overseen by the ISA can be regarded as international administration because the ISA exercises its regulatory powers not through member States but directly *vis-à-vis* the contractor at the international level. Nevertheless, as also shown in Chapter 2, the broad powers conferred on the ISA stand in contrast to the limited resources in terms of personnel, finance, technology, and facilities at the disposal of the ISA. Thus, although the ISA can perform international administration on its own in legal terms, in reality, it would not be easy to do so on all occasions because of its limited practical abilities. Thus, the ISA is paradoxically a strong and a weak international administrator. The author would like to note that the ISA is not a world government but at best an international organization the inception and functioning of which rely heavily on the support of its member States, in particular, the sponsoring State. This necessitates that the sponsoring State should play a certain role in the regulatory system.

The DSM legal regime embodies a sponsorship mechanism which obliges the sponsoring State to assist the ISA in regulating the contractor at the international level via the establishment of a regulatory system concerning DSM at the national level. The author thus argues that the DSM legal regime embodies a two-track regulatory system: the ISA plays the primary role in the international regulatory system and the sponsoring State plays a role in both the international and national regulatory systems. National legislation on DSM is of significance nationally and internationally: it constitutes the legal basis for the national regulatory system; at the same time, it is a means to implement international obligations of States (Chapter 8). Furthermore, the two-track regulatory system gives rise to problems such as duplicate regulatory burden and liabilities of the contractor. Therefore, the coordination or division of competencies between the ISA and the sponsoring State is necessary. The regulatory system at the international and national levels should be examined comparatively and be perceived as a whole.

The contractor is the operator of DSM activities. The contractor is the regulated party with the ISA and the sponsoring State functioning as two regulators. There are three different categories of actors which may serve as the contractor: private or public funded entities, States, and the Enterprise (of the ISA). The author argues that, despite their different nature, contractors must comply with the international (environmental) obligations on an equal footing since the DSM legal regime adopts 'the market-oriented approaches'[2] which imply equal treatment among contractors. Specifically, the Enterprise, albeit an organ of the ISA, possesses an independent international and national legal personality, and thus can fulfil obligations and

2 Preamble, para. 5, the 1994 Implementation Agreement.

assume liability independently from the ISA as the regulator. In a similar vein, it should be noted that States as contractors cannot invoke immunities before international administrative or judicial institutions.

2 The role of marine scientific knowledge and the response to its limitations

The author argues that marine scientific knowledge serves as the factual basis upon which legal norms concerning marine environmental protection in DSM are formulated, interpreted and implemented. From Chapter 2, it follows that the ISA has to date focused primarily on the scientific and technical work necessary to carry out its functions. It must be noted that the fulfilment of the ISA's function concerning marine environmental protection relies particularly heavily on marine scientific knowledge. It is anticipated that when DSM enters into the exploitation stage, marine scientific knowledge will play an even larger role. Correspondingly, the LTC of the ISA will need to assess marine scientific knowledge on a continuous basis and the Secretariat of the ISA must also improve its scientific and data management abilities. Similar to the ISA, the sponsoring State must also rely on marine scientific knowledge to implement its international environmental obligations and to establish its national regulatory system. For the contractor, marine scientific knowledge as well as mining technologies and facilities are the keys to fulfilling its environmental obligations in DSM.

Also, both the establishment of international environmental liabilities in DSM and remediation rely on marine scientific knowledge. First, there is a scientific definition for the concept of 'marine environment'. Second, the establishment of a marine environmental baseline and the assessment of the natural or human-made variations of the environment which are critical steps for identifying marine environmental damage are matters of scientific work. Third, the proof of causal links between DSM activities of the contractor and marine environmental damage, and between regulatory acts of the ISA and the sponsoring State and marine environmental damage all rely on scientific evidence. Fourth, remediation such as the availability and feasibility of restoration measures has to be determined on the basis of scientific knowledge. In short, environmental obligations and liability are not only legal issues but also very much scientific issues.

Thus, it is evident that marine scientific knowledge plays a prominent role in both the obligations and liability parts of this research. If marine sciences fail or are inadequate, then the substantive content of most of the environmental obligations would become vague and the environmental liability regimes would be difficult to apply. Nevertheless, the current situation is that marine sciences are at the nascent stage of development and that there are still great gaps in marine scientific knowledge.

This raises the question of how to respond to the limitations of marine sciences. Both the obligations and liability parts of this research include

rules (potentially) applicable or suggestions to deal with the problems caused by gaps in marine scientific knowledge. In the obligations part, it was seen that the precautionary principle/approach applies in the situation of 'scientific uncertainty'. The precautionary principle/approach provides general guidance for the policy-maker as well as the operator when science becomes silent or undecided, namely 'precaution' (Chapter 3). In the liability part, it is demonstrated that an administrative approach to the environmental liability of the contractor is suggested. The administrative approach has a lower level of evidential requirement for the establishment of liability, and thus can overcome to some extent the difficulties in establishing the liability of the contractor under the UNCLOS (Chapter 6). However, neither the precautionary principle/approach nor the administrative approach to environmental liability of the contractor denies the role of marine scientific knowledge. Rather, these two approaches constitute attempts to set rules for participants in DSM in the situation when marine sciences reach their limits.

In short, this research has elucidated the legal rules on how the ISA, the sponsoring State and the contractor should act to prevent marine environmental damage and to redress the damaged marine environment with or in the absence of adequate marine scientific knowledge.

3 International environmental obligations

Although playing different roles and of different natures, generally, the participants in DSM must comply with essentially the same international environmental obligations. Most prominently, they are all required to apply the principle of prevention, the precautionary approach, BEPs, to fulfil EIA requirements, and to respond to an environmental emergency. These legal requirements are consistent with the overarching principles of sustainable development which, although not incorporated in, could certainly be inferred from, the DSM legal regime. Through the analysis in Chapter 3, it is seen that the principle of prevention and the precautionary approach in a context of general international environmental law can fit within the context of DSM in their entirety, while the EIA rules in a transboundary context can only partly be applicable in the Area as global commons.

The principle of prevention is the first principle of international environmental law (IEL) in the sense that all other international environmental rules and principles can be conceived as derivations from or further developments of this first principle. The principle of prevention is now an established customary international rule in IEL. Like any customary international law norm, the principle of prevention evolved in a long formative process: it originated from the 'no-harm principle' initially formulated in the *Trail Smelter* arbitral case between the US and Canada; subsequently, the 'no-harm principle' was endorsed and developed into Principle 21 of the 1972 Stockholm Declaration and Principle 2 of the 1992 Rio Declaration; thereafter, the ILC further developed 'Principle 21/2' into the 'principle of

prevention'. According to the principle of prevention, States should exert their best efforts to take all necessary measures to prevent detrimental effect on the environment during the conduct of activities. This implies a balancing process, with environmental protection as a restriction to economic development. What the obligation of prevention requires is not to guarantee the non-occurrence of environmental damage, but to endeavour to avoid its occurrence. Namely, the obligation of prevention is not an obligation of result but an obligation of conduct. In determining whether States have fulfilled the obligation of prevention, a standard of due diligence is employed. For that reason, the obligation of prevention is also called the obligation of due diligence. Yet, due diligence is a variable concept. The core of the standard of due diligence is the proportionality element: the higher the level of risks the activity involves, the more stringent the level of care that is required during the conduct of the activity. With the advancement of science and technology, the level of care during the conduct of the activity should also be enhanced.

The precautionary approach is exactly such a development of the principle of prevention as a response to the failure of the latter in a situation of scientific uncertainty. The application of the principle of prevention is conditioned on the predictability of environmental damage or risks; yet, the precautionary approach applies when science reaches its limits, namely in the absence of precise scientific evidence on the detrimental effect of a certain activity. Whereas the principle of prevention is based on reactive thinking, the precautionary approach requires proactive thinking. The implementation of the precautionary approach inevitably involves a value judgement which would be based on social, economic, and political considerations, common sense or environmental ethics. Having to resort to a value judgement is the distinctive feature as well as the significance of the precautionary approach in comparison with the well-established principle of prevention. Yet, the precautionary approach is subject to different interpretations: some consider a precautionary approach as being tantamount to a prohibition on activities in the situation of scientific uncertainty, some consider a precautionary approach as not being a prohibition on all activities in the situation of scientific uncertainty, while others consider a precautionary approach as a requirement of the operator to take actions in the situation of scientific uncertainty. These various interpretations imply that the specific contents of the precautionary approach are vague, which contributes to the controversy on its legal status. Although incorporated in a large number of treaties and instruments and invoked before international judicial institutions, the question of whether the precautionary approach has gained a fully-fledged customary international law status remains unsettled.

From a practical point of view, the requirement concerning EIA is the most significant environmental obligation as it is the most commonly-used practical tool or procedure to implement both the principle of prevention and the precautionary approach. This argument is valid in both the

transboundary and global commons contexts. However, it should be noted that EIA in a global commons context differs from that in a transboundary or national context in respect of the relationship between the subjects and the procedural requirements. EIA in the context of DSM is similar to EIA in the Antarctic since the Area and the Antarctic can both be conceived as global commons. In both contexts the international organization (the ISA or ATCM) plays a central role in providing guidance to the operator, exchanging information between States and making decisions. Yet, the ISA plays a more significant role in the context of DSM than the ATCM does in the Antarctic.

These principles and rules are binding not only on States but on all participants in DSM since they are endorsed in the DSM legal regime. Only if all participants in DSM diligently observe their international environmental obligations emanating from these principles and rules can the common goal of marine environmental protection in DSM be achieved. However, one should also bear in mind that a rule or principle can have different meanings when it is perceived from different perspectives by different viewers according to their different roles. Taking the obligations in the event of an environmental emergency as one example: the contractor is obliged to report an accident to the ISA and to take measures in accordance with an emergency order; the ISA is obliged to circulate the information to States, to decide on the responding measures, to issue emergency orders, and to take measures when necessary; while the sponsoring State is only obliged to ensure the compliance of the contractor with the ISA's emergency order. Taking EIA as another example: the contractor is obliged to conduct different kinds of EIAs during the process of the formulation and implementation of plans of work for DSM; while the ISA and the sponsoring State are obliged to review the EIA reports of the contractor and to establish and maintain monitoring programmes at the international and national levels, respectively.

Lastly, the international environmental obligations in DSM are not only obligations 'of all (participants in DSM)' but also obligations 'to all' which are the commonly called 'obligations *erga omnes*'. As stated in Chapter 1, it is now generally acknowledged that environmental protection is a common interest of the international community, that the problem of environmental degradation such as climate change and loss of biodiversity has become a common concern of mankind. Correspondingly, obligations relating to issues of common interests and common concerns are *erga omnes* in nature. Marine environmental protection in DSM is just such a case in point: the international community is considered as having common interests in marine environmental protection in DSM, thus international environmental obligations in DSM are obligations *erga omnes*. Additionally, the CHM status of the Area and its resources further strengthens this argument. The *erga omnes* nature of these obligations has an influence on the question of who is entitled to invoke liabilities of the contractor, the sponsoring State and/or the ISA. Also, the *erga omnes* nature of these obligations might serve as

a basis for an argument of broader public participation in the formulation, implementation, and enforcement of these obligations.[3]

4 International environmental liabilities

The analysis of the international environmental liabilities of the contractor, the ISA and the sponsoring State in Chapters 5 and 7 follows the same pattern: each covers the establishment, the content and forms (remediation), and the implementation of liability.

The conditions for establishing the international environmental liabilities of the participants in DSM are similar. To establish these liabilities, one needs to define and measure environmental damage – the common triggering element – determine internationally wrongful acts on the part of the contractor/the sponsoring State/the ISA, and prove the causal link between the wrongful acts of participants and the environmental damage. Only if these three conditions are satisfied cumulatively can the liabilities of the participants be established. In practice, however, there are formidable difficulties in satisfying each of these three conditions.

The content and forms of the international environmental liabilities of the participants in DSM, that is remediation, are also similar. Article 22, Annex III, UNCLOS states that 'liability in every case shall be for the actual amount of damage'. Thus, the key is the identification and measurement of environmental damage. Similar to many other contexts, the detrimental impact on the marine environment has to cross a certain threshold in order to be identified as 'marine environmental damage' in the context of DSM. As to the question of how to measure environmental damage, drawing mainly on the practical experience of the IOPC and UNCC compensation regimes (Chapter 4), it is suggested that environmental damage should be measured primarily in the form of the costs of taking preventive measures, restoration measures, etc. In a situation where damage is irreversible and reinstatement impossible, one could refer, for example, to the contingent valuation method to assess pure/interim environmental damage. As to the forms of liability, drawing mainly on the remediation framework in the 2004 ELD, the author suggests that environmental liability should first take the form of restoration of the damaged environment to its baseline condition. If that is not possible, then a substitute or compensation should be provided. These three categories of environmental remediation are called primary remediation, complementary remediation and compensatory remediation,

3 This argument can also base itself on the idea of the international community as a whole. However, at this time there are controversies over the existence of an international community and its components. Some acknowledge the existence of an international community, while others deny it; some contend that the international community is composed of States only, while others claim that besides States, it comprises also individuals and entities.

respectively. In addition, the author notes that it is difficult to apply the full reparation principle in environmental liability regimes since it is, on a practical level, difficult to measure environmental damage with preciseness. Lastly, as Boyle observed, 'the international law of remedies for breach of obligation has not yet caught up with the expansion of international legal commitments to the protection of the environment'.[4] Indeed, remediation for the damaged environment also faces practical difficulties. In this sense, environmental protection legal regimes should place an emphasis more on prevention (of the occurrence of environmental damage in the obligation part) rather than remediation (of the damaged environment in the liability part).

As to the implementation of liabilities, the specialized dispute settlement mechanisms stipulated in Section 5, Part XI, UNCLOS are of utmost importance. In particular, Article 187 UNCLOS confers compulsory jurisdiction on the SDC to deal with disputes relating to DSM.[5] The DSM legal regime is unique because of the special geographical scope – the Area as global commons, the internationalization of DSM, and the special institutional arrangement. These features have impacts on the issue of the implementation of international environmental liabilities in DSM. This research focused on the question of who is entitled to invoke liability. The answers on the basis of existing international law are: the ISA and the contractor can invoke the liability of each other since they have legal relations under both Exploration Regulations and contracts. Furthermore, States can invoke liability of the sponsoring State on the basis of either Article 42 (as the injured State) or Article 48 (as a State other than the injured State) of the ILC's 2001 ASR. At the same time, the ISA is also entitled to invoke liability of the sponsoring State in accordance with the DSM legal regime. In the author's view, the ISA's invocation of liability is a better choice. Moreover, with the development of international law, in particular the broader availability of dispute settlement mechanisms in the future, the possibility of the invocation of liabilities for the purpose of common interests by other actors such as individuals and NGOs cannot be excluded.

International environmental liability in DSM is placed primarily on the contractor as the operator. This is a common feature shared by all existing environment-related liability treaties except the 1972 Space Treaty. This argument has its theoretical basis in the polluter-pays principle which requires that the one who has the control over activities ('the operator') should assume primary liability to compensate the victim and/or to restore

4 Alan Boyle, 'Reparation for Environmental Damage in International Law: Some Preliminary Problems', in Michael Bowman and Alan Boyle (eds.), *Environmental Damage in International and Comparative Law* (OUP 2002) 25.

5 On dispute settlement mechanisms under the UNCLOS in general, see Natalie Klein, *Dispute Settlement in the UN Convention on the Law of the Sea* (CUP 2005); on dispute settlement mechanisms relating to DSM in particular, see Linlin Sun, 'Dispute Settlement relating to Deep Seabed Mining: A Participant's Perspective' (2017) 18(1) MJIL 71-94.

the environment when environmental damage occurs. However, international environmental liability of the contractor in the context of DSM differs from liability regimes in existing environment-related liability treaties in two significant aspects. The first aspect is the standard for the establishment of liability. The existing liability treaties adopt the standard of strict liability according to which the operator must be held liable should environmental damage occur. In contrast, the establishment of liability of the contractor in the context of DSM requires three conditions: environmental damage, an internationally wrongful act of the contractor, and a further corollary condition – the causal link between environmental damage and the wrongful act. These three conditions have to be satisfied cumulatively. The second aspect relates to the procedures for the implementation of liability. Under the existing liability treaties, liability of the operator is normally implemented through a judicial or administrative channel within domestic legal systems. In contrast, owing to the internationalization of the DSM regime and, in particular, the specialized dispute settlement mechanisms relating to DSM as stipulated in Section 5, Part XI, UNCLOS, the implementation of international environmental liability of the contractor can operate at an international level. Furthermore, the author disagrees with the SDC where it stated that the sponsoring State must, in accordance with Article 235(2) UNCLOS, make sure that recourse is available within its legal system for prompt and adequate compensation or other relief for environmental damage. It is argued in this research that international environmental liability of the contractor should be implemented at an international level only: a parallel existence of international and national channels for implementation of liability is not desirable since it would erect a hurdle for a unifying application of liability and places an unnecessary burden on the sponsoring State.

International environmental liabilities of the sponsoring State and the ISA as the regulators are independent from the international liability of the contractor. Furthermore, the international liability of the sponsoring State as the regulator is only secondary in comparison with that of the ISA because the international regulatory power is assigned primarily to the ISA.

One special issue relating to the international environmental liability of the ISA was examined. That is, whether and in what circumstances should member States of the ISA be liable for acts of the ISA? In answering these questions, the author referred to general discussions on this issue within international law forums and came to the conclusion that a general 'no-liability' rule[6] exists which, however, allows for exceptions in situations where piercing the organizational veil is possible. These general discussions are valid in the specific case of the ISA.

6 The 'no liability' rule means that member States shall not be liable by reason only of their membership for acts of the international organization. See Article 6 of the 1995 IDI Resolution, and Commentary to Article 62, the ILC's 2011 ARIO.

International environmental liability of the sponsoring State is considered as State liability *ex delicto*. It has a complex relationship with the general rules of State responsibility as depicted in the ILC's 2001 ASR. State liability *ex delicto* falls within the scope of State responsibility since they both are secondary rules. Yet, the author argues that the concept of State liability *ex delicto* as employed in this research should be differentiated from State responsibility since they have different starting points and purposes: the concept of State responsibility is centred on 'internationally wrongful act', in contrast, the concept of State liability in the field of IEL revolves around the element of 'environmental damage'. 'Environmental damage' is a common trigger element for the establishment of environmental liabilities and a determinant for the content and forms of liability. International liability of the sponsoring State can be considered as a *lex specialis* which departs partially from the general rules of State responsibility as depicted in the ILC's 2001 ASR: for matters where the DSM legal regime has specific rules, the application of the general rules is excluded. For matters which the DSM legal regime does not cover, one can fall back on the general rules.

On the basis of a thorough conceptual clarification of the international environmental liabilities of the three categories of participants in DSM in Chapters 5 and 7, the author arrived at the overall conclusion that the role of the liability regimes for marine environment protection in DSM should not be overestimated because of the formidable practical difficulties in the satisfaction of each of these three conditions for establishing liabilities and in identifying and measuring environmental damage. Put more simply, the environmental liability regimes are difficult to apply in practice.[7] This conclusion seems counter-intuitive. Nonetheless, the author by no means intends to deny any value to liability regimes. Just as the commentary reads:

> The problems in constructing a viable regime for the protection of the global commons that incorporates a liability component are, as we have seen, formidable. But the consequences of not fashioning such a regime – and doing it soon – may well constitute the most profound common threat to humanity in the twenty-first century.[8]

One should not forget that the liability regime has preventive, reparative and corrective functions. Even though the latter two functions might not be activated, the very existence of liability regimes could have the function of prevention or deterrence, which is very valuable. Therefore, despite its inherent weakness, the liability regimes in DSM are still needed.

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7 The same conclusion can be found in Jutta Brunnée, 'Of Sense and Sensibility: Reflections on International Liability Regimes as Tools for Environmental Protection' (2004) 53(2) ICLQ 351-367. See also Anne Daniel, 'Civil Liability Regimes as a Complement to Multilateral Environmental Agreements: Sound International Policy or False Comfort?' (2003) 12(3) RECIEL 225-241.

8 Mahnoush Arsanjani and W. Michael Reisman, 'The Quest for an International Liability Regime for the Protection of the Global Commons', in Karel Wellens (ed.), *International law: theory and practice - essays in honour of Eric Suy* (Martinus Nijhoff 1998).

Considering the difficulties in the application of liability, alternatively mechanisms for 'allocation of loss', including compulsory insurance and compensation funds, were explored in Chapter 6. There are two salient features of these alternative mechanisms: they allow for the participation of more actors, and have a direct focus on remediation of the damaged marine environment. These alternative mechanisms might be the direction to take for the future development of the DSM legal regime.

To sum up, in dealing with the issue of international environmental obligations of participants in DSM, the author examined primarily the general principles and rules of IEL. It was found that those general principles and rules are mostly applicable in the context of DSM. In dealing with the issue of international environmental liabilities of participants in DSM, the author made use of the structure of the ILC's 2001 ASR. However, it is emphasized that the author employed the concept of 'liability' throughout this research which was distinguished from the concept of State responsibility. DSM is a specific category of 'activities not prohibited by international law'. For this category of activities, the focal point of the legal regime is preventing and redressing the 'injured consequences' rather than detecting and correcting the 'wrongfulness of the act'. Although the ILC discontinued its efforts to formulate general rules of international liability as opposed to those of State responsibility, the different rationales underlying the concepts of liability and State responsibility remain. A major problem with the SDC's 2011 Advisory Opinion was that the SDC completely followed the logic of State responsibility. Although the SDC identified (environmental) damage as a constituent element for establishing (environmental) liability, it did not give centrality to the element.[9] In a sense, the whole research revolves around the concept of environmental damage – prevention of environmental damage in the obligations part and remediation for environmental damage in the liability part.

5 Final observations about the future development of the DSM legal regime

Lastly, the author would like to make some observations about the future development of the DSM legal regime on the basis of this research. The author has identified three points that are likely to be the most prominent in the future.

First, in the future, the ISA's power relating to environmental protection will focus less on endorsing general environmental principles and rules than on setting and ensuring compliance with specific environmental standards. As is indicated in the introductory Chapter, DSM is now in a crucial

9 See explanatory notes on the term of 'liability' in the introductory Chapter and section 2.2 of Chapter 7.

transitional period moving away from the exploration to the exploitation stage. With the anticipation of soon starting the exploitation stage, the ISA is undertaking the task of developing a set of Exploitation Regulations. As is shown in Chapter 2, the Exploitation Regulations (environmental aspects) would only lay down principles or rules at a highly abstract level which, if applied in practice, would need to be operationalized by technical guidance, guidelines and recommendations. In effect, the further DSM advances, the more intense the need for specific (environmental) standards will be.

At the same time, the ISA will increasingly feel the need to justify its authority in response to questions about the legitimacy of international environmental governance in DSM. As Bodansky argued, the issue of legitimacy would arise when authority is exercised at the international level by institutions,[10] and the stronger the institution, the greater the concern about its legitimacy.[11] In the specific case of DSM, the ISA will inevitably encounter a problem with legitimacy since the ISA is an international institution empowered to directly control and manage DSM *vis-à-vis* the contractor, and the further DSM advances, the greater authority the ISA will exercise. Then the question will be: are there ways to help make the ISA 'resilient to claims of illegitimacy'?[12] The author, concurring with Bodansky, notes that a general consent of States will not be sufficient. The ISA would have to resort to public participation as well as the expertise of marine scientists as justifications for international environmental governance in DSM.[13] In effect, as demonstrated in Chapter 2, the ISA has already given special attention to the involvement of stakeholders in the drafting process of the Exploitation Regulations. The author also suggests in Chapter 2 that the LTC of the ISA should explore new ways to assess marine scientific knowledge on a continuous basis. The author notes here that seeking experts' assistance is not only necessary on a practical level for fulfilling the ISA's mandate relating to marine environmental protection but will also serve as a relatively objective justification for the ISA's exercise of authority.

In short, future concerns for international environmental protection in DSM will include not only the substantive content of environmental standards and their compliance but also how environmental standards are made within the ISA and implemented or enforced by the ISA.

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10 Daniel Bodansky, 'The Legitimacy of International Governance: A Coming Challenge for International Environmental law?' (1999) 93 AJIL 596-624, 605.

11 Ibid., 623.

12 Ibid., 624.

13 Bodansky argued that State consent is not sufficient to justify international environmental institutions with greater rulemaking and enforcement authority. Alternatively, he considered democracy, public participation, and expertise as three bases of legitimacy. He further contended that democracy as a basis of legitimacy at the international level is unrealistic at the time; while public participation can provide a kind of democratic legitimacy, and expertise is needed to provide continuing legitimacy once State consent is initially conferred on an international environmental institution. Ibid.

Second, the relationship between the ISA and the sponsoring State as regulators of DSM will become an issue of increasing importance. As is argued in Chapter 8, the DSM legal regime embodies a two-track regulatory system. To date, the ISA has played a dominant role in the functioning of the DSM legal regime: it has been the ISA that adopts regulations, issues dozens of exploration contracts and supervises the compliance with the contracts. Although in recent years some sponsoring States have also promulgated national legislation on DSM, this is just a matter of transposing international law at a national level. However, the author argues that, if DSM further advances, the sponsoring State would play an increasingly important role since the ISA, being a small international organization equipped with limited practical ability, relies on States with respect to the implementation and enforcement of international rules. There, the problem of coordination and division of labour between the ISA and the sponsoring State with respect to regulatory powers at both legal and practical levels will arise. This problem, if not handled well, would almost certainly result in confusion on the part of the contractor and low level of effective regulation on the part of the ISA and the sponsoring State.

Third, DSM would not be able to move full steam ahead towards the exploitation stage since a significant restrictive factor exists, i.e., the environmental protection requirement. The reason why the environmental protection requirement serves as a significant restrictive factor is because of the substantial unknowns about the deep sea. Exploiting mineral resources in the Area now is like walking in a vast darkness with a dim torchlight. Considering the fact that on the one hand, deep-sea ecosystems are so fundamental to the survival of all species on Earth, including human beings, and on the other hand, that great gaps exist in marine scientific knowledge, we have no choice but to conduct DSM activities alongside precautionary measures and to make progress with extreme caution. All in all, as the development of marine sciences is a matter that takes time, patience is what is needed with respect to the development of DSM. This for the sake of the international community interest is what DSM is supposed to serve.