Maria de Menezes Pena de Azevedo Ermida

The Precautionary Principle applied to Deep-Sea Mining

Dissertação com vista à obtenção do grau de

Mestre em Direito Internacional e Europeu

Orientadora: Doutora Maria Inês Gameiro,

Professora e Investigadora da Faculdade de Direito da Universidade Nova de Lisboa

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"Se fosse possível a um jurista particularmente interessado pelas coisas do direito público entrar no sono da princesa da fábula, não precisaria de deixar correr os cem anos para descobrir atónito que à sua volta tudo mudou. Bastava-lhe ter esperado pelo desencanto dos últimos vinte anos e verificaria que o seu castelo de construções e os seus servidores estavam irremediavelmente submersos nos silvados duma nova realidade, perante o qual se encontravam indefesos."

Rogério Soares – O Direito Público e a Sociedade Técnica

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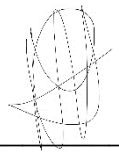

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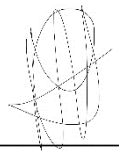

Abstract

As the popularity of deep-sea mining beyond national jurisdiction grows amongst the international community, so does the need to assess whether or not humanity is moving too fast into something unknown and if the application of the Precautionary Principle is in order. Throughout this thesis we analysed the impacts of this activity and the evolution of its legal framework. We also focused on the Precautionary Principle, its core elements and determined whether or not there was cause for applying it to deep-sea mining. We found that there is, in fact, cause and that this Principle has already been included in some aspects of the legal framework of deep-sea mining beyond national jurisdiction. However, this inclusion is still insufficient and in order to build a legal framework based upon the Precautionary Principle, some necessary measures are still missing.

Resumo

À medida que a popularidade da mineração em mar profundo para lá da jurisdição dos Estados cresce entre a comunidade internacional, aumenta também a necessidade de avaliar se estamos a mover-nos demasiado rápido na direção do desconhecido e se a aplicação do Princípio da Precaução é necessária ou não. Para esse efeito, analisámos os impactos da mineração em mar profundo e a evolução do seu quadro legal. Seguidamente, estudámos o Princípio da Precaução, tendo em vista a sua potencial aplicação a esta atividade. Chegámos à conclusão de que o Princípio é já aplicado em alguns aspetos do quadro legal da mineração em mar profundo, mas que a sua inclusão é ainda insuficiente para fazer face aos potenciais impactos desta atividade. Assim sendo, apontámos algumas medidas cujo objetivo é o fortalecimento deste quadro legal tendo por base o Princípio da Precaução.

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VII. Citações extensas (mais de 40 palavras) são feitas de forma destacada.

Glossary

Term	Definition
Abyssal Plain	The nearly flat region in the deep-sea floor.
Benthic	The ecological region at the lowest level of a body of water such as an ocean or a lake, including the sediment surface and sub-surface layers.
Benthos	The organisms found at the bottom of the ocean.
Biodiversity	The number of species in the world or in a particular habitat.
Bioluminescence	The production of light by living organisms.
Biomass	The total mass of living organisms in a given area or ecosystem at a given time.
Bioprospecting	A search for useful products derived from bioresources including plants, microorganisms, animals, etc., which have the potential of being developed further for commercialization.
Cobalt-rich Ferromanganese Crusts	Mineral source formed by crusts which aggregate on hard-rock substrates of volcanic origin through the precipitation of metals dissolved in seawater.
Exploitation	To carry out activities for commercialization and/or consumption.

Exploration	To inventory resources and assess their commercial potential.
Fauna	The animals found in a particular area.
Flora	The plants found in a particular area.
Hydrothermal vents	A deep-sea hot spring where heated seawater forces its way up through the crust.
Ecosystem	A community or communities plus the physical environment, interacting in a large, more or less self-contained area.
Pelagic Waters	Water column of the open ocean which can be further divided into regions by depth.
Photosynthesis	The chemical process by which solar energy, water and carbon dioxide are transformed into glucose and oxygen.
Phytoplankton	The photosynthetic component of plankton consisting primarily of single-celled algae and bacteria.
Polymetallic Sulphides	Chimney-like formations of dark rock atop sulphide mounds.
Polymetallic Nodules	Mineral-rich lumps which are found on the seafloor beyond the continental shelf.
Seamounts	A submarine mountain usually of volcanic origin usually located in the abyssal plain.

Abreviations

Full term	**Abreviation**
Advisory Opinion 17 on Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area	AO17
Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982	1994 Agreement
Areas of particular environmental interest	APEI
Clarion-Clipperton Zone	CCZ
Common Heritage of Mankind	CHM
Communication from the Commission on the Precautionary Principle	(COM (2000) 1 final)
Disturbance and recolonisation experiment	DISCOL
And following	*Et seq.*
Environmental impact assessment	EIA
European Parliament	EP
European Union	EU
Group of the 77	G77
Hazardous and noxious substances	HNS
Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction	BBNJ
International Court of Justice	ICJ
International Law Commission	ILC

International Seabed Authority	Authority
International Tribunal of Law of The Sea	ITLOS
International Union for Conservation of Nature	IUCN
Nautilus Minerals Inc.	NM
Non-Governmental Organizations	NGO
Nodules regulations, cobalt-rich ferromanganese crusts regulation and sulphides regulation all combined	Exploration regulations
Page	P.
Pages	Pp.
Paragraph	Para.
Regulation on prospecting and exploration for cobalt-rich ferromanganese crusts in the area	Cobalt-rich ferromanganese crusts Regulation or ISBA/18/A/11
Regulation on prospecting and exploration for polymetallic nodules in the area and related matters	Nodules Regulation or ISBA/19/C/17
Regulations on prospecting and exploitation for polymetallic sulphides in the area	Sulphides Regulation or ISBA/16/A/12 REV. 1
Remotely operated vehicle	ROV
Rio Declaration on Environment and Development (1992)	1992 Rio Declaration
Seabed Disputes Chamber	SDC
Sic erat scriptum	Sic.
Union of the Soviet Socialist Republics	USSR

United Nations	UN
United Nations Convention on the Law of the Sea	LOSC or Montego Bay Convention

The Precautionary Principle Applied to Deep-Sea Mining

I. Introduction

In the last 40 years, we have learned more about the oceans than in the whole-time humanity has inhabited Planet Earth. Not that long ago, it was thought that the ocean floor was barren. The deep-sea was seen as an inhospitable environment: great depths, extreme cold, enormous pressures, and complete darkness characterized it and therefore it was believed that life was not sustainable in such adverse conditions. Today, we know that this is not so, and that strange and fragile beings populate these areas and that its levels of undiscovered biodiversity surpass those on land by far.

With the knowledge of the high levels of biodiversity and possible amount of undiscovered species in the deep-sea also came the understanding that the ocean floor is filled with mineral riches. Mineral sources like polymetallic nodules, cobalt-rich ferromanganese crusts or polymetallic sulphides are the target of many investors as they are thought to be an alternative source of many vital metals found in on land mining (SHARMA, 2015, p. 204) which have many uses in our everyday lives, namely in the making of coins (nickel), electrical wires (copper) , batteries (cobalt), additives for fuel (manganese), means of transportation (iron) amongst many others (SHARMA, 2015, p. 205).

However, until recently, the advanced technology needed to navigate the extreme conditions of the deep-sea environment, made deep-sea mining seem like something out of a sci-fi movie. The distance to shore and the depths at which these minerals lie make for a hostile environment with impossibly high pressures and extreme variations in temperatures which can be as low as 0º C and rise to 400º C around hydrothermal vents. In the end, the amount of investment needed to build a machine able to sustain these adversities was enormous, and consequently, the initial enthusiasm of the international community regarding deep-sea mining faded away. However, in recent

years, successful tests of deep-sea mining machinery have been carried out (LETMAN, 2018) and deep-sea mining has returned to public discussion.

However, law has remained behind progress in this area. Legislation regarding deep-sea mining is still minimal both within and beyond national jurisdiction. Advisory Opinion 17 on Responsibilities and Obligations of States Sponsoring Persons and Entities with respect to Activities in the Area (AO17) of the Seabed Disputes Chamber (SDC), a special chamber of the International Tribunal of Law of the Sea (ITLOS), made several breakthroughs regarding the deep-sea mining legal framework concerning State responsibility and liability. Also, the International Seabed Authority (Authority) has also adopted a few regulations and recommendations regarding these activities. And yet, there is still much work to be done.

We believe that due to the likely serious and/or potentially irreversible environmental damage that can arise from deep-sea mining and the lack of scientific certainty that surrounds it, the building of a legal framework regarding this activity should start with the application of the Precautionary Principle.

Throughout this thesis the impact of deep-sea mining and the legal regime surrounding it will be analysed. Subsequently, the Precautionary Principle will be analysed, and it will be determined if, and how, it should be applied to deep-sea mining.

For the purposes of this thesis only deep-sea mining beyond national jurisdiction will be focused on. Nevertheless, the concerns raised throughout the next pages are applicable, *mutatis mutandis*, to deep-sea mining activities within national jurisdiction, namely, in the continental shelf of States.

II. Deep-Sea Mining

1. The Deep-Sea

Today, marine scientists divide the marine environment, in terms of depth and regarding the lifestyle of marine organisms, into two oceanic subdivisions: The pelagic and the benthic. Pelagic waters are those where organisms live up in the water column, away from the bottom. The two top layers, the epipelagic and mesopelagic zones are those where sunlight can still penetrate, even if just slightly. The epipelagic zone is home to most marine organisms and where there is more biomass due to the optimal conditions for marine life productivity. The mesopelagic zone, also known as the twilight zone, is where there is not enough light to support photosynthesis, limiting primary production. There is still enough light to see by, but many creatures which inhabit this area tend to rise to the photic zone (layer of water reached by enough sunlight to support photosynthesis) for food at night. The bottom three layers of the pelagic area are those where no sunlight can penetrate and where strange beings start appearing. These are the bathypelagic, the abyssopelagic and the hadopelagic. The bathypelagic (1.000 m – 4.000 m) is home to the pelican eel, a creature that despite its name is not an actual eel but a fish with a mouth cavity that expands 5 to 11 times the volume of its body. The abyssopelagic (4.000 m– 6.000 m), it its turn, is home to the dumbo octopus as well as the cusk-eel. Finally, the hadopelagic (deep trenches below 6.000 m to about 11.000 m deep) which is highly understudied due to its extreme environments.

Once the bottom sediments are reached, we are in the Benthic subdivision. Much like the pelagic, benthic zones are also classified by depth: The intertidal (area underwater at high tide but exposed to the air when during the low tide), the subtidal (up to about 200 m), the bathyal (up to 4.000 m), the abyssal (from 4.000 m – 6.000 m), and the hadal (from 6.000 m to 11.000 m). Benthic surfaces usually vary according to bottom composition – a mix between rock, sand, mud or clay, and in some areas unique geological characteristics produce distinct benthic formations, like hydrothermal vents. Most of the living beings in the benthos are invertebrate and are specially

adapted to each one of these environments. For example, bioluminescent creatures, such as the black dragonfish, reveal an essential and ubiquitous specificity of deep-sea creatures to help them survive in the dark world[1].

The benthos beyond national jurisdiction is legally called *"Area"*.

2. Deep-Sea mining in practice

When it comes to the exploitation and exploration of the deep-seabed, technologies are evolving every day. However, the lack of economic certainty of this activity, its expensiveness and high risks have kept many investors away. For example, according to a 2015 European Parliament report, specialized vessels are vital for these activities. However, they can cost up to €100.000,00 per day to fully operate (EP, 2015, p. 7).

Another example is the remotely operated vehicles (ROVs), one of the most expensive aspects of deep-seabed mining. These machines must be strong enough to sustain the enormous pressures they will be under while at the bottom of the ocean. Also, each of the three primary sources of minerals (ferro-manganese crusts, polymetallic nodules and seafloor massive sulphides) must be mined with different technologies. In the case of polymetallic nodules, for example, because they are loose from the seabed, they can be sucked with ROV vacuums and pumped to a surface vessel (EP, 2015, p. 7). Manganese crusts, in their turn, must first be ground and only then harvested by an ROV. Thus, considering the different stages that go into deep-sea mining, experts state that deep-sea mining has four different crucial components: An extraction tool, a lifting system, a surface platform and a disposal system (EP, 2015, p. 7). The lack of readiness of these four components (the extraction tool, the lifting system, the surface platform and the disposal system) and all the uncertainty surrounding the existence of the resources is what has, in the last few years, hindered major deep-sea actors in going towards the exploration phase.

[1] More on Marine Biology and the deep-sea environment at CASTRO, Peter; HUBER, Michael E. - **Marine Biology**. 10th. ed. New York: McGraw- Hill, 2016. ISBN 978-0-07-802306-4.

Additionally, there is great uncertainty not only about where interesting mineral deposits could be located but about how much of these minerals exists in these sites. In fact, the most significant risk of deep-sea mining is the consequences that may arise from the lack of knowledge that still exists about this activity, its surrounding environment, and all its related aspects.

The cost-benefit analysis is still far too uncertain to justify its apparent potential, which deeply discourages this activity. In fact, it must be noted that to this day, Nautilus Minerals Inc (NM), the leading company in the deep-sea mining industry (and the responsible for the Solwara 1, a deep-sea mining site 30 km off Papua New Guinea), has only dealt with exploration which is also the case for all operators that have been attributed contracts in areas beyond national jurisdiction by the Authority. (EP, 2015, p. 7).

3. Impacts of Deep-Sea Mining

3.1. Environmental

The possible environmental impacts of deep-sea mining are countless.

Firstly, the risks associated with the resuspended material plumes that might be dispersed due to the movement and action of the ROVs. For example, when manganese crusts are crushed, small fauna may be dispersed with plumes. Besides, fauna can also become smothered by plumes as, once it settles, because it is now extremely fine, larvae that are used to a rocky benthic soil sink into the newly deposited sediments making it impossible for them to move freely and acquire food. Larvae recruitment will inevitably be impaired. Finally, plumes may also block sunlight, stopping it from penetrating the water. This will have impacts on primary productivity as organisms like phytoplankton will not be able to carry out photosynthesis (SHARMA, 2015, p. 207).

Secondly there is a risk of fauna being crushed due to the movement and action of the ROVs. We have mentioned that benthic fauna and flora are amongst the most fragile beings in the world with small levels of both resilience and inertia. In order to

better understand these effects many studies with simulated mining have been carried out. One of them was the *Disturbance and Recolonisation Experiment* (also known as DISCOL) which was started in 1989 by scientists from Hamburg University. Its objective was to test the effects of ROVs moving in the deep-sea. By using a plough harrow in a circular area, scientists managed to replicate tracks similar to those derived from a deep-sea mining rover. Twenty-six years later, scientists have reassessed the area and discovered that the effects of their disturbance were still clear. The plough marks were still there and most smaller fauna has perished (SIMON-LLEDÓ *et al.*, 2019, p. 4). Nevertheless, larger fauna like fish, jellyfish and crustacea appeared to be plentiful (SIMON-LLEDÓ *et al.*, 2019, p. 3). The reassessment of this area has shown that "If the results of this experiment at DISCOL can be extrapolated to the Clarion-Clipperton Zone, the impacts of polymetallic nodule mining there may be greater than expected and could potentially lead to an irreversible loss of some ecosystem functions, especially in directly disturbed areas." (SIMON-LLEDÓ *et al.*, 2019, p. 1)

Thirdly, pelagic fauna and flora can fall under severe damage due to the adverse effects of discharges in the water column (due to the transport of minerals to the surface). For example, in 2009, upon the analysis of deep-sea black corals, which were over two thousand years old, oceanography researcher Nancy Prouty stated that despite living in the deep-sea at a depth where no light can penetrate, these creatures are extremely sensitive to disturbances on the surface, as they feed off organic matter that falls onto the seafloor (UNITED STATES GEOLOGICAL SURVEY, 2011). In the end, this will also have repercussions on the entirety of the pelagic food chain (SHARMA, 2015, p. 207).

Finally, systems as newly discovered such as hydrothermal vents should not be destroyed before being thoroughly studied, even if inactive. In fact, scientists have declared that observation of inactive hydrothermal vents (which in theory can be mined) has only revealed colonisation by deep-sea creatures not exclusive to the ecosystems that usually surround active hydrothermal vents. However, inactive sites have not been thoroughly examined by marine biologists and therefore this data

deficiency should be suppressed before mining is carried out (INTERRIDGE, 2001, p. 7-8).

Even though there are many published studies addressing this issue, it is extremely difficult to ascertain their reliability. Some companies point out, that mitigation techniques may be carried out, including "*patchwork extractions*" wherein, if there is fauna or flora associated with a part of a mining site, it will be left undisturbed. Nevertheless, scientists assert that, even if directly affecting these ecosystems is avoided, loss of biodiversity is inevitable due to the degradation of the surrounding environment where direct mining occurs (DOVER*, et al.*, 2017, p. 464).

According to Prouty, as these ecosystems are characterized by their longevity, recovery from a disturbance, whether natural or manmade, could take centuries (UNITED STATES GEOLOGICAL SURVEY, 2011).

3.2. Social

In the case of land-based mining, the taxes and royalties paid to the state at a local and national level affect the populations as they can be invested in infrastructure and services. This can be taken as fact because, as Franks points out in "Management of the Social Impacts of Mining" (*apud.* EP - Deep-seabed exploitation - Tackling economic, environmental and societal challenges - p. 47), land-based mining has been occurring for a long time, and in 2011, a study was published summarizing the local and social impacts of this activity.

However, with deep-sea mining, the effects are far more uncertain. The impacts of this activity will inevitably vary as the mining activity goes through each of its phases throughout approximately 30 years (EP, 2015, p. 47), which will inevitably have an impact on the livelihoods and well-being of coastal communities. Socio-environmental concerns such as noise, fisheries and water pollution are also a big slice of social impacts and must not be disregarded (EP, 2015, p. 50).

Nevertheless, Franks points out that some societal benefits of deep-sea mining could be an increase in employment, an incentive to local businesses and investment in

infrastructure (*apud.* EP - Deep-seabed exploitation - Tackling economic, environmental and societal challenges- p. 47). However, all this data comes from when a deep-sea mining activity is carried out close to shore (ex: The aforementioned Solwara 1 mining site). Beyond national jurisdiction, none of these impacts apply. The economic effects will impact the Contractor and (possibly) the Sponsoring State (figures which we will address further in this text).

It could however be argued that deep-sea mining will allow society in general to benefit with new discoveries, namely biological, because the technology developed can be used for bioprospecting in deep-sea mining (EP, 2015, p. 47). Nevertheless, this is fairly debatable as there are also those that see deep-sea mining as a conflicting activity with bioprospecting (SYNNES, 2007). However, as we have said, even if deep-sea mining is carried out combined with mitigation techniques, these will not guarantee that biodiversity is not affected. Destroying these strange yet fascinating ecosystems could potentially mean robbing humanity of the opportunity to discover new and helpful biological resources (SHARMA, 2015, p.206).

In addition, listing this as a positive social impact of deep-sea mining seems to us rather farfetched as it will not be a direct social effect in most societies.

3.3. Economic

Many argue that deep-sea mining will have many positive economic impacts. It is a fact that the land-based mining industry is one of the most expensive ones in the world (EP, 2015, p. 7). It is however expectable that offshore mining will surpass it. According to a report from the EU, exploration trips must count with a budget of $50 to 200 million. When looking at exploitation the cost will double or even triple depending on the deposit's depth and location. (EP, 2015, p. 7). So how worth is it to pursue this activity considering its costs?

Companies, entities and governments that are pro deep-sea mining will always argue that deep-sea mining is necessary in order to both maintain our lifestyle and help the ever-increasing boom of green technology. For example, according to the International Energy Agency (IEA), in 2017 the number of electric vehicles sold

almost doubled that of the year before (3,7 millions). According to the 2018 Global EV Outlook[2] the tendency is that, in 2020, this number will have grown up to 13 million and nearly 130 million by 2030 (IEA, 2018, p. 75). The main reason for this is the policies that have been adopted by most States promising to reduce significantly CO_2 emissions until 2030 (IEA, 2018, p. 20). Each one of these electric cars needs a battery which is usually produced resorting to high quantities of materials like lithium or cobalt (IEA, 2018, p. 62). For this reason, it is expected that demand for these materials will increase in the next few decades. However, such an increase alone does not mean that all the land resources will be exhausted in the next few decades as well due to electric vehicles. In fact, right now, 60% of cobalt mining occurs in the Democratic Republic of Congo alone and it is a by-product of the mining of nickel and copper (SHALINA RESOURCES, 2015). Research shows that shortages can happen but are usually due to lack of industrial response when faced with temporary high demand. Furthermore, one cannot forget that a reserve is an identified deposit and that the exhaustion of a reserve does not at all mean the exhaustion of that resource (FONTBOTÉ, 2017, p. 2). If it does, humankind has always found a way to conserve, replace or reuse materials that serve the purpose of an exhausted resource. For example, when China, the main exporter of rare earths in the world, decided to reduce the exports of this resource in 2010 (for commercial as well as political reasons) the rest of the world did not stumble into "*the rare earths war*" (PINKER, 2018, p. 126). Instead, at first, states sought after this resource in their own mines. They then proceeded to look for it in industrial waste and remodelling products so that they worked without this resource (GHOLZ, 2014, pp. 4-6). This proves that this necessity for minerals such as the ones described above may be remedied by reduction and circular economy.

Past the necessity or not of deep-sea mining, those that are pro-deep-sea mining will also use the argument that deep-sea mining could be a source of financial and economic benefits for the international community. This could be true considering

[2] The Global EV Outlook is an annual publication which analyses the recent developments in electric mobility across the world.

the original moulds of the so-called parallel system which was supposed to benefit mankind as a whole. However, as we will see further, the 1994 Agreement Relating to the Implementation of Part XI of the UN Convention on the Law of the Sea of 10 December 1982 (1994 Agreement) changed the original moulds of the parallel system making these strategic metals virtually unavailable to those States that do not possess the technology to pursue them. This made it virtually impossible for them to feel the benefits of these newfound resources (KIM, 2017, p. 135). In addition, the EP has called for the application of the Precautionary Principle to deep-sea mining because of the scientific uncertainty revolving around this activity. In fact, the EP has stated that the "*European Union (EU) should not support the development of this industry but should, rather, invest in sustainable alternatives, and specifically in a transition to sustainable consumption and production, as called for in SDG 12 under Agenda 2030*"[3].

It is worth mentioning that bioprospecting could prove to be far more important and worthwhile investment than deep-sea mining. In fact, scientists estimate that there is a real chance for identification of new and potentially useful genes since there may be an average 1,2 million previously undescribed ones per cubic meter of water (EP, 2015, p. 5). Even then however, at the rate new species identification is going, it could be another 1000 years before all ocean species are identified and analysed (EP, 2015, p. 5).

[3] EU Parliament Resolution (2017/2055(INI)), para. 67.

III. Historical Context

Deep-sea mining was the catalyser for the development of the international law of the sea and therefore its legal framework is inevitably connected to the history of the Law of the Sea Convention (LOSC) as we shall see throughout the next few pages.

The well-known story of the 1872 Challenger Expedition carried out by the British Royal Navy vessel, the HMS Challenger, was what started everything. This scientific expedition established the basis for oceanography as we know it. In addition, it was during it that the first polymetallic nodules were discovered.

At the time, it was not possible to retrieve great quantities of these nodules at the same time. Nevertheless, the mere possibility of this happening posed the first great challenge to the *mare liberum* doctrine.

The *mare liberum* doctrine was developed by Hugo Grotius in the XVI century. It opposed the *mare clausum* doctrine which dictated that States could claim sovereignty over the seas they discovered closing them off to other States (it is not surprising that this doctrine was put forward by Spain and Portugal who wished to divide the world amongst themselves through the Treaty of Tordesillas). On the contrary, the *mare liberum* doctrine called for liberty to navigate the oceans for all States (GUEDES, 1998, pp. 15-25). This last one was the rule for years to come until the first Conventions addressing the oceans.

Since the LOSC was only adopted in 1982, the marine seabed and subsoil were completely under the *mare liberum* doctrine up until that year being the only limitation to this, the 1967 Moratorium. This generated a race to the bottom of the ocean during the post WWII period when many States extended their territorial sea, namely the United States of America (USA) through the Truman Proclamation 2667.

This virtual legal void[4] led to the adoption of the 1958 Geneva Conventions: Geneva Convention on Fishing and Conservation of the Living Resources of the High Seas;

[4] Prior to 1958 the maritime territory was governed by certain principles which dated back to the 17th century like the Freedom of the Seas (which came from the *Marum Liberum* doctrine by Hugo Grotius) and the Convention and Statute on the International Régime of Maritime Ports 1923.

Geneva Convention on the Continental Shelf; Geneva Convention on the High Seas; Geneva Convention on the Territorial Sea and Contiguous Zone.

According to the 1958 Geneva Convention on the Continental Shelf[5], coastal States had the right to explore and exploit all the resources that found themselves 200 meters deep or below that depth where it was possible to exploit or explore. Beyond that were the areas beyond national jurisdiction. These were not contemplated in any of the Conventions. Therefore, these areas were under the freedom of the high seas' regime.

The late '60s were marked by new possibilities and technological advancements which allowed for limits, which were once deemed insurmountable, to become something from the past. The bottom of the ocean, an unreachable place was becoming closer every day. Due to this, in plain cold war, nuclear submarines mapped the deep-sea and projects entailing the installation of missiles at the bottom of the ocean were studied (PARDO, 1967, p. 7, para 50-56). Besides this, technological advancements were expected to make commercial exploitation of polymetallic nodules a reality very soon.

Suddenly States were turning to areas beyond national jurisdiction to take advantage of the riches of the deep-sea. However, the common perception was that only technologically developed States would have the ability to unlock this wealth. This meant that only about 20 or 30 States would be interested in the negotiation of a new Convention. In order to avoid this, the new Convention would have to guarantee two things: Make technological and financial means available to all interested in pursuing deep-sea mining and ensure that the legal framework that was going to be developed enough to guarantee that all States, and not just those with technical and economic power to do so, would share in the wealth of the deep-sea.

This exponential increase in tensions amongst sovereign States, fighting for this space and resources, led the Ambassador of Malta, Arvid Pardo, to deliver a very famous speech at the United Nations (UN) General Assembly in the 1st of November 1967.

[5] 1958 Geneva Convention on the Continental Shelf, Articles 1 and 2.

In his speech, Pardo alerted the international community to the dangers it incurred by not agreeing upon a legal framework concerning the deep-seabed and subsoil beyond national jurisdiction. According to Pardo the international law framework at the time encouraged the arrogation of these areas by technologically developed States (PARDO, 1967, para. 90) whether it be for its resources, for military purposes (PARDO, 1967, para. 55) or to serve as a dumping area for radioactive materials (PARDO, 1967, para. 75). As a result, the rise of tensions amongst States would be inevitable. Developing States would remain unable to make use of resources in the deep-sea and developed States would be fighting amongst themselves for the best military advantage or resources.

In order to solve this, a new regime for this space and its resources had to emerge. However, a regime similar to sovereignty, which already existed in territorial waters, would have led to a competition on the extension of the limits of national jurisdiction by coastal States. On the other hand, freedom would lead to a race towards the exploitation of the deep-sea based on a "*first come first served rule*" (SCOVAZZI, 2004, p. 385). This was the background for the introduction to the Principle of the Common Heritage of Mankind (CHM)[6] applied to the deep-seabed and subsoil in areas beyond national jurisdiction.

In light of this Principle, the Moratorium Resolution (Resolution 2574) was adopted by the UN General Assembly on the 15th of December 1969. This resolution halted all exploitation and exploration beyond national jurisdiction and stated that no appropriation of any area or resources beyond the national jurisdiction existent at the time would be recognized by the international community. However, the effects of this resolution were extremely discussed: While some stated that they were mandatory, others refuted this by saying that this resolution would not produce any effects until a legal framework was adopted to regulate areas beyond national

[6] Due to its importance we will devote a full chapter to this Principle further in this text. For now, we will define the CHM as a Principle of international law which protects certain elements or areas and classifies them as interests of mankind which must not be appropriated by states, must only be used for peaceful purposes and in a sustainable manner with the interests of future generations in mind. For more on this principle see PUREZA, José Manuel – **O Património Comum da Humanidade: Rumo a um direito internacional da solidariedade**. Porto: Edições Afrontamento, 1998. ISBN 972-36-0465-5.

jurisdiction. One thing was however certain: The CHM Principle made its entrance in law of the sea.

Consequently, a first project for the new treaty was presented to the UN Assembly which focused mainly on the CHM Principle applied to the seabed along with many other Principles that would later shape LOSC. For example, the prohibition of national appropriation of the seabed, the benefit for all mankind by sharing the profit of the exploitation with developing States or the creation of an independent entity that would regulate, supervise and control that area (BASTOS, 2005, p. 472)[7].

Hence, the Declaration of Principles Governing the Seabed and the Ocean Floor, and the Subsoil Thereof, Beyond the Limits of National Jurisdiction by Resolution 2749 which was adopted by the UN General Assembly on the 17th of December 1970. According to the Declaration, all the minerals beyond national jurisdiction resting upon the seabed or in the subsoil thereof were considered to be CHM (point 1 of Declaration). With this Declaration the UN also managed to stop any activities or appropriation of the now called Area until a proper regime was drawn up (point 2, 3 and 4 of the Declaration).

However, drawing up such a regime proved to be a difficult task due to the legal void States were faced with. There were no previous instruments that could guide the international community to a simple answer on how to regulate these issues. This posed a risk; if there was a vote, States would pick and choose what benefited them. This went against the point of such a regime which strived for uniformity. Thus, in order to avoid this, negotiations for a new Convention on law of the sea were called to come up with a package deal solution which would appease all interests and where States could not just choose what was advantageous to them (BASTOS, 2005, 196).

[7] For a more detailed account on the negotiation process and adoption of the LOSC (BASTOS, 2005) BASTOS, Fernando Loureiro - **A internacionalização dos recursos naturais marinhos: contributo para a compreensão do regime jurídico-internacional do aproveitamento conjunto de petróleo e de gás natural nas plataformas continentais, do potencial aproveitamento de recursos minerais na área, da pesca no alto mar e os efeitos da regulamentação convencional respetiva em relação a terceiros estados.** 1st ed. Lisbon: Universidade de Lisboa, 2005; DUPUY, René-Jean - **L'océan partagé: Analyse d'une négociation— Troisième Conférence des Nations Unies pour le droit de la mer**. Paris: A. Pedone, 1979. **ISBN** 2233000609; DUPUY, René-Jean (Eds.) - **A Handbook on the New Law of the Sea**. 1st Ed., Dordrecht: Martinus Nijhoff Publishers, 1991. ISBN 978-0792309246.

However, the USA and USSR along with various maritime powers were against the package deal solution and made sure all nations involved knew this during the 1973-1974 negotiation on the procedure rules for the discussion and adoption of the Convention threatening to not be a part of the negotiations or boycotting them when matters of grave importance come to a vote.

In the end, the rule was that until there was a consensus, ideas would be discussed so that all interests at stake were accommodated. This guarantee brought developed States to the negotiations table. However, it was also what made them stay on that same table for almost ten years.

The main issue that contributed for this was the regime for the Area (now Part XI of the LOSC) which kept the various negotiators busy from 1977 to 1982. The reason for this was the eternal rift dividing developed States and developing States along with the two blocks that had been formed during the Cold War. The divergences in ideologies were clear as was the way of negotiating. For example, while developed States sent expert advisors in marine related areas, developing States sent people of generic knowledge that spoke more of ideals than fact (BASTOS, 2005, 199). In the end part XI was adopted more on the basis of political than actual scientific or economic data.

Finally, in 1982, all these issues were put into paper with UNCLOS III and the adoption of the LOSC which classified the seabed and subsoil as "*The Area*".

It is worth mentioning that this Convention is unique and revolutionary at many levels.

Firstly, to this day, the LOSC counts with 168[8] ratifications. It is one of the few treaties of universal application at both a spatial (in the sense that it applies to all the marine areas independently of that area being under the jurisdiction of States) and at a subjective level (it can subject to its rules any state, coastal or not, international

[8] On the 21st of January 2019 it counted with 168 ratification *in* http://www.un.org/depts/los/reference_files/chronological_lists_of_ratifications.htm, last visited on the 20th of May 2019.

organizations and even private actors[9]) (BASTOS, 2005, p. 190). In fact, as Oxman points out in "The Rule of Law and the United Nation Convention on Law of the Sea" (*apud*. BASTOS, Fernando Loureiro - A Internacionalização dos Recursos Naturais Marinhos: Contributos para a compreensão do regime jurídico-internacional do aproveitamento conjunto de petróleo e de gás natural nas plataformas continentais, do potencial aproveitamento de recursos minerais - p. 192) the rules of the LOSC and their structure are prepared for a universal application as many of them presuppose the cooperation amongst States from which results the regulation of national, regional and universal activities such as deep-sea mining.

Secondly, it aims at creating a complete regulatory scheme both at a horizontal level, defining for example which areas are under the jurisdiction of States and which are common to all, and at a vertical level, regulating the whole of the water column from the ocean's surface to its subsoil (BASTOS, 2005, p. 191).

Thirdly, it is considered to be the most complete Convention regarding law of the sea since the 1958 Geneva Conventions establishing what behaviours States can and cannot have in the different parts of the sea as well as a section of generic rules on the protection and conservation of the marine environment (BASTOS, 2005, p. 191).

Fourthly, even though it holds a privileged position regarding other law of the sea instruments, its drafters were careful enough to safeguard previous agreements and instruments either explicitly or implicitly throughout the Convention (BASTOS, 2005, p. 192)[10].

Most importantly, the signing of the Convention meant the creation of entities, principles, rules and institutions common to all those who wanted to act within the ocean in peaceful terms establishing the legal framework for activities beyond national jurisdiction[11].

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[9] Private actors in the LOSC will be addressed in the chapter concerning Contractors.
[10] Take for example LOSC, Article 237 (1) which safeguards agreements aimed at environment protection.
[11] The scope of this thesis will not allow us to discuss in detail all of these creations. Nevertheless, we will address all those that relate to deep-sea mining, starting with the CHM Principle which was the fundamental premise for the whole of the LOSC III negotiations.

Some argue that this premise was what led a discussion that should have been based on facts and practice and the potential importance of the exploration of the deep seabed to turn into a political and ideological one based on unrealistic presuppositions that aimed at a structural transformation of the framework for deep-sea exploration beyond national jurisdiction (BASTOS, 2005, p. 200). However, having a Convention that is based upon fundamental Principles and ideals is perhaps what makes LOSC such a complete and unique instrument. Principles such as CHM are what has stopped this Convention from becoming obsolete as it is not held to technical and practical aspects that soon become outdated specially in a time where scientific and technological breakthroughs happen daily.

Even so, at the end of the negotiations, the disagreement between technologically developed and developing States was such that even though many States signed the LOSC very few proceeded to its ratification. The States who did were mainly part of the Group of the 77 (G77)[12]. In fact, the LOSC only entered into force on the 16th of November 1994 – one year after it attained the minimum number of signatures to come into force (sixty[13]) (MARTINS, 2001, p. 22) and almost 4 months after the signature of the 1994 Agreement which would reshape the whole Convention.

1. The 1994 Agreement

1.1. The need for the 1994 Agreement

In 1994 the unattainability of universal application by LOSC was almost certain (BASTOS, 2005, p. 226). The reason for this was the absence of support of a great number of developed States, mainly the ones which possessed the financial and technological means to pursue deep-sea mining (SCOVAZZI, 2004, p. 388). In order to avoid this, the UN promoted new negotiations to be held in regard to part XI of the LOSC. This eventually led to the approval of the 1994 Agreement being adopted

[12] Now with 134 members, the G77 was originally a group of 77 developing States whose aim is to create a block with negotiating capacity within the UN in order to pursue their collective interests effectively.
[13] LOSC, Article 308 (1).

by the General Assembly on the 17th of August 1994. Thus, deep-sea mining was the catalyser for yet another legal instrument regarding law of the sea.

For these reasons, the international community was faced with many options (MARTINS, 2001, p. 23). The first option was to keep everything as it was disregarding the opinions and reservations of developed States. This was put aside as the signatures of developed States were needed, as we have mentioned, to give this Convention a universal character which was the objective of the LOSC.

The second option was to hold an UNCLOS IV, addressing Part XI alone. This option was put aside as it brought with it the risk of a) not reaching an agreement and b) the whole conference turning into one of general nature addressing more than part XI (MARTINS, 2001, p. 23).

The third option was to change Article 309 allowing for party States to make reservations to the Convention. However, it was felt that this would go against the spirit of the LOSC itself (MARTINS, 2001, p. 23).

The fourth and final option was to celebrate an agreement regarding part XI of the Convention. Thus the 1994 Agreement was signed, altering some core aspects of part XI (MARTINS, 2001, p. 23).

The nature of the 1994 Agreement is widely discussed.

Some say that we are before and interpretation agreement[14]. This would actually be supported by the 1969 Vienna Convention on Law of the Treaties[15] and by the 1994 Agreement Annex which states that "*the provisions of this Agreement and Part XI shall be interpreted and applied together as a single instrument*"[16]. This is actually the position of Marques Guedes in "Direito do Mar" even though he also admits that the agreement also revokes several rules and adds new ones (*apud.* MARTINS, Ana Maria Guerra-

[14] More on this view see GUEDES, Armando Marques - **Direito do Mar**. 4th. ed. Coimbra: Coimbra Editora, 1998. ISBN 9789723208290; BASTOS, Fernando Loureiro - **A Internacionalização dos Recursos Naturais Marinhos: contributos para a compreensão do regime jurídico-internacional do aproveitamento conjunto de petróleo e de gás natural nas plataformas continentais, do potencial aproveitamento de recursos minerais**. Lisbon: Universidade de Lisboa, 2005, p. 204).
[15] 1969 Vienna Convention on the Law of Treaties, Article 31 (2).
[16] 1994 Agreement, Annex, Article 2 (1).

O Acordo Relativo à Aplicação da Parte XI da Convenção das Nações Unidas sobre o Direito do Mar de 1982 na ótica do Direito dos Tratados - p. 32). However, most scholars subscribe to the view that since the 1994 Agreement introduced a substantial modification of the regime of the Area it cannot be considered a simple interpretation agreement as these agreements cannot alter pre-existing norms. They can only limit and find the meaning of the already existing content of a Convention (MARTINS, 2001, pp. 34-35)[17].

Another thesis is that we are before an amendment which modifies part XI of the LOSC. This thesis is supported by Nelson in the "The New Deep-Sea Mining Regime" (*apud.* MARTINS - O Acordo Relativo à Aplicação da Parte XI da Convenção das Nações Unidas sobre o Direito do Mar de 1982 na ótica do Direito dos Tratados - p. 32).[18] This would actually be supported by the second part of Article 2 (1) which states that "*in the event of any inconsistency between this Agreement and Part XI, the provisions of this Agreement shall prevail*". It is important to state that LOSC has specific Articles regarding its revision in Articles 312 to 316. In fact, Article 314 addresses Part XI and the Seabed Dispute Chamber specifically a proposes a special regime where amendments must be approved by both the council and the assembly in order to be adopted. On the contrary the general regime of Article 312 only states that amendments must be approved using same mechanisms in UNCLOS III.

However, again, some scholars reject the idea that we are before an amendment for a number of reasons. Firstly, when the agreement was signed LOSC had not yet come into force. By definition an amendment can only be considered as such when the rules it amends are in force. Secondly, the LOSC as a strict number of rules about its revision. One could argue that those rules were still not in force. However, the whole LOSC was adopted through a package deal which reinforces the idea that any

[17] For more on this view please see TREVES, Tullio - The Agreement Completing the UN Law of the Sea Convention: Formal and Procedural Aspects. in MYRON H. NORDQUIST, JOHN N. MOORE (Ed.) - **Rhodes Papers**. The Hague, Boston, London: Martinus Nijhoff Publishers, 1995. ISBN 9041100997. p. 104 *et seq*.

[18] More on this view see VIGNES, Daniel - La fin du schisme des fonds marins. **Revue Belge de Droit International**. Brussels. ISSN 0035-0788. Vol. 1 (1995) 153–163.; ZORRILLA, Diego - Nota informativa sobre el acuerdo relativo a la aplicación de la parte XI de la Convencion de las Naciones Unidas sobre el Derecho del Mar. **Revista Espanhola de Derecho Internacional**. ISSN 2387-1253. (1994), p. 436-441.

amendments should be only be adopted through unanimous approval (MARTINS, 2001, pp. 35-47).

Some say that the conditions under which these negotiations were held led to the signing of two different Conventions: The Montego Bay Convention signed in 1982 and the Agreement Concerning the Application of Part XI of the LOSC signed in 1994 (BASTOS, 2005, p. 204). This would mean that the latter replaced part XI of the LOSC due to the *rebus sic stantibus clause* (MARTINS 2001, p. 33). This would actually make sense considering the preamble of the 1994 Agreement which reads: "*Noting the political and economic changes, including market-oriented approaches, affecting the implementation of Part XI*". In fact, considering the conditions stated in Article 62 of the 1969 Vienna Convention on the Law of Treaties, for this clause to be applied, a simple economic and political change may fuel the will for an amendment or a review. Nevertheless, this is not the only condition for the *rebus sic stantibus* clause to apply an it is therefore agreed upon that this was also not the case[19]. (MARTINS, 2001, p. 47).

In the end, what the 1994 Agreement did was create conditions for the application of part XI which is why it does not use the vocabulary "*amendment*" or "*modify*" (BASTOS, 2005, p. 228). Instead it uses expressions like "t*he obligation of States Parties to fund one mine site of the Enterprise as provided for in Annex IV, article 11, paragraph 3, of the Convention shall not apply*"[20]. According to Koskenniemi and Lehto in "The Privilege of Universality. International Law, Economic Ideology and Seabed Resources", this could be called "*a masterpiece of diplomatic ingenuity*" since, because it was not perceived as a formal alteration now review dispositions of the LOSC were invoked (*apud* BASTOS, Fernando Loureiro - A Internacionalização dos Recursos Naturais Marinhos: Contributos para a compreensão do regime jurídico-internacional do aproveitamento conjunto de petróleo e de gás natural nas plataformas continentais, do potencial aproveitamento de recursos minerais - p. 228). Treves also has some

[19] The application of the *rebus sic stantibus* clause to the relationship between the LOSC and the 1994 Agreement is not the focus of this thesis. For more on this issue see MARTINS, Ana Maria Guerra - O Acordo Relativo à Aplicação da Parte XI da Convenção das Nações Unidas sobre o Direito do Mar de 1982 na óptica do Direito dos Tratados. **Revista Jurídica**. Vol. 24 (2001) pp. 47–50.
[20] 1994 Agreement, Annex, Section 2 (3).

considerations about this issue classifying the 1994 Agreement as "*a very delicate balancing exercise, in which legal technique must be combined with presentational and political concerns.*" (TREVES, 1995, p. 101). Thus, a solution was reached that accommodated the views of all those involved going back to the initially proposed strategies and maintaining Part XI as a basis (TREVES, 1995, p. 103). More than creating an effective regime for deep-sea mining States wanted to guarantee "*the success of the LOSC as an instrument for ensuring peaceful coexistence in the oceans of the world*" (TREVES, 1995, p. 116).

In the end, the 1994 Agreement meant a substantial increase in the ratifications of the LOSC and the few States that had already ratified the 1982 LOSC did not have to alter the terms of their ratifications. However, as Scovazzi puts it, the term "*implementing agreement*" was used to covers that aspects of CHM "*were changed in their form and substance to meet the hope for universal participation in the LOSC*" (SCOVAZZI, 2004, p. 388).

1.2. The Content of the 1994 Agreement

Firstly, there was a major change in dynamics surrounding the decision-making process of the Authority and the relationship of its organs. Some view these changes as essential considering the confidence in these decision-making processes are crucial for the success of an organization such as the Authority (NANDAN, 2006, p. 82).

In fact, the system that was implemented after the 1994 Agreement entered into force was supposed to allow for the promotion of cooperation and coordination between the different bodies. It also was meant to be an efficient system of checks and balances between the bodies of the organization. For instance, according to LOSC, major policies were to be adopted by the Assembly alone[21]. However, with the signature of the agreement the Council gained some control over these matters stating that "*decisions of the Authority on any matter for which the Council also has competence or any administrative, budgetary or financial matters shall be based on the recommendation of the*

[21] LOSC, Articles 159 and 160.

Council"[22]. So, in practice, decision making became a part of the Council in all matters. This was one of the most criticized changes as, in practice, the main organ of the Authority went from being the Assembly to be the Council.

Moreover, even though, at first this may seem like the afore mentioned system of checks and balances, one cannot forget that with the 1994 Agreement also came changes in the constitution of the bodies of the Authority, namely the Council. Its 36 members (of a universe of 168) were to be elected by the Assembly.[23] However, these 36 could not be just any States. They each had to fall under one of the five categories representing States with different types of interests in activities in the Area. These would be roughly the four of the biggest consumers of minerals extracted from the deep seabed with the largest economies (Group A)[24], four States that have widely invested in activities in the Area (Group B)[25], four States who are land based producers and exporters of minerals that one can also find in the Area (Group C)[26] and finally six members had to be elected amongst developing States Parties (Group D)[27]. The remaining 18 seats had to be elected "*according to the Principle of ensuring an equitable geographical distribution of seats in the Council as a whole*" (Group E)[28].

In terms of voting within the Council, groups A, B and C would each have one vote while groups D and E would only be treated as single chamber[29]. This meant that even though more developing States were represented in the Council, they would be entitled to two votes – one for group C and another for groups D and E together.

It is our opinion that what at first seemed like a fair system of checks and balances amongst State Parties was in fact a compromise to get developed States to ratify the LOSC giving them decision making power outside the Assembly where they were outnumbered. A counterargument often used (for example, NANDAN, 2006, p. 84)

[22] 1994 Agreement, Annex, section 3 (4).
[23] 1994 Agreement, Annex, section 3 (15).
[24] 1994 Agreement, Annex, section 3 (15) (a).
[25] 1994 Agreement, Annex, section 3 (15) (b).
[26] 1994 Agreement, Annex, section 3 (15) (c).
[27] 1994 Agreement, Annex, section 3 (15) (d).
[28] 1994 Agreement, Annex, section 3 (15) (e).
[29] 1994 Agreement, Annex, section 3 (9) (a) - These were the chambers that represented the developing States' interests along with group C.

is that according to the 1994 Agreement, decisions can only be adopted through consensus. If it could not be reached decisions relating to procedural matters would be taken by a simple majority while decisions on substance would be taken by a two-thirds majority of present voting members[30].

This could be seen as a way of balancing the plates and of giving developing States to oppose measures that could be too grave to them. The decisions that came out of the previously mentioned majorities could never be opposed by a majority of one of the other chambers[31].

This was a very criticized section of the 1994 Agreement which completely shifted the balance that had been achieved in terms of power within the Authority with LOSC.

Secondly, the 1994 Agreement has a clear market-based approach (SCOVAZZI, 2004, p. 388). It starts by postponing the establishment of the Enterprise leaving the Secretariat to "*perform the functions of the Enterprise until it begins to operate independently of the Secretariat*"[32]. This was to happen when the Enterprise conducted its first joint venture deep sea mining operation, as this was the only framework allowed by the 1994 Agreement[33].

Finally, the Authority was banned from exercising the power referred to in Article 174 (1) to borrow funds to finance its administrative budget. It was to have its own budget and administrative expenses were to be met by contributions of the member States until the Authority had enough funds to sustain itself[34].

Many see the 1994 Agreement as "*product of political necessity that, above all, made the LOSC generally acceptable and facilitated universal participation*" (DOLLIVER *et al.*, 2006, p. 31) as it altered its most controversial areas. In the end this agreement achieved its goal, as

[30] 1994 Agreement, Annex, section 3 (5).
[31] 1994 Agreement, Annex, section 3 (5).
[32] 1994 Agreement, Annex, section 2 (1).
[33] 1994 Agreement, Annex, section 2 (2).
[34] 1994 Agreement, Annex, section 1 (14).

after it, enough States ratified the LOSC allowing it to enter into force and to achieve the goal of universal application.

1.3. The 1994 Aftermath

Twenty years after the signing of the Montego Bay LOSC, the Authority faced crisis as the early 2000s were marked by uncertainty. In 2001 the Regulation on Prospecting and Exploration for Polymetallic Nodules in the Area and related matters (Nodules Regulation), was adopted and at least seven contracts[35] for exploration activities had been signed. In addition, the possibility of exploring hydrothermal polymetallic sulphides and cobalt rich ferromanganese crusts was also being considered which called for a framework for those activities[36].

However, the possibility of commercial mining seemed to be much more remote than States had initially thought during the LOSC negotiations. In a report submitted in 2002 by the Authority's Secretary-General he stated that despite the enthusiastic predictions of the '70s and the '80s progress for commercial exploitation of the deep-sea had been hindered by factors such as the already mentioned extreme conditions of the deep-sea, the high costs of the activity. For these reasons the initial enthusiasm about this activity decreased exponentially (NANDAN, 2002, p. 8).

In fact, the budget of the Authority did not increase significantly from 1997 to 2002 (LÉVY, 2014, p. 13) which led many to think that the Authority had no choice but to close its doors and that deep-sea mining would be abandoned. In fact, in that same report Secretary-General Anand pointed out that States were no longer interested in attending the Assembly's meetings which made it extremely hard to get a quorum and hindered the decision-making process (NANDAN, 2002, p. 8).

[35] Ifermer-Fernod (France), DORD (Japan), Yuzhmorgeologiya (Russian Federation), COMRA (China), ICM (Bulgaria, Cuba, Czech Repubic, Poland, Russian Federation and Slovakia), the Government of the Republic of Korea, the Government of India in https://www.isa.org.jm/deep-seabed-minerals-Contractors last visited on the 20th of May 2019.

[36] In the meantime, the regulations concerning these minerals have also been adopted by the Authority which along with its recommendations form the Mining Code. These are Regulations on Prospecting and exploitation for polymetallic sulphides in the Area (2010) – Sulphides Regulation; Regulation on Prospecting and Exploration for cobalt-rich ferromanganese crusts in the Area (2012) – Cobalt-rich Ferromanganese Crusts Regulation. We shall refer to them as Exploration Regulations.

In 2004 Michael Lodge, as a representative of the Authority, stated that "*the prospects for deep-sea mining remain highly uncertain*". According to him:

> *"with respect to polymetallic nodules, there appears to be no real prospect of commercial mining in the foreseeable future. The prospects for recovery of polymetallic sulphides and cobalt-rich crusts appear more promising, but even here it is likely that mining will take place in areas under national jurisdiction before it takes place in the international Area"* (LODGE, 2004, p. 404).

However, in recent years this has changed. Technological advancements have made commercial deep-sea mining an attainable reality. Therefore, it is of the utmost importance to guarantee that the legal framework for deep-sea mining is prepared to accompany these changes.

IV. The Common Heritage of Mankind Principle

Even though the CHM Principle is not the centre of our discussion, it is an element of paramount importance in any analysis of the legal framework of deep-sea mining as well as its history. We have therefore decided to devote a few pages addressing this principle and what it was and is supposed to mean for law of the sea.

The CHM Principle, as stated in Article 136 of LOSC, was the main innovation of the LOSC in regard to the previous international law of the sea regimes (SCOVAZZI, 2004, p. 384). It offered a new pathway that distinguished itself from state sovereignty (territorial waters) and complete freedom (high seas) (SCOVAZZI, 2004, p. 384) presenting a way out of the simple state vs state dialogue. As Barnes put it in "Property Rights and Natural Resources", the drafters of the LOSC delineated "*a sound and universal value that limits activities and property rights over deep-sea resources, thus imposing a new conception of international law*" (*apud.* ROCHA, Armando - Private Actors as Rights-Holders under the International Law of the Sea - p. 326).

The roots of the Principle are placed in the dichotomy between the concepts of *res nullius* and *res communis*. This dichotomy was particularly important after the 1958 Geneva Conventions were signed as the high seas remained outside national jurisdictions and the seabed and subsoil were not addressed at all. However, maintaining these areas under the freedom of the high seas' regime was dangerous. Therefore, a choice had to be made. These areas were to either be called *res communis* – areas beyond national jurisdiction belonging to all – or *res nullis* – areas beyond national jurisdiction belonging to no one – or even *res extra commercium* – something that cannot be appropriated by private rights (ROCHA, 2018, p. 330).

One could argue that this was a mere semantics choice as the end result would not change anything: The high seas, the sea soil and subsoil beyond national jurisdiction belonged to no one and could not be appropriated by any States. However, even though some state that there is no relevant or fundamental difference between *res nullius* and *res communis* (KISS, 1985, p. 324), it is undeniable that these concepts were the basis for the development of the concept of CHM.

The first written elements of the CHM Principle applied to the ocean appeared in the 1961 Antarctic Treaty which regulates international relations regarding Antarctica and its surrounding waters (KISS, 1985, p. 428). This treaty called for the prohibition of using this area for non-peaceful purposes reserving it for scientific investigation (Articles I, II and II of the Antarctic Treaty). After the initial treaty, two others were signed in order to ensure that the allowed uses of Antarctica and its surrounding waters did not conflict with the general aims of the first treaty which included the preservation of the environment, wildlife and living resources (KISS, 1985, p. 429). Today, this legal framework includes not only Antarctic, but also the ocean surrounding it. Interestingly enough, the treaty never mentions the Principle of CHM. Nevertheless, the ideas behind it configure what we today define as that same Principle.

As we have stated, the idea of applying the CHM Principle to the resources of the now called Area, dates back to Arvid Pardo's 1967 speech in the UN assembly alerting all nations to the danger of an uneven distribution of resources from the deep-sea and subsoil beyond national jurisdiction (PARDO, 1967, para. 104). With this in mind Pardo stated that these resources should become CHM. It is noteworthy that some think Pardo's initial idea was to extend the CHM Principle to the ocean as a unitary juridical space as a reflection of its unitary natural state integrating in the same regime the surface, the water column, the soil and subsoil (PUREZA, 1998, p. 175). In fact, Malta's 1971 Draft Ocean Space Treaty addressed all these areas saying the CHM was supposed to be applied to the "*international ocean*" (PUREZA, 1998, p. 176). According to Pureza, Pardo avoided calling for such a regime in his speech for the sake of diplomacy to ensure that this Principle was at least applied to the deep-sea soil and subsoil (PUREZA, 1998, p. 176)

According to Arvid Pardo, a regime of co-operation amongst States was key to prevent the depletion of the deep-sea resources due to human activities. For Pardo, areas beyond national jurisdiction, which should be seen as an interest of mankind, should be safeguarded by special legal regimes (KISS, 1985, p. 425). This was not a new idea. In fact, interests common to mankind have led to the establishment of

international regimes, for example the free navigation of the Suez Canal which, in this case, aimed at keeping the peace in a specific area with international importance. With the CHM Principle this idea of using a new regime as a way of regulating the international system reached a new level; as well as maintaining peace, this new regime also managed resources in order to avoid their rapid depletion (KISS, 1985, p. 428).

For Pardo, the seabed and its subsoil were to be used exclusively for peaceful purposes, for scientific research (not linked to the military), and its resources should be exploited in the interest of all mankind. Arvid Pardo was conscious that if too much freedom was given to States in the Area it could lead to disastrous consequences. Thus, he proposed the term, CHM at the UN General Assembly.

To this day, the most complete definition of the CHM Principle is the one present in the LOSC in Articles 136 *et seq*. (KISS, 1985, p. 431) which defines this Principle through its five criteria (ROCHA, 2018, p. 326) [37].

Firstly, the subjection to an international management regime led by the Authority. The regime and organization of the Authority has been addressed in this text and therefore we will only leave some brief notes on this element. While addressing the UN General Assembly in 1967 Pardo asked for an entity to manage the seabed areas beyond national jurisdiction in order to guarantee the compliance with this Principle and thus, a complex system was created in which exists a central entity: The Authority. This entity is responsible for organizing, carrying out and controlling activities in the Area. The Authority was established through the LOSC[38].

Secondly, the Principle of non-appropriation by States; according to this Principle there is a prohibition on establishing jurisdiction over areas that have been recognized as CHM. This means that there can be no exploitation, exploration or appropriation

[37] The number of criteria of the CHM Principle is highly debatable. See generally, TANAKA, Yoshifumi - The International Law of the Sea. 1st. ed. Cambridge, United Kingdom: Cambridge University Press, 2012. ISBN 1107009995; ROCHA, Armando Luís Silva - Private Actors as Rights-Holders under the International Law of the Sea. Lisbon: Universidade Católica Portuguesa, 2018; KISS, Alexandre - KISS, Alexandre - The Common Heritage of Mankind: Utopia or Reality? In CAMINOS, Hugo (ed.) The Library of Essays in International Law - Law of the Sea. Burlington. ISBN 1-84014-090-9. 2001, Chapter IX, pp. 423–441.
[38] LOSC, Articles 156 *et seq*.

of the Area or of its resources on the basis of sovereignty[39]. This Principle, on its own, is the definition of the aforementioned *res communis* (KISS, 1985, p. 433). Arvid Pardo himself stated, at the *Pacem in Maribus* Seminar in Rhode Island in 1970, that the word "*heritage*" was chosen in determent of "*property*" on purpose. According to Pardo "*property as we have it from ancient Romans implies the jus utendi et abutendi (right to use and misuse*). *Property implies and gives excessive emphasis to just one aspect: resource exploitation and benefit therefrom.*" (*apud* BUTTIGIEG, J. - The Common Heritage of Mankind from the Law of the Sea to the Human Genome and Cyberspace - p. 82). "*Heritage*" however, rendered already an idea of "*sound management of a resource to be transmitted to the heritors*" (SCOVAZZI, 2004, p. 385) making it a more desirable term. Later, during the final session of the Third UN Conference on the Law of the Sea in 1982, the President, Tommy T. B. Koh, reinforced that "*Any attempt by any State to mine the resources of the deep-sea outside the LOSC will earn universal condemnation of the international community and will incur grave political and legal consequences*" (KOH, 1982, xxxiv). This statement showed that there had been a true change in the way areas beyond national jurisdiction were perceived, especially the deep-sea.

Thirdly, the Area must only be used for peaceful purposes[40]. This corollary was controversial from the moment it was introduced in point 8 of the Declaration of Principles Governing the Seabed and the Ocean Floor, and the Subsoil thereof, Beyond the Limits of National Jurisdiction (Resolution 2749), adopted by the UN General Assembly on the 17th of December 1970 which stated that:

> "*The Area shall be reserved exclusively for peaceful purposes, without prejudice to any measures which have been or may be agreed upon in the field of disarmament and which may be applicable to a broader area. One or more international agreements shall be concluded as soon as possible in order to implement effectively this Principle and to constitute a step towards the exclusion of the sea-bed, the ocean floor and the subsoil thereof from the arms race."*

[39] LOSC, Article 137.
[40] LOSC, Article 141.

Finally, the exploration of the Area must benefit mankind as a whole[41]. This statement must be divided into the two final elements of the CHM Principle: The fact that there must be an equal sharing of the benefits from the exploitation of resources and the fact that these must benefit mankind as a *whole*.

Regarding the equal sharing of benefits derived from activities in the Area, the word benefit, used in Article 140 of the LOSC, is immediately associated with the sharing of financial and other economic benefits derived from activities in the area. However, it is our view that an expression such as "*exploration of the area must benefit mankind as a whole*" should be read as much more than just that. Evidently, during discussions about the drafting of this provision, the main concern was the "*benefit-sharing*" aspect and all the structures that had to exist in order to ensure developing States received part of the economic profit directly derived from deep-sea mining (KISS, 1985, p. 438). Moreover, this could mean that even States that have no technological or economic means to explore the resources of the deep-sea should have the opportunity to do so if they so wish. Pardo believed, that the riches of the deep seabed would serve as a way of narrowing the moat between developed and developing States as all States would be able to benefit from them. (BUTTIGIEG, 2012, p. 82). Taking this into account, we agree with Kiss when he states that the word "*benefit*" can also be generously interpreted as to include "*aesthetic, cultural, and scientific benefits as well as economic revenues*" (KISS, 1985, p. 438). All these benefits would have to be distributed equally amongst States regardless of their technical or economic development.

Regarding the benefit of all humanity as a whole, the word "*humanity"* points towards the interpretation that the exploration of the resources in the area should be conducted in a way that benefits both present and future generations. Our reading is that activities in the Area should be carried out in an optimum manner, preserving the marine environment for future generations and sustainably using resources of the Area within a spirit of conservation. This is also the opinion of KISS who states that:

[41] LOSC, Article 140.

> *"the essential characteristics of the common heritage concept include exclusive use for peaceful purposes and optimum use of resources in a spirit of conservation for future generations, which means rational exploitation and, if necessary, appropriate management by or under the supervision of the international community"* (KISS, 1985, p. 438).

It is worth mentioning, however, that this Principle was introduced by Pardo in a time where the main concern was not the environment. In his speech, Pardo addressed the appropriation by States of the deep-sea for military purposes, the exploitation of deep-sea resources in an unequal manner and the dumping of radioactive waste in these areas. Although the latter bears an environmental concern, one must remember that at this point in time environmental law was taking its first steps. The CHM Principle was therefore not born out of a deep concern for the environment and quality of the marine environment. Nevertheless, according to general principles of law (present in Article 31 of the 1969 Vienna Convention) legal terms must be interpreted taking into account their true and present meaning taking into account the purpose that was intended in its genesis[42], and therefore, while analysing the meaning of CHM and its corollaries one cannot ignore the environmental and sustainability aspects of this Principle.

In the end, the concept of CHM Principle present in LOSC was so detailed that it scared off many States who considered it dangerous. This was also one of the reasons why, before 1994, not many States had signed the LOSC (KISS, 1985, p. 432). Nevertheless, Pardo never accepted what his initial proposition had become declaring in 1983 *"the common heritage regime established for the international seabed is little short of a disaster*" (PARDO, 1983, p. 499).

[42] On general interpretation of law see OLIVEIRA ASCENSÃO, José - **O Direito. Introdução e Teoria Geral**. Coimbra: Almedina, 2010. ISBN 9789724024431.

V. The Deep-Sea Mining Regime according to LOSC

As we will proceed to a detailed exposition on the legal nature, regime and obligations of different actors who take part in deep-sea mining (contractors, the authority and States) in the next chapter, we will now only address the general procedures for a private actor to carry out activities in the area.

The Area includes "*the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction*"[43]. Its resources are limited to "*all solid, liquid or gaseous mineral resources in situ in the Area at or beneath the sea-bed, including polymetallic nodules*"[44]. We have also mentioned that, since the signing of the LOSC, the Area and its resources hold the status of CHM[45]. The administration of the Area and its resources is carried out by the Authority, one of the institutions created by LOSC (along with ITLOS and the Commission on the Limits of the Continental Shelf).

The activities that need proper regulation in order to achieve the aforementioned goal are "*drilling, dredging, excavation, disposal of waste, construction and operation or maintenance of installations, pipelines and other devices related to such activities*"[46]. In AO17, the SDC also included in the concept of "*activities in the area*" activities that are directly connected to the abovementioned activities. However, this does not include processing as this is usually done on land or the transport to said land. (ITLOS, AO17, 2011, p. 37, paras. 94 and 95). But the processing of these minerals is normally conducted at a plant situated on land and for that reason it's excluded from the expression "*activities in the Area*". The same is valid for their transportation (ITLOS, AO17, 2011, p. 37, paras. 95-96). However, the same does not apply to transportation within that part of the high seas. According to the SDC:

> *"In the case of polymetallic nodules, this applies, for instance, to transportation between the ship or installation where the lifting process ends and another ship or installation where the evacuation of water and the preliminary separation and*

[43] LOSC, Article 1 (1) (1).
[44] LOSC, Article 133 (a).
[45] LOSC, Article 136.
[46] LOSC, Article 145 (a) and LOSC, Annex III, Article 17 (2) (f).

> *disposal of material to be discarded take place"* (ITLOS, AO17, 2011, p. 37, para. 96).

In fact, excluding this would go against the general obligation of Article 192 "*to protect and preserve the marine environment*" as such an activity could prove to be hazardous to the environment (ITLOS, AO17, 2011, p. 38, para. 97).

No entity can pursue activities in the Area without the knowledge and permission of the Authority in the form of a contract. Hence why, miners, after they are awarded the contract, become known as Contractors. In its original version, the LOSC defined the so-called parallel system; this system established that if an entity wished to pursue any activity in the Area, it would have to submit plans of work to the Authority for approval as stated in Article 3 (1) of annex III of LOSC. According to Article 153 (2), these entities include the Enterprise, States Parties, state enterprises and natural or legal persons holding the nationality of a State Party or being effectively controlled by a State Party or its nationals, provided that they are sponsored by that State.

Each plan of work would be analysed and approved (or not) by the Authority's Council as stated by Article 162 (2) (j). Each plan must include a big enough area so that two mining operations can take place at the same time. Inside each submitted plan of work an area of particular environmental interest should be designated by the applicant. The Authority should then proceed to select a part of the proposed area in the plan of work under assessment to be explored and /or exploited by the Enterprise on its own or in association with a developing State as stated by Article 148 of the LOSC. The selected area would be the called the "*reserved area*". The part the Authority forgoes was to be explored/exploited by the state or entity that submitted the initial plan (TANAKA, 2012, p. 184–194).

In "1994 Agreement", Brown refers to the parallel system as the compromise that accommodated two opposing views: On one hand, one which stated that activities should be conducted by the Authority and/or the Enterprise. On the other hand, one which called for an open system that allowed operations to be conducted by States and private actors (*apud.* ROCHA, Armando - Private Actors as Rights - Holders

under the International Law of the Sea - p. 348). In the end, the participants in mining operations could be explained in the following manner:

RESERVED AREAS	
The Enterprise	Direct Exploitation
	Agreement of joint venture with the applicant (state or entity from which the application for an area emanates)
	Agreement or joint venture with any other entity referred to in LOSC, Article 153 (2) (b)
	Joint venture with developing States
	Through contracts of work
Developing States	Direct exploitation
	Through natural or legal actors under their control
	Through natural or legal actors under the control of another developing State
	In association with other entities
AREAS SUBJECT TO A CONTRACT	
Contractors (State parties, public enterprises of States, natural or legal persons sponsored by them)	Direct exploitation
	Agreement or joint venture with the enterprise
	Agreement or joint venture with the enterprise coupled with the participation of developing states
	Other forms of association of these latter entities

Figure 1 – General scheme of the participants in activities in the Area according to LOSC and 1994 Agreement[47]

[47] This table was inspired by those present in ROCHA, Armando Luís Silva - **Private Actors as Rights-Holders under the International Law of the Sea**. Lisbon: Universidade Católica Portuguesa, 2018, p. 352 and DUPUY, René-Jean (Eds.) - **A Handbook on the New Law of the Sea**. 1st Ed., Dordrecht: Martinus Nijhoff Publishers, 1991. ISBN 978-0792309246, p. 654.

We have already discussed some of the changes the 1994 Agreement brought in terms of the constitution and voting system of the Authority. However, this agreement also brought many important changes to the parallel system and the Enterprise.

Firstly, according to the 1994 Agreement State Parties were no longer obliged to provide funding for the Enterprise's mining sites[48].

Secondly, the agreement gave Contractors the "*right of first refusal to enter into a joint-venture arrangement with the Enterprise for exploration and exploitation*"[49] of an area they presented to the Authority that has been designated as a reserved area. This delayed severely the establishment of the Enterprise and the 1994 agreement stated that its initial operations should commence in this manner[50].

Thirdly, the Agreement undermined the powers and mandate of the Enterprise by stating that it would have the same obligations as Contractors removing the competitive advantage the Enterprise was to have over them[51].

Finally, the obligation of transfer of technology was replaced by a general obligation of cooperation by Sponsoring States in order to facilitate the acquisition of deep-sea mining technology if developing States and the Enterprise were finding it particularly difficult to access that technology on the open market or through a joint venture[52]. This was so as developed States were not prepared to give up the research done by them or their nationals for the whole international community to see. This goes directly against what was the ratio for the creation of the Authority – a guardian of the CHM. Before we get into the core of our thesis and address the Precautionary Principle, due to bits importance, we find it is essential to address the CHM.

[48] 1994 Agreement, Annex, section 2 (3). LOSC, Annex IV, Article 11 (3) imposed this obligation before 1994.
[49] 1994 Agreement, Annex, section 2 (5).
[50] 1994 Agreement, Annex, section 2 (2).
[51] 1994 Agreement, Annex, section 2 (4).
[52] 1994 Agreement, Annex, section 5 (1) and (2).

VI. The Precautionary Principle and Deep-Sea Mining

1. The Precautionary Principle and its core elements

The Precautionary Principle as such is an extremely recent concept and perhaps this is the reason for the reluctancy of courts to apply it as we will see further in this text (SANDS et al., 2012, p. 218). Nevertheless, it is undeniable that this Principle has been the object of much reflection having promptly evolved in the last 40 years.

Since 1992 this Principle has been included in many legal instruments and legal decisions including not only in instruments meant for the protection of the marine environment as well as in those meant for the conservation of marine living resources due to their increasingly rapid depletion (TANAKA, Y., 2012, p. 219)[53]. International courts have also attempted to shed some light on the true meaning of the Precautionary Principle. Nevertheless, the International Court of Justice (ICJ) has been quite reluctant in accepting this Principle as customary international law (SANDS *et al.,* 2012*,* p. 224).

It is generally agreed upon that applying the Precautionary Principle, presupposes that we are before three cumulative requirements:

1. An activity or substance that poses a potential risk which may not be identifiable through an evaluation of scientific data.
2. We must take an identified hazard, identify its risks and evaluate them. The damage that may result from it must be deemed serious or irreversible[54].
3. There must be scientific uncertainty, about the degree, likeliness or type of damage that can be caused by such an activity or substance. Scientific uncertainty will depend on scientific data and this "uncertainty" can arise not

[53] See for example 1995 Fish Stocks Agreement, Article 6; 2006 Southern Indian Ocean Fisheries Agreement, Article 4(c); 2009 Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean, Article 3 (1) (b).

[54] To this day there is no unitary definition of what is considered to be "*serious*" or "*irreversible*" damage in international law. We will leave this discussion out of this thesis as it is beyond its scope but recognize its value and importance.

> only from lack of data but also from the dubious origin of that data or even from contradicting data (RECUERDA, 2008, p. 10).

If these requirements exist, the Precautionary Principle must be applied. This may involve regulating the activity or substance or stop it altogether.

2. The Historical Evolution of the Precautionary Principle in Environmental Law

One of the very early cases of the application of the Precautionary Principle in the modern world occurred in 1854 in Victorian London when an epidemic of cholera broke out. In 10 days, 500 people died. At the time, the cause of this illness was unknown, and most physicians thought it to be caused by airborne contamination. On the contrary, Dr. John Snow suspected that the poor water quality of certain areas of London due to a poor sewage system was the problem. In fact, he had published a paper in 1849 about polluted water potentially being the cause of cholera called The Mode of Communication of Cholera. For this reason, he recommended the removal of the handle of the water pump of Broad Street, a popular water source at the time, as he found out that many of those affected by the illness had drawn water from that well (EUROPEAN ENVIRONMENT AGENCY, 2001, p. 14). This was a classic case of application of the Precautionary Principle where an unpopular and uncertain scientific opinion was used in policymaking (EUROPEAN ENVIRONMENT AGENCY, 2001, p. 15).

In international law, the first formulation we can find of the Precautionary Principle lies in Article 11 of the World Charter for Nature (Resolution 37/7) adopted by the United Nations General Assembly on the 28th of December 1982 which states that "*activities which might have an impact on nature shall be controlled, and the best available technologies that minimize significant risks to nature or other adverse effects shall be used*".

In this formulation of the Precautionary Principle the slightest doubt about the effects of a certain activity towards the environment will lead to it being stopped (GOMES, p. 329).

Later in 1982, the LOSC text is adopted. This Convention is quite detailed on its regime concerning how the Area is supposed to be governed. Nevertheless, when it comes to the protection of the marine environment, part XI presents us with Article 145 which leaves the definition of this regime to the Authority through norms, regulations and procedures. Article 162 goes further in stating that amongst the powers of the Authority's Council are issuing "*emergency orders, (…) to prevent serious harm to the marine environment arising out of activities in the Area*;"[55] and to "*disapprove areas for exploitation by Contractors or the Enterprise in cases where substantial evidence indicates the risk of serious harm to the marine environment*"[56]. Therefore, even though the LOSC never mentions the Precautionary Principle *per se*, it is clear that it was in the minds of its drafters.

In 1984, the Ministerial Declaration that derived from the First International Conference on the Protection of the North Sea stated, in conclusion A7, that to wait for damage to occur before applying Precautionary action could result in irreversible damage in the marine environment. Moreover, the preamble on this Ministerial declaration also emphasized the economic impacts of waiting for the damage to come.

Later, in 1987 this idea is reaffirmed in the Second International Conference on the Protection of the North Sea. According to Article XVI (1) of the Ministerial Declaration, States vowed to protect the North Sea's Marine environment by reducing pollution emissions by using the "*best available technology and other appropriate measures*" especially if there is a risk of causing "*damage or harmful effects on the living resources of the sea (…), even where there is no scientific evidence to prove a causal link between emissions and effects*".

This got the attention of all those involved and eventually lead to the reaffirmation of this Principle in the preamble of the Third International Conference on the Protection of the North Sea in 1990 (NORTH SEA CONFERENCES, 1995).

[55] LOSC, Article 162, (2) (w).
[56] LOSC, Article 162, (2) (x).

Nevertheless, to this day no formulation has gathered more support than that of Principle 15 of the 1992 Rio Declaration on Environment and Development (Rio Declaration). According to it:

> "*In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.*"

Regarding the burden of proof, in most cases, it lies with the party trying to stop the activity or substance. However, this is slowly changing. For example, the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) allows for the dumping of radioactive waste at sea if those who wish to do so inform OSPAR about:

> *"the progress in establishing alternative land-based options and on the results of scientific studies which show that any potential dumping operations would not result in hazards to human health, harm to living resources or marine ecosystems, damage to amenities or interference with other legitimate uses of the sea."* [57]

This is a good example of a Convention placing the burden of proof on parties who are dumping a hazardous substance in the marine environment that could cause serious or irreversible damage. This Convention is revolutionary in the sense that it pushes away lack of scientific certainty as an excuse to carry on with an activity or substance which could be considered to be hazardous.

At the EU level, the revision of the treaties in 1993 also led to the Principle being included in the text of the Treaty on the Functioning of the European Union in Article 191 (2), referring to the treatment of the Environment within the EU. The Principle is also mentioned in many secondary sources of European law, notably in the Communication on the Precautionary Principle (COM (2000) 1 final). The main objective of COM (2000) 1 final was to provide detailed guidelines on the application

[57] OSPAR Convention, Annex II, Article 3(3)(c).

of the Principle in order to provide "*a rapid response (…) in the face of a possible danger to human, animal or plant health, or to protect the environment*" particularly in cases where there was scientific uncertainty concerning the effects of a certain activity. In addition, COM (2000) 1 final recognized that there is no such thing and "*zero risk*" being that we live in the famous conception of Ulrich Beck, "*The risk society*" (BECK, 2015) and therefore measures based upon the Precautionary Principle should not aim at "*zero risk*", as this would be almost impossible to achieve but should also embody a desirable level of protection. For this to happen COM (2000) 1 final recognized that scientific data was essential as "*an incomplete assessment of the risk may considerably limit the number of options available to the risk managers*" (COM (2000) 1 final, p. 17). In addition, COM (2000) 1 final emphasized the importance of taking socio-economic impacts of certain measures into account in decision making besides a strict cost/ benefit analysis (COM (2000) 1 final, p. 19).

Nevertheless, while describing its aims, this communication admits the possibility of stopping activities that may have a hazardous effect by stating that "*recourse to this Principle may, for example, be used to stop distribution or order withdrawal from the market of products likely to be hazardous*". Therefore, it can be said that the EU has admitted being prepared to apply the Precautionary Principle to its dire consequences.

Regarding the burden of proof, COM (2000) 1 final takes a step back giving this responsibility to those who claim that there is an adverse effect associated with a certain activity or product. However, it also admits the possibility of the producer or operator to prove the absence of such an effect. Even though this Communication is soft law, one cannot deny the contributions the EU has made towards the development of the Precautionary Principle and its expansion to all issues regarding either the environment or human health[58] (RECUERDA, 2008, p. 31).

In recent case law, ITLOS has applied the Precautionary Principle, even if not expressly. This occurred in the Southern Bluefin Tuna cases (ITLOS, Southern Bluefin, p. 20, para. 77) in face of the scientific uncertainty regarding the measures of

[58] For example, Directive 2001/18/EC of the EP and of the Council of 12 March 2001 **or** Council Regulation (EC) N.º 708/2007 of 11 June 2007.

conservation that should be taken concerning Bluefin Tuna (ITLOS, Southern Bluefin, p. 20, para. 79). In the end, by ordering the parties to refrain from any experimental fishing programmes, the court clearly applied the Precautionary Principle even without expressly naming it, by refusing to allow Japan to conduct an experimental fishing programs to assess if it would be possible to increase the catch without compromising management objectives for recovery of the Southern Bluefin Tuna stocks. (ITLOS, Southern Bluefin, 2000, p. 12, para. 24).

In 2010, the ICJ recognized the Precautionary Principle in the Pulp Mills Case, even though it did not apply it to its dire consequences, rejecting it as a reason for the reversal of burden of proof by stating that "*the Court considers that while a precautionary approach may be relevant in the interpretation and application of the provisions of the Statute, it does not follow that it operates as a reversal of the burden of proof*" (ICJ, Pulp Mills, 2010, p. 71, para. 164).

AO17 however, changed the paradigm of the Precautionary Principle both in Law of the Sea and in Environmental Law. The SDC established that, because this principle is present in so many legal instruments, which refer back to Principle 15 of the already mentioned Rio Declaration, a trend has been initiated towards turning the precautionary principle into a part of customary international law (ITLOS, AO17, 2011, p. 47, para. 135) as it recognized that there was both "*usus (use of the custom), and opinio iuris (the belief that a behaviour was displayed because it was a legal obligation).*" (RECUERDA, 2008, p. 24).

However, controversy arises once individual entities or parties try to establish the criteria for the application of this Principle in practice (RECUERDA, 2008, p. 3) particularly when it comes to classifying this idea as an Approach or a Principle (RECUERDA, 2008, p. 3). We have chosen to address the Precautionary Principle and therefore, for a question of clarity, a few lines should be devoted to the Approach v. Principle issue[59].

[59] Due to its evolution and growing importance in international environmental law, we will use the term Precautionary Principle, despite citing sources that refer to it as the precautionary approach.

3. A Principle or an Approach

The United States have opposed to the "*Principle*" designation because Principles of law are a source of law. According to Dworkin in "Taking Rights Seriously", addressing the Precautionary Principle as such would make it hard law and allow it to be applied by a court in order to interpret and fill out gaps (*apud.* RECUERDA, Miguel A. - Dangerous Interpretations of the Precautionary Principle and the Foundational Values of European Union Food Law: Risk versus Risk - p. 5). This is what happens within the EU where, the Principle is incorporated in numerous legal texts at different levels. For this reason, an approach becomes a much more desirable term in a highly technology driven State.

Although in some cases approach can be seen as binding, this is not usually the case (RECUERDA, 2008, p. 5). The term "*approach*" is mainly seen as a risk assessment technique. According to Recuerda, the "*precautionary approach is a particular "lens" used to identify risk that every prudent person possesses*" (RECUERDA, 2008, p. 5).

In international law of the sea this issue is unclear. AO17 itself refers to this concept as the Precautionary approach throughout. Nevertheless, when it refers to the French texts of the Authority's Regulations which mention this concept as the Precautionary Principle (ITLOS, AO17, 2011, p. 47, para. 133), it leaves the reader to wonder what exactly this represents for international law of the sea.

Nevertheless, even those who admit the existence of a Precautionary Principle recognize that it has many versions which can be mostly divided into two categories: Weak and strong versions. Those who argue for weak versions state that "*lack of decisive proof in regard to the possibility of grave harm must not be a reason to negate adopting regulatory measures*" (RECUERDA, 2008, p. 17). Those who adopt this version of the Principle base themselves upon the text of Principle 15 of the Rio Declaration as here the Precautionary Principle will only be applied if there is "*serious or irreversible damage*" (not any kind of damage will do) and "*lack of full scientific certainty*". Even with these conditions, States will apply the Principle "*according to their capabilities*" (RECUERDA, 2008, p. 17). We do not agree with this limited weak version of the precautionary

Principle as it removes any possibility of a standard of action or of measures of what would be the effective application of the Principle.

The strong versions, however, remove all these limitations: Any risk will be valid for the application of this Principle as well as any kind of scientific uncertainty (even related to the causal link between the cause and potential effects) (RECUERDA, 2008, p. 17). Some would view this version as aggressive and limitational. We, however, believe that a stronger version of the Principle will be more useful than one that will let slide most risks because they are deemed unimportant. In fact, according to AO17, completely disregarding risks will "*amount to a failure to comply with the Precautionary approach*" (ITLOS, AO17, 2011, p. 46, para. 131). This does not mean paralyzing progress as some might say, but instead, stop and think about how progress can be achieved without causing as much impact as it could. A stronger version of this Principle will allow for better and more effective standards.

4. The Denial of the Principle

Some authors have suggested that precaution is a risk management technique that emerged as a decision-making paradigm when we are faced with the uncertainty of science (GOMES, p. 323).

One of the main arguments of these authors is that the application of the Precautionary Principle will inevitably hinder progress. According to them, the Precautionary Principle uses the phrase *in dubio pro ambiente* despite of any causality link between a certain conduct and the serious or irreversible damage that conduct may cause (GOMES, 2017, p. 323). From their point of view, asking operators to prove beforehand that their activity is "*zero risk*" will impose significant costs becoming an obstacle impossible to overcome (GOMES, 2017, p. 327).

However, as has been mentioned, we live in Ulrich Beck's "*Society of Risk*" (BECK, 2015) and therefore proving/achieving "*zero risk*" will never be the goal as it would be unrealistic. Thus, the logic behind the Precautionary Principle is one where if there is uncertainty regarding the potential risks of an activity, authorities should be able to take measures to minimize those risks or stop the activity altogether. The fact that

today we are aware of the risks that certain activities pose means that we have grown as a society, and that we are able to recognize that certain activities are bound to cause serious or irreversible damage and are not therefore worth any advantage they may or may not bring. Van der Linde and Porter argue in "Toward a New Conception of the Environment - Competitiveness Relationship" that applying environmental standards through well designed regulation, for example, will in fact boost innovation which in its hand will inspire productivity and consequently increase profit (*apud* JONES, Daniel O. B. *et al.* - Existing environmental management approaches relevant to deep-sea mining - p. 173).

Cross argues in "Paradoxical Perils of the Precautionary Principle" that the Principle only applies to new activities posing new risks because we have forgotten the old risks (*apud.* GOMES, Carla Amado - Precaução e Proteção do Ambiente - Da Incerteza à Condicionalidade - p. 327). Once again, we completely disagree with this argument as is defeats the point of any precautionary action, which is to prevent serious or irreversible damage when we do not know much about a certain activity's effects. In the case of old risks, the international community has recognized the negative impacts of many of these old activities and has acted to reduce them. For example, within the international community, States have agreed to lower carbon emissions through the Kyoto Protocol as well as the Paris agreement both of which are included within the UN Framework Convention on Climate Change[60] (UNFCCC), a Convention whose aim is to apply appropriate measures aimed at halting climate change and dealing with its impacts.

Finally, some fear that the application of the Precautionary Principle could lead to a great deal of discretion by the authorities and to arbitrariness. Nevertheless, we cannot forget that the Precautionary Principle is, in fact, a Principle, that will always have to be applied and balanced with other Principles, such as the Principle of Proportionality, the Principle of Non-Discrimination and must always be subject to review in case new scientific data arises.

[60] UNFCCC: https://unfccc.int/ last visited on the 24th of May 2019.

From our point of view, the term Principle is a more realistic description of reality. The support this designation is yet to gain within law of the sea is extremely necessary as the marine system is highly connected, causing hazardous effects of certain activities to spread out. Because of this, the full effects of activities such as deep-sea mining are virtually unknown hence the need for the Precautionary Principle.

5. The Precautionary Principle Applied to Deep-Sea mining

Having summarised in our thesis, the main arguments and necessary data for the problem, we must now answer the question: Should we apply the Precautionary Principle to deep-sea mining? In order to be able to answer this question we have analysed reports issued by various international organizations[61] which offer a step by step guide for the application of the Precautionary Principle. Using these guidelines, we have devised a set of questions that will help us decide if precautionary measures are in fact needed.

First of all, does the scientific assessment of this activity show that plausible harm can be derived from it?

Even though not that many deep-sea mining operations have taken place (and those that have, were in fairly small scale being incomparable to those that will happen if we move on to commercial mining), there is room to say that there can be plausible damage arising from deep-sea mining.

When we analysed the environmental impacts of deep-sea mining, we concluded that plausible environmental harm can arise from deep-sea mining, whether it is for the damage left behind by the ROVs, the crushing of fauna and flora or the spreading of a sediment plume throughout the water column due to currents.

[61] For example, the International Union for Conservation of Nature guide (IUCN) - **Guidelines for applying the Precautionary Principle to biodiversity conservation and natural resource management as approved by the 67th meeting of the IUCN Council** or EP - **Information Brochure 13 - Application of the Precautionary Principle for Deep Sea Minerals** [Online] [Last visited on the 1st of May 2019]. Available at WWW:<URL:http://dsm.gsd.spc.int/public/files/resources/Deep_Sea_Minerals_in_the_Pacific_Islands_Region_Brochure_13_Precautionary_Principle.pdf>.

Having established that plausible harm can arise from deep-sea mining, we must now answer a second question which is:

How serious and/or irreversible is this harm?

The answer is not clear. According to the Exploration Regulations, regulation 1 (3) (f) for example serious or irreversible damage is:

> *"any effect from activities in the Area on the marine environment which represents a significant adverse change in the marine environment determined according to the rules, regulations and procedures adopted by the Authority on the basis of internationally recognized standards and practices".*

However, some consider that this definition is not enough. In the specific case of deep-sea mining, some argue that in the future the Authority must adopt a functional definition of these terms which will have serious effects within and beyond national jurisdiction (LEVIN *et al.,* 2016, p. 246).

Let's take the environmental impact statement for the Solwara 1 mining site. This mineral source sought by the NM is located at approximately 1.600 m water depth on the floor of the Bismarck Sea (NM, 2008, p. 1). According to their environment impact statement, impacts of this project will include the direct removal of the seafloor substrate "*causing loss of habitat and associated animals*". Moreover, the "*removal and relocation of the surface layers of unconsolidated sediment*" will inevitably cause further destruction on the seafloor. In addition, the water column will be contaminated, and shallow water species affected as "*Water containing elevated concentrations of metals and some retained sediments from the dewatering of ore will be discharged 25 to 50 m above the seafloor*". Underwater noise is also pointed out as an impact which is problematic as many underwater species depend on sound waves for communication or hunting food. Finally, the assessment goes on to state that "*If unplanned events were to occur, additional issues could arise from loss of material from abnormal conditions, ranging from minor leaks of hydraulic fluids, pump and rise pipeline failures, spillage of ore during transfer, to ship collisions*" (NM, 2008, p. 26). The significance of all these impacts is undisputable and their

mitigation is extremely hard as we are talking about ecosystems that are not that well known.

However, the environment impact statement for the Solwara 1 mining site goes on stating that:

> *"The time sequence for the recovery of fauna is not known precisely but it is expected, from observations during research surveys, that within a few years, the major faunal elements will have re-established. It is also evident that animals living in such a highly mineralised area are tolerant to the naturally elevated levels of metals in ambient water and sediments compared with those from mid water or shallower and less naturally contaminated environments."* (NM, 2008, p. 26)

The use of the word "*not known*" is key, revealing true scientific uncertainty regarding the described effects. The uncertainty of these impacts specially around fragile ecosystems such as the ones surrounding hydrothermal vents that were completely unknown to exist until fairly recently is indisputable.

Having established that we are before an activity plausible of causing serious or irreversible harm but about which there is scientific uncertainty, we have indications to apply the Precautionary Principle.

This brings us to the next question:

How precautious do we have to be?

Some say that simply monitoring the activity and solving environmental impacts as they happen and learning from them is enough of an application of the Precautionary Principle. However, we agree with E. Mitchell when she states that this "*learn by doing approach*" represents "*an incorrect interpretation of the Precautionary Principle, which seeks to prevent environmental damage before it occurs*". (MITCHELL, 2012, p. 7). The ITLOS has also opposed to such an approach in the aforementioned Southern Bluefin Tuna cases (ITLOS, Southern Bluefin, 2000, p. 20, para. 79 and 80).

Nevertheless, some scientist state that if environmental management measures were to be used to mitigate the impacts of deep-sea mining, the effects felt would not be at all permanent or that damaging. However, others say that these measures will only do so much and that "*serious harm will inevitably occur*" (KIM, 2017, p. 135).

Thus, considering the potential unknown risks, which we have addressed, it is our opinion that precautionary measures have to be put in place as we are dealing with fairly new technology, an unknown resource and unknown impacts.

We must now analyse the state of the art in terms of the deep-sea mining legal framework for the three main actors of deep-sea mining beyond national jurisdictions (Contractors, Authority and Sponsoring States), identifying its strong and weak points.

VII. The stakeholders of deep-sea mining, their obligations and the influence of the Precautionary Principle

1. Advisory Opinion 17 - Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area

For the development of this chapter, some backstory on AO17 is fundamental.

AO17 came from a need to know what the obligations of Sponsoring States were concerning activities in the Area. The process that led to it started in 2008 when Nauru Ocean Resources Inc. and Tonga Offshore Mining Limited, sponsored by Nauru and Tonga applied for exploration in the Area. However due to the underdevelopment of these States, many doubted their ability to meet with standard State obligations. As Zhang stated, "*the focus of the controversy amongst States was: What is the nature and the specific standards of the obligations under the LOSC system? What measures shall the Sponsoring State take to fulfil its obligations?"* (ZHANG, 2013, p. 683).

As we have stated, AO17 was revolutionary in the sense that it recognized that the application of the Precautionary Principle was essential in activities in the Area. In light of this, we will now attempt to continue the work of AO17 by providing a detailed analysis of the three main actors of this activity: The States, the Authority and the Contractors. We will focus on their legal nature and jural relations, their obligations, their liability and finally how the Precautionary Principle already fits into their regime. Our starting point will be the questions posed to the SDC.

The first and second questions analysed by the SDC were:

> *"What are the legal responsibilities and obligations of States Parties to the Convention with respect to the sponsorship of activities in the Area in accordance with the Convention, in particular Part XI, and the 1994 Agreement relating to the Implementation of Part XI of the UN Convention on the Law of the Sea of 10 December 1982?"*
>
> *"What is the extent of liability of a State Party for any failure to comply with the provisions of the LOSC in particular Part XI, and the 1994 Agreement,*

by an entity whom it has sponsored under article 153, paragraph 2(b), of the LOSC?"

Before analysing all the proposed issues, and because we will be addressing in detail the liability of all these actors, it is worth spending a few lines in the clarification of two issues concerning international liability: Private actors in International Law and the different standards of liability.

2. International Liability in International Environmental law and in the LOSC

2.1. Private Actors in International Law

The issue of private actors as subjects of international law is quite beyond the scope of our thesis. Nevertheless, offering the reader some of the most recent insights on this subject may be helpful to allow the full understanding of the international obligations of Contractors in light of the LOSC[62].

The traditional perspective concerning administrative law was that it would always have at its source, national law. According to this view even if we were to consider the existence of international obligations, these would have to go through national law and find themselves transfigured into national rules (CASSESSE, 2004, p. 5). However, this perspective has been challenged. The phenomenon of globalization connected the world, socially, culturally and economically. Thus, the creation of the so-called global village brought with it the "Globalization of Law" (MARTY, 1999, p. 132). This gave rise to international administrative law, which tied itself to global administrations and the rise of global rules which addressed States, as well as private actors (CASSESSE, 2004, p. 5).

In "Administrative Law without the State? The Challenge of Global Regulation" Sabino Cassese goes as far as to argue that we are moving towards a global

[62] For a more detailed insight on private actors as rights-holders in international law see, ROCHA, Armando Luís Silva - **Private Actors as Rights-Holders under the International Law of the Sea**. Lisbon: Universidade Católica Portuguesa, 2018.

administrative law where global governance is in the hands of organizations like the Authority (*apud.* ROCHA - Private Actors as Rights-Holders under the International Law of the Sea - p. 362). In fact, the drafters of LOSC made the relationship between the Authority and private miners a paradigmatic example of this new dynamic where an international organization, created by a Convention, is described by some as a "*state-like entity*" (ROCHA, 2018, p. 366) whose function within the international legal order is to manage the, already mentioned, CHM. For this purpose, this entity intervenes directly in the sphere of private actors.

The Report of the WTO Appellate Body on the Shrimp v. Turtle illustrates all this as it agreed that Member States are entitled to adopt domestic measures that affect private parties from another State (Shrimp v. Turtle, 1998, para. 182 *et seq.*) as long as these *"are not applied in a manner that constitutes a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail or a disguised restriction on international trade."* (Shrimp v. Turtle, 1998, para. 186 *et seq.*). According to the Appellate Body, these domestic measures should always be accompanied by due process requirements (Shrimp v. Turtle, 1998, para. 180 *et seq.*) so as to avoid arbitrariness. In addition, this decision also paved the way for such measures to be adopted within the international organizations with the same requirements, such as the Authority (ROCHA, 2018, p. 366). Thus, we have a direct interaction between States, International Organizations and Private actors in the International plane.

The relevance of the Authority in a context of global administrative law is clearly visible when we are faced with the scarcity of specific rights and duties of the private actor at a pre-contractual phase, contained in the LOSC and related instruments (ROCHA, 2018, p. 358, *et seq.*). This could potentially be discouraging by those wishing to endeavour in activities in the Area. However, according to Rocha, this scarcity is what makes the existence of global administrative law of paramount importance as if we perceive the principles of global administrative law as general principles of law (through Article 38 (c) of the ICJ Statute, for example) we are able to limit, for example, the discretion of the Authority though principles of non-discretion or due process (for example a right to procedural transparency and rights

to compliance with proportionality standards respectively) (ROCHA, 2018, pp. 366-368). In the LOSC itself, we can see the drafters were already trying to include the aforementioned principles of global law in order to limit the discretion of the Authority. For example, plans of work can only be refused according to specific reasons mentioned in the LOSC. Some would even state that there is a right to the plan's approval[63]; as Armando Rocha puts it, "*The goal of the procedure, thus, is to assess whether the conditions are met and to regulate with greater detail the discretionary powers of the Authority"* (ROCHA, 2018, p. 360). This guarantees that private actors are not only invited to participate in International law but also are protected in doing so.

2.2. The Standard of Liability

It is generally accepted in international law, that when looking at liability, one must look at the degree of fault, which is necessary to impose liability (CRAIK, 2018, p. 1). For us the simplest way to grasp the idea of what liability entails is that out forward by La Fayette: "*A person or entity responsible for causing harm to another must "make good" the harm or compensate the victim for the damage suffered*".

Some of the levels of liability that are identified throughout the bibliography on deep-sea mining are negligence or due diligence, strict liability, residual liability and absolute liability.

Negligence or a breach of an obligation of due diligence requires a degree of fault that corresponds to a breach of a certain standard of care and a causal link between the actions of the subject of liability and the damage caused[64] (CRAIK, 2018, p. 1). However, it is worth mentioning that due diligence is a variable concept in permanent evolution. As Zhang puts it "*Measures considered to be sufficiently diligent at a certain moment may become not diligent enough in light of new scientific or technological knowledge.*" (ZHANG, 2013, p. 689). In fact, in AO17, the SDC agreed with this view and went further by saying that even in activities in the Area that are occurring at the same time, the

[63] LOSC, Annex III, Article6 (3).

[64] For the purpose of these thesis, and even though the text of the LOSC is unclear, we will adopt the notion proposed by AO17 which is that the word "d*amage*" refers to "*the damage to the Area and its resources constituting the Common Heritage of Mankind, and damage to the marine environment*." (ITLOS, AO17, 2011, p.59, para. 179).

standard of due diligence may not be the same as "*activities in the Area concerning different kinds of minerals (…) may require different standards of diligence. The standard of due diligence has to be more severe for the riskier activities.*" (ITLOS, AO17, 2011, p.43, para. 117). Therefore, this standard must evolve and develop according to the known risks along with new scientific discoveries regarding this activity.

Residual liability, in its turn, could occur if the actor or entity under the control or jurisdiction of another entity, exercising due diligence, had caused the harm and was impecunious or could not otherwise be held liable. In this case, the controlling entity or state will be held liable due to the fact that it is expected to exercise due diligence (CRAIK, 2018, p. 1).

Finally, **strict liability** will hold a certain subject responsible even if there is no link between its actions or omissions and the damage caused. This type of liability is usually associated with activities which involve a high degree of risk as it occurs without there being any fault. It may, however, allow for certain exceptions such as acts of war, necessity and third party or contributory negligence. **Absolute liability** will occur where no such exceptions exist (CRAIK, 2018, pp. 1-2).

Nevertheless, liability in environmental law still lacks a unitary body of law (CRAIK, 2018, p. 1) including when it comes to deep-sea mining in particular. As we will see, the uncertainty of the liability regime in deep-sea mining poses an unsettling scenario. Precautionary measures must be applied as the risk of the liability question being left unanswered in the end is too great.

With all this in mind, in the next few pages we will analyse the main obligations of the three actors of deep-sea mining (Contractors, the Authority and Sponsoring States) along with how the Precautionary Principle is already reflected in their regime. In addition, we will also focus on what is the standard of liability for each one of these actors.

2. Contractors

2.1. Regime and Definition

Looking at Article 153 (2) (b) of the LOSC, we are faced with a Convention that invites legal and natural private parties to participate in the international law. According to this Article, activities in the Area are to be carried out by the Enterprise and/ or States Parties, State enterprises and finally natural or juridical persons which are nationals or controlled by a State Party or their nationals.

They are invited to do so through the Authority being given, by the LOSC, the right to submit an application to carry out activities in the Area. If it is approved, they will be given a title of exploration or exploitation of the Area for a specific category of resources which is covered by the plan of work presented to the Authority[65]. Once these actors obtain a title of exploration or exploitation, they become "*Contractors*".

However, Article 153(2)(b) imposes two conditions without which no operator can aspire to pursue activities in the Area. Firstly, that commercial operator must possess either the nationality or be controlled by a State Party. Secondly, they should have a sponsor which, according to Article 139, can be either an International Organization or a State Party[66].

2.2. Responsibilities and Obligations in light of the Precautionary Principle

As we have said, the specific rights and obligations of contractors are scarcely found in the law of the sea framework, thus the importance of the aforementioned global administrative law principles. Nevertheless, we will analyse some of the ones present in the LOSC and the part the Precautionary Principle already plays on these specific rights and obligations.

[65] LOSC, Annex III, Article 16.
[66] Due to the scope of our thesis we will only address the regime of Sponsoring States. However, almost everything mentioned in this chapter will apply to these entities.

Some authors discuss that there might be a "*right of approval*" of the Contractor's application. However, this approval always comes from the Authority and in order to get it, those who wish to carry out these activities must submit an application to the Authority[67] where the applicant must accept it will be bound to Part XI and Annex III of the LOSC, the rules, regulations, and procedures adopted by the Authority[68] and promise to do so in a written statement[69]. The applicant will also accept the control of the Authority and Sponsoring State over its activities in the area[70] and will provide written assurance that it will fulfil its obligations in good faith[71]. Finally, the applicant must submit a prior assessment of what are the potential environmental impacts of the activities it is setting out to do as well as a description of a programme for oceanographic and baseline environmental studies[72]. This reveals the LOCS's drafters' concern for the application of the Precautionary Principle, as it shows that the Authority's decision to award contracts will be based upon scientific data coming from the oceanographic and baseline environmental studies. Nevertheless, there are no clear guidelines or standards for these studies and being that there are still no international standards for EIA's it can be argued that the Precautionary Principle is not being effectively applied.

If the private actors are awarded an exploration or exploitation title, they will be faced with the obligations linked to the contractual phase. At this point, the Contractor is bound by whatever obligations are established in the contract paying special attention to its core Principles[73]. Moreover, the Contractor must obey any instructions coming from the Authority, as well as its rules, procedures and regulations. Finally, the Contractor will fulfil its obligations in good faith during the duration of the contract[74]. If the Contractor fails to do so the Authority will suspend or terminate the

[67] LOSC, Article 153 and Annex III.
[68] LOSC, Annex III, Article 4 (6) (a).
[69] LOSC, Annex III, Articles 2, (1) (b) and 4 (6) (a).
[70] LOSC, Annex III, Article 4 (6) (b).
[71] LOSC, Annex III, Article 4 (6) (c).
[72] 1994 Agreement, Annex, Section 1 (7); Polymetallic Nodules Regulation, Regulation 18 (b), (c) and (d) and Sulphides Regulation and Cobalt-rich Ferromanganese Crusts Regulation, Regulation 20 (b), (c) and (d).
[73] LOSC, Annex III, Articles 4 (4).
[74] LOSC, Annex III, Article 4 (6) (c).

Contractors rights[75]. Additionally, the Contractor will incur in liability if its wrongful acts cause damage[76]. This will be further addressed in the next chapter.

It is important to mention that both the Authority and the Sponsoring State have an obligation to ensure that those who are carrying out activities in the area or wish to do so fulfil the abovementioned obligations. Nevertheless, we are before two different sets of obligations: On one hand, the obligations both the Authority and Sponsoring States have in ensuring Contractors behave according to their obligations. On another hand, we have the direct obligations that Contractors must comply with that derive directly from the LOSC, annexes, procedures, rules and regulations and their contracts. Violating such obligations will bring the abovementioned direct consequences (suspension or termination of the contract and liability)[77].

2.3. Contractor Liability

The way liability is treated in International Environmental Law has changed severely in the last century concerning hazardous activities. Firstly, its scope went from only concerning the damage affecting people and property to one that also concerned the environment (FAYETTE, 2010, p. 320). Secondly, while at first the focus was mainly on state actors, as soon as transboundary issues started arising, States negotiated new treaties allowing for liability to be placed on the so-called *"operators*", the private parties carrying out the so-called *"hazardous activities"* (FAYETTE, 2010, p. 320).[78]

Civil responsibility is not a new concept. In fact, the 1996 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS)[79] for example strives to minimize

[75] LOSC, Annex III, Article 18.
[76] LOSC, Annex III, Article 22.
[77] LOSC, Annex III, Article 22.
[78] For the purpose of this thesis, we will only be analysing the liability standards that arise from the LOSC while understanding that they are not the only existing ones and are not necessarily applied in the same forms for all environmental law. More on Liability in Environmental law FAYETTE, Louise De La - International Liability for Damage to the Environment. In FITZMAURICE, MALGOSIA; ONG, DAVID M.; MERKOURIS, PANOS (Eds.) - **Research Handbook on International Environmental Law**. Northampton, USA: Edward Elgar, 2010. ISBN 9781847201249. pp. 320–360.
[79] HNS 1996 - http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-on-Liability-and-Compensation-for-Damage-in-Connection-with-the-Carriage-of-Hazardous-and-Noxious-.aspx last visited on the 20th of May 2019.

the effects of a potential incident involving the transportation of HNS. It states that, until a certain limit, the shipowner will have to compensate for, amongst other types of damage, environmental damage. Unfortunately, due to lack of signatures, this Convention has not yet entered into force. The same is true for the Convention on Jurisdiction and the Recognition and Enforcement of Judgments in Civil and Commercial Matters (Lugano Convention) which aims at ensuring adequate compensation, prevention and reinstatement for damage resulting from dangerous activities to the environment. The Lugano Convention, was signed in 2007 but to this day, counts with only nine ratifications and has been suspended by other EU legislation and protocols (FAYETTE, 2010, p. 340). However, these attempts serve to show that the idea of civil liability is not a strange one to international environmental law.

In terms of liability of the Contractor in law of the sea, the LOSC is clear: "*The Contractor shall have responsibility or liability for any damage arising out of wrongful acts in the conduct of its operations*"[80]. The direct obligation of prevention of environmental harm is however, not on Article 22 but on the Authority's previously mentioned regulations. For example, the Exploration Regulations state that "*Each prospector shall take necessary measures to prevent, reduce and control pollution and other hazards to the marine environment arising from prospecting, as far as reasonably possible, applying a precautionary approach and best environmental practices*"[81].

By combining both these provisions we can reach the conclusion that we are before a standard of due diligence as no damage will occur without a "wrongful act" practised by the Contractor[82].

Therefore, firstly, for there to be liability for the contractor, there must first be damage. Without it, even if there was a wrongful conduct by the Contractor, there won't be liability. Nevertheless, as we have mentioned, in the case of Contractors,

[80] LOSC, Annex III, Article 22.
[81] Exploration Regulations, Regulation 5 (1).
[82] LOSC, Annex III, Article 22.

carrying out deep-sea mining and not complying with their obligations, will mean the suspension of the rights included in their contract or its termination[83].

Secondly there must be a "*wrongful act*" by the Contractor. For example, if the Contractor fails to comply with an emergency order, this act or omission will be considered wrongful, and the Contractor will be deemed liable (CRAIK, 2018, p. 4). However, due to the expression *"necessary measures"* present in the regulations, it is argued that we are before a standard of due diligence (CRAIK, 2018, p. 4) and that therefore, a damage that arises even though all "*necessary measures*" were taken, would not entail liability.

Thirdly, there must be a causal link between the wrongful act of the Contractor and the damage caused. If the latter is not verified, then this would mean that Article 22 wouldn't be applied and that damage to the environment could go unremedied.

There may still be cases where the other two mentioned actors come into play through residual or joint liability. For example, there may be occasions when the Contractor is unable to meet its liability in full due to bankruptcy (ITLOS, AO17, 2011, p. 64, para. 203) or the Sponsoring State has failed to take the required measures but there is no causal link with the environmental harm (ITLOS, AO17, IUCN, 2010, p. 26, para. 83). In these situations, it is unclear who will be responsible for the damage. This will be further addressed when we are discussing the liability of the Authority and Sponsoring States.

3. The Authority

3.1. Regime and Definition

The Authority's regime is included in Part XI of the LOSC. The Authority *per se* is properly introduced through Article 137 (2):

> *"All rights in the resources of the Area are vested in mankind as a whole, on whose behalf the Authority shall act. These resources are not subject to alienation.*

[83] LOSC, Annex III, Article 18 (a).

> *The minerals recovered from the Area, however, may only be alienated in accordance with this Part and the rules, regulations and procedures of the Authority."*

The main point which we can take from this provision is that, the Authority is the organization that controls activities in the Area and administers its resources.

According to Articles 136 and 137 of the LOSC, if any claim, acquisitions or exercise of rights is made without the support of the LOSC, the Authority's regulations, rules and procedures, of the 1994 Agreement, it will not be recognized. Because of this and due to the vertical jural relationship the Authority has with Contractors, some go as far as classifying it as a state-like entity (ROCHA, 2018, p. 338).

In terms of its composition, the most important bodies of the Authority are the Assembly[84], the Council[85] and the Secretariat[86]. The Assembly is the maximum organ of the Authority establishing general policy and to which all other bodies report to. Its membership consists of all the parties' part of the 1982 LOSC[87]. The Council holds the executive powers of the Authority. Finally, the Secretariat consists of the Secretary-General, the Chief Administrative officer of the Authority and over 40 staff members divided amongst the Office of the Secretary General, the Office of Environmental Management and Mineral Resources, the Office of Legal Affairs and the Office of Administrative Services. The Authority also possesses a Legal and Technical Commission, responsible for aiding the Council and the Assembly in their decisions with scientific and legal expertise concerning exploration and exploitation of non-living marine resources[88], and the Finance Committee which is responsible for all financial matters regarding the Authority. Finally, we could not address the composition of the Authority without mentioning the Enterprise[89]. The Enterprise is the operational arm of the Authority. Its mandate is to pursue activities in the Area,

[84] LOSC, Article 159 *et seq.*
[85] LOSC, Article 161 *et seq.*
[86] LOSC, Article 166 *et seq.*
[87] LOSC, Article 156 (2).
[88] Not to be mistaken for the aforementioned Office of Legal Affairs which is a central service of the Authority's secretariat providing legal advice and representing the Authority in legal conferences and in judicial proceedings.
[89] LOSC, Articles 170 and 153 (2).

including transport, processing and commercialization of the Area's resources. It was to do so on its own as well as in association with developing States[90].

3.2. Responsibilities and Obligations in light of the Precautionary Principle

Even after the 1994 Agreement, one can still note that the Authority has an extremely broad mandate which allows it both to be a deep-sea mining competitor as well as the regulator of such an activity, as States will act through the Authority in order to "*organize and control activities in the Area*"[91] bearing[92] "*the main responsibility to realise a just and equitable economic order of the oceans and seas*" (SCOVAZZI, 2004, p. 391). As we shall see, the role of the Authority, along with the instruments that have been approved by this institution, are already heavily marked by the Precautionary Principle.

For starters, as we have stated *supra,* LOSC defines the Area and its resources as CHM[93] and the role of the Authority is to ensure that there is "*an equitable sharing of financial and other economic benefits derived from activities in the Area*"[94]. In fact, as noted by the SDC, Article 153 (4) states that the Authority has the obligation to exert the necessary control over activities in the Area in order to secure compliance with part XI of the LOSC, the rules, regulations and procedures of the Authority, and the plans of work approved in accordance with Article 153 (3).

But, by looking beyond the economic rationale concerning the CHM Principle, one could argue that the establishment of the Principle was a way in itself to apply the Precautionary Principle in activities within the Area. If we go back to our analysis of the CHM Principle, we can see that in order for it to be applied, the resources of the Area cannot face rapid depletion and that precautionary measures must be put in place to avoid such a scenario.

[90] LOSC, Article 148.
[91] 1994 Agreement, Annex, Section 1 (1).
[92] LOSC, Article 153.
[93] LOSC, Article 136.
[94] LOSC, Article 140 (2).

In addition, the Authority's broad mandate encompasses several matters which should be addressed through rules, procedures and regulations. Examples of such matters are the Authority's responsibility to promote the effective protection of the marine environment as well as encouraging and even carrying out scientific research in the Area[95].

Concerning the effective protection of the marine environment and biodiversity from potentially harmful effects that can arise from exploitation or exploration, Article 145 of the LOSC provides the Authority with the competence to adopt the aforementioned "*appropriate rules, regulations and procedures*". According to some, this obligation goes beyond adopting measures that mitigate the effects of deep-sea mining, including the responsibility for ensuring the protection and conservation of all the fauna and flora present in the Area as well (SCOVAZZI, 2004, p. 393).

In order to fulfil its mandate on this matter, the Authority has already approved multiple regulations and recommendations which make up the Mining Code. The Exploration Regulations possess a distinctive environmental character throughout and include a Part V which addresses the "*protection and preservation of the marine environment*". In addition, the Exploration Regulations feature a disposition stating that the Authority and prospectors or Contractors "*shall apply a precautionary approach, as reflected in Principle 15 of the Rio Declaration on Environment and Development*"[96] showing the growing concern of drafter and decision makers have for the application of this Principle. Moreover, all these regulations recognize the vulnerability of certain marine ecosystems such as cold-water corals, seamounts and hydrothermal vents[97], which could potentially serve as a legal base for special MPA's and even to completely forbid mining in and around such vulnerable areas (JAECKEL, 2017, p. 216).

[95] Other matters such as these are the Protection of Human life (LOSC, Article 146) or the protection of underwater cultural heritage (LOSC, Article 149). However, due to the scope of this thesis we decided to not include a thorough analysis of these issues, recognizing nevertheless the importance of either one.
[96] Sulphides and Polymetallic Nodules Regulations, Regulation 2 (2) and Cobalt-rich ferromanganese crusts Regulation, Regulation 2 (2) and (3).
[97] Nodules Regulations, Regulation 31 (4); Sulphides Regulations; Cobalt-rich ferromanganese crusts Regulation Regulation 33 (4).

Furthermore, by defining the precautionary approach as one of the obligations of Sponsoring States[98], these regulations transformed the "*non-binding statement of the precautionary approach in the Rio Declaration into a binding obligation*" (ITLOS, AO17, 2011, p. 46, para. 127).

Nevertheless, in AO17, the SDC criticized the Authority stating that the Precautionary approach was only reflected in these regulations concerning exploration and that the legal framework for exploitation is still to come (ITLOS, AO17, 2011, p. 46, para. 130). According to the SDC the Authority is expected to "*either repeat or further develop this approach"* in the regulations to come (ITLOS, AO17, 2011, p. 46, para. 130).

Other projects of the Authority concerning the effective protection of the marine environment include the Environmental Management Plan for the Clarion-Clipperton Zone (CCZ) through Areas of Particular Environmental Interest (APEI). All these APEI are surrounded by 100 km buffer zones called safety margins that aim at minimizing environmental harm that may come from exploration and exploitation activities (JAECKEL, 2017, p. 214). This could be seen as an application of the Precautionary Principle. Nevertheless, the Authority's Legal and Technical Commission recommended the adjusting of the APEI in order to avoid changing the existing contracts thus compromising the application of the Precautionary Principle (JAECKEL, 2017, p. 206). Nevertheless, even though it could be argued that these areas possess a limited value due to the fact that they should have been designated before the contracts had been granted, we cannot help but feel that it was the step in the right direction.

According to the LOSC, the Authority is also under the obligation to "*promote and encourage the conduct of marine scientific research in the Area and shall coordinate and disseminate the results of such research and analysis when available*" [99]. The role of the Precautionary Principle in the drafting of these dispositions is clear as scientific knowledge is one of

[98] Nodules Regulations, Regulation 31 (2); Sulphides Regulations; Cobalt-rich ferromanganese crusts Regulation Regulation 33 (2).
[99] LOSC, 143 (2).

the pillars that dictates the application, or not, of this Principle. The Authority has tried to carry out this obligation through various measures.

The Kaplan project was a way of attempting to satisfy this pursuit for knowledge. Between 2002 and 2007, this project financed by the Authority and the JM Kaplan Fund focused on the biodiversity levels and gene flows and recolonization following disturbances in the abyssal plains of the CCZ. The technical study that resulted from it found that biodiversity varied tremendously in different locations and eventually served as a base for the Environmental Plan for the CCZ (JAECKEL, 2017, p. 196).

Other initiatives that contributed to scientific research within the Area were the 2006 Workshop on Cobalt-Rich Crusts and the Diversity and Distribution Patterns of Seamount Fauna designed to establish what data was needed from Contractors to establish environmental baselines and associated monitoring programmes; or the ongoing collaboration of the Authority with *Census of Marine Life on Seamounts,* an initiative that investigates biodiversity and abundance of marine life in seamounts.

In addition, in 2001 the Authority's Legal and Technical Commission adopted the Recommendations for the Guidance of Contractors for the Assessment of Possible Environmental Impacts Arising from Exploration for Polymetallic nodules in the Area (ISBA/19/LTC/8) establishing that:

> *"After approval of the plan of work for exploration in the form of a contract and prior to the commencement of exploration activities, the Contractor is required to submit to the Authority: (…) (c) Data that could be used to establish an environmental baseline against which to assess the effect of future activities."*[100]

This data can be obtained through baseline data collection which will include a description of the "*physical, chemical, biological, geological and human-related environmental conditions that will prevail in the absence of the project, together with interactions between elements of them*." (JONES *et al.*, 2019, p. 176). Nevertheless, to this day, this data has not been divulged even though the Exploration Regulations all specifically classify that same

[100] ISBA/19/LTC/8, paragraph 8 (c).

data as non-confidential[101]. However, neither the Contractor nor the Authority have an obligation of disclosing such information aside from a general Principle of Transparency. Moreover, the Authority itself lacks the resources and institutional capacity to do this research (JAECKEL, 2017, p. 309).

Even so, the EU, Non-Governmental Organizations (NGOs) and other relevant stakeholders have criticized the Authority for this. According to these actors even though the Authority has disseminated some of the information acquired by the abovementioned initiatives through technical studies and workshop reports[102], it is yet to publicize the collected data by Contractors that have obtained their license for exploration (EP, 2015, p. 8).

We recognize that much has been done by the Authority to further the application of the Precautionary Principle. Nevertheless, research findings are still not used in full to promote the dissemination of knowledge. Furthermore, the scientific data that exists, and that is in the possession of the Authority, is still not applied in full in the development of environmental management measures. For the Precautionary Principle to be fully applied, scientific knowledge must be used and fomented to further management measures for the effective protection of the marine environment.[103]

3.3. The Authority's Liability

The Authority can be liable on two separate occasions, both described in annex III, Article 22.

[101] Exploration Regulations, Regulation 7 (1) and (2).

[102] For example, International Seabed Authority - **Biodiversity, species ranges, and gene flow in the abyssal Pacific nodule province: predicting and managing the impacts of deep seabed mining International Seabed Authority.** [Online] Kingston, Jamaica: International Seabed Authority, 2007. [Last visited on the 19th of May 2019]. Available at WWW:URL:https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/techstudy3.pdf. ISBN 978-976-95217-2-8.; International Seabed Authority - **A Geological Model of Polymetallic Nodule Deposits in the Clarion Clipperton Fracture Zone.** [Online] Kingston, Jamaica: International Seabed Authority, 2010. [Last visited on the 19th of May 2019]. Available at WWW:URL:https://ran-s3.s3.amazonaws.com/isa.org.jm/s3fs-public/files/documents/tstudy6.pdf ISBN 978-976-95268-2-2.

[103] For more information on the Precautionary Principle applied to the Authority's action see JAECKEL, Aline Lene - **The international Seabed Authority and the Precautionary Principle: balancing deep seabed mineral mining and environmental protection**. Boston: Brill Nijhoff, 2017. ISBN 9789004332270.

The first case occurs when the Contractor causes damage and there was a contributory act or omission by the Authority. The drafters of this provision chose to establish that the acts originating the damage had to be "*wrongful*" thus ruling out the possibility of the Authority or the Contractors of being subject to strict liability leaving us with due diligence (CRAIK, 2016, p. 5). An example could be an acceptance of a plan of work that had clear deficiencies environmentally wise or if the Authority, during its oversight of a mining operation, ignores clear violations of the Contractor's obligations.

Some claim, however, that there could also be joint liability. One of the main arguments for this theory is clause 16 of the standard clauses for exploration contracts (annex IV) of the Exploration Regulations (ROCHA, 2018, p. 377). In fact, section 16.2 and 16.4 mention a type of joint liability between the private miner and the Authority as a way of overcoming the shortcomings of dispute settlement. Here, just like in LOSC, Annex III, Article 22, it is stated that when private miners are liable for damage to the marine environment due to wrongful acts or omissions, the contributory acts or omissions of the Authority will always have to be taken into account when it comes to compensation (ROCHA, 2018, p. 377).

The second case where liability will arise for the Authority will be when damage derives directly from wrongful acts of the Authority in the exercise of its powers and functions. Again, the wording of the Article and particularly the word "*wrongful*" excludes strict liability leaving us with due diligence. However, what happens when the standard of due diligence is not met but there is no direct causality to damage? Or in cases where damage has gone uncompensated by the Sponsoring State and the Contractor? Could there be a fund or a form of residual liability? We will address this question further on the last chapter of our thesis.

4. Sponsoring States

4.1. Regime and Definition

Article 139 of the LOSC, does not exactly define what a Sponsoring State is. However, it does give us a notion of its role:

> *"States Parties shall have the responsibility to ensure that activities in the Area, whether carried out by States Parties, or state enterprises or natural or juridical persons which possess the nationality of States Parties or are effectively controlled by them or their nationals, shall be carried out in conformity with this Part".*

Article 153 (2) (a) of the LOSC and the Exploration Regulations[104] further this by stating that all those who wish to carry out activities in the area, must have a Sponsoring State throughout the entire process. Nonetheless, what does this mean in practice? To Oyarce "*sponsorship is the medium through which the Sponsoring State exercises control over the Contractor, by requiring it to comply with the provisions of the LOSC*" (OYARCE, 2018, p. 1).

So much importance is attributed to this figure that, in AO17, the SCD stated that in situations where the Contractors are nationals of one state, but their activities are under the effective control of another state, sponsorship of both States was necessary (ITLOS, AO17, 2011, p. 33, para. 77).

It is also important to mention that States Parties to the convention have obligations that derive from the Convention and related legal instruments directly (ITLOS, AO17, 2011, p. 44, para. 121) and will be held responsible for them despite of the actions of Contractors. These can be found for example in LOSC, Article 153 (4) *in fine* (obligation to assist the Authority) or in the Sulphides Regulation, regulation 33, (2) (Application of best environmental practices). We will talk about these in more detail in the next chapter.

4.2. Responsibilities and Obligations in light of the Precautionary Principle

Even though many provisions exist about the obligations of States, this regime is still deemed as fairly incomplete (ZHANG, 2013, p. 682). It is the view of Zhang, and ours, that there had never been an effort to densify this regime because until Tonga and Nauru "*Contractors and Sponsoring States were either strong developed States or legal persons*

[104] Exploration Regulation, Regulation 9 (b).

sponsored by strong States" (ZHANG, 2013, p. 682). Such States included Germany (Sponsoring State for Federal Institute for Geosciences and Natural Resources of Germany contract since July 19th, 2006), India (since March 25th, 2002) or France (Sponsoring State for Institut Français de Recherche pour l' Exploitation de la Mer since June 20th, 2001) (AUTHORITY, 2018).

In reality, the game changer for the clarification of what were in fact the obligations of States (specially regarding the actions of sponsored contractors) was AO17. In terms of defining what were the obligations and responsibilities of Sponsoring States, this advisory opinion's role was twofold: Firstly, it differentiated between direct obligations and the obligations related to being a sponsoring state and secondly, it provided the international community with a list of the major responsibilities and obligations of Sponsoring States bearing in mind the two previous categories.

The obligation related to the Contractor's conducts is present in Article 139 of LOSC. It is intrinsically linked with the acceptance of being a Sponsoring State and the responsibility that the state assumes before the international community and the Authority. According to it, the Sponsoring State will have to ensure the compliance of the Contractor with the LOSC, the Authority's regulations along with other relevant provisions. Direct obligations, however, are those which are in the text of the LOSC with "*which they* [Sponsoring States] *have to comply* [with] *independently of their obligation to ensure a certain behaviour by the sponsored Contractor*" (ITLOS, AO17, 2011, p. 44, para. 121).

It is important to anticipate that even though states have two sets of obligations, they will only be directly liable for damage resulting from the failure to comply with their direct obligations. However, liability may also arise due to damage caused by Contractors provided certain conditions which we will address shortly.

Nevertheless, before we explain each category separately, we find it useful to clarify that even though they are dissociated for one another these two sets are joined by an underlying general Principle: States have the duty to prevent any harm to come to the environment (ANTON, 2011, p. 1).

The LOSC Part XII focuses on the Protection and Preservation of the Marine Environment from pollution and other possible sources of degradation, namely, deep-sea mining. Article 235 (3) urges States to cooperate in the implementation of international law concerning these matters and in developing international law that addresses responsibility, liability, and compensation for damage to the marine environment both within and beyond state jurisdiction.

In fact, this had already been established in 1992 as a Principle by the Convention on Biological Diversity Article 3, which states that:

> *"States have, (…) the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction."*

This duty has also been established by the ICJ as customary law in ICJ's advisory opinion concerning the Legality of the Threat of Use of Nuclear Weapons:

> *"The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment."* (ICJ, Nuclear Weapons AO, 1996, p. 241, para. 29).

The LOSC, in its turn, states that States Parties "*have the obligation to protect and preserve the marine environment*"[105] and must do so by ensuring that activities which occur under their jurisdiction or control are conducted in a way that does not cause environmental harm (ANTON, 2011, p. 1).

4.2.1. Direct or Primary Obligations

According to AO17, the direct obligations of Sponsoring States regarding activities are numerous and include, amongst others, the obligation to apply best environmental

[105] LOSC, Article 192.

practices[106], the obligation to assist the Authority[107] and finally, the application of the *"precautionary approach* [sic.]"[108] (ITLOS, AO17, 2011, p. 44, para. 122).

It is generally agreed upon that direct obligations have a great influence over the "due diligence" obligation to ensure of Sponsoring States, which we will address shortly. In fact, some state that *"(…) compliance with these obligations can be considered a relevant factor in determining whether a State has acted with due diligence (…)"* (OYARCE, 2018, p. 320). AO17 points to such a conclusion when it states that the Sponsoring States' compliance with direct obligations "*can also be seen as a relevant factor in meeting the due diligence "obligation to ensure" and that the said obligations are in most cases couched as obligations to ensure compliance with a specific rule"* (ITLOS, AO17, 2011, p. 44, para. 123).

For the purpose of this thesis however, we will focus mainly on the obligation to apply the Precautionary Principle which we have analysed in detail.

The obligation of application of the precautionary approach is quite prominent throughout Exploration Regulations and for this reason, AO17 has stated that *"the precautionary approach is also an integral part of the general obligation of due diligence of Sponsoring States"* (ITLOS, AO17, 2011, p. 46, para. 131). AO17 continues by affirming that the due diligence obligation will require Sponsoring States *"to take all appropriate measures to prevent damage that might result from the activities of Contractors"* (ITLOS, AO17, 2011, p. 46, para. 131).

We will therefore analyse the due diligence obligations of states in light of the Precautionary Principle, bearing in mind that all direct obligations of states apply to them.

4.2.2. The "Due Diligence" Obligation to Ensure

According to Article 139 (1):

> *"States Parties shall have the responsibility to ensure that activities in the Area, whether carried out by States Parties, or state enterprises or natural or juridical*

[106] For example, Sulphides Regulation, Regulation 33 (2).
[107] LOSC, Article 153 (4).
[108] For example, Nodules Regulation, Regulation 31 (2).

persons which possess the nationality of States Parties or are effectively controlled by them or their nationals, shall be carried out in conformity with this Part."

This Article is unclear as to what type of obligation it entails: An obligation of result or an obligation of conduct. Therefore, AO17 attempted to reconcile the two opposing views.

On one hand, some argued that we are before an obligation of result, being that States have to guarantee that no harm whatsoever hits the environment due to deep-sea mining. According to many scholars the word "*ensure*" would point towards an obligation of result, an assurance that the state would guarantee that no harm comes to the environment, from an activity in the area carried out by a sponsored Contractor of that same state (ZHANG, 2013, p. 684).

On the other hand, one can also argue that we are before an obligation of means or of conduct where the Sponsoring State is merely required to deploy the best possible mechanisms in order to prevent harm to come to the environment due to deep-sea mining.

During AO17 many States and organizations shared this view and said so in their written statements requested during the AO17 process[109]. This is understandable because, as Zhang puts it, "*considering the complexity of seabed development technology, and the long distance from the territory and regulatory agency of the Sponsoring State, it is difficult for a Sponsoring State to totally control the behaviour of its Contractors*" (ZHANG, 2013, p. 685). For this reason, it would be difficult for States to accept that what was requested of them was an obligation of result as this could prove to be quite costly and difficult to manage in practice.

Amongst scholars, the stronger position is also that we are before an obligation of conduct (ANTON, 2011, p. 3). In addition, this position was also the one adopted by AO17 which stated that "*the Sponsoring State's obligation "to ensure" (…) is an obligation to*

[109] For example, the United Kingdom (ITLOS, AO17, United Kingdom of Great Britain and Northern Ireland, 2010, para. 3.8) and North Korea (ITLOS, AO17, United Kingdom of Great Britain and Northern Ireland, 2010, para. 3-5).

deploy adequate means, to exercise best possible efforts, to do the utmost, to obtain this result." (ITLOS, AO17, 2011, p. 41, para. 110).

Consequently, it is safe to say that Sponsoring States have an obligation of conduct when it comes to ensuring that the Contractors comply with part XI of the LOSC. This obligation of conduct requires, on the one hand the enactment, by Sponsoring States, of appropriate measures which maintain the activities of persons under its jurisdiction controlled, and on the other hand, to provide a means of securing compliance with those measures. This was also the opinion of Pulp Mills on the River Uruguay judgement which stated that "*an obligation to adopt regulatory or administrative measures and to enforce them is an obligation of conduct*" (ICJ, Pulp Mills, 2010*,* p. 77, para. 187).

However, it is still not clear what the content of these obligations is. The SCD (ITLOS, AO17, 2011, p. 67, para. 215) stated that according to Annex III, Article 4 (4) this obligation of conduct could be satisfied if the legal framework of the national legal system includes measures which are "*reasonably appropriate for securing compliance by persons under its jurisdiction*"[110].

Some scholars have tried to densify what is meant by regulatory or administrative measure and have concluded that if a "*State Party has adopted laws and regulations and taken administrative measures which are, within the framework of its legal system, reasonably appropriate for securing compliance by persons under its jurisdiction*" (FREESTONE, 2011, p. 758) then the obligation of conduct would be complete.

This would mean that in order to satisfy its obligation of conduct, the Sponsoring State must deploy adequate means in order to "*ensure"* that activities in the Area conducted by entities under their jurisdiction or control are in conformity or compliance with the requirements of Part XI and subsidiary rules developed by the Authority, as well as those contained in plans of work and in the Contracts between the operators and the Authority[111].

[110] LOSC, Annex III, Article 4 (4).
[111] LOSC, Article 139 (2) and Annex III, Article 4 (4).

Nevertheless, to this day there is no standard legal framework for what are considered "reasonably appropriate measures". However, as we have seen, it is generally agreed upon that such measures should be based on the Direct obligations of States Parties including the Precautionary Principle. We will further develop this idea in the last chapter of our thesis.

4.3. State Liability

AO17 was very clear in the division between liability originating from the direct obligations of states and that related to the actions of sponsored contractors (ITLOS, AO17, 2011, p. 44, para. 121). State Liability is included mainly in article 139 (2) of the LOSC.

The different nature of these obligations dictates what part of article 139 (2) we are going to apply to determine whether or not there should be liability. Thus, if we are dealing with direct obligations, we will apply the first sentence of Article 139 (2). If we are dealing with obligations of conduct of the sponsoring state related to damage caused by a sponsored contractor, we will apply all of Article 139 (2) (ITLOS, AO17, 2011, p. 58, para. 177). We will now address both these types of liability separately.

4.3.1. Liability Concerning Direct Obligations of Member States

State liability for failing to meet its direct obligations finds its legal framework in LOSC, Article 139 (2), first sentence, which reads: "*Without prejudice to the rules of international law and Annex III, Article 22, damage caused by the failure of a State Party or international organization to carry out its responsibilities under this Part shall entail liability"*[112]. There must therefore be damage, a failure by the state to carry out its obligations and finally a causality link between the other two requisites. This causality link is established by the words "*damage* ***caused*** *by the failure of a State Party (…) to carry out its responsibilities"*. This immediately leads us to exclude strict liability.

This is a curious exception to the general international law regime as, according to customary law, a State may be held liable even if no material damage results from its

[112] LOSC, Article 139 (2).

failure to meet its international obligations. For example, if a treaty obliges a state to enact a certain law and that State fails to do so, the obligation is already breached without there needing to be any real damage.

The International Law Commission (ILC) acknowledges its importance in some cases, but states that it will depend on the context as this extra condition might be a hindering one in some cases. According to the ILC:

> *"Whether a particular obligation is breached forthwith upon a failure to act on the part of the responsible State, or whether some further event must occur, depends on the content and interpretation of the primary obligation and cannot be determined in the abstract"*[113].

In fact, according to the ILC, there are only two requirements for classifying an act by a state as internationally wrongful: *"(1) a conduct which is attributable to the State under international law and (2) that conduct must constitute a breach of an international obligation*"[114].

In the end, like we have mentioned, the drafters of the LOSC decided that damage was in fact needed for there to be liability concerning Sponsoring States. Not only that, they established that there should be a causal link between the violation of the obligations of the state and the damage that was caused by it. Taking this into account, AO17 points out two situations that are not covered by the LOSC. Firstly, the state will never be liable if it has failed to carry out its responsibilities but there is no damage. Secondly, if there is damage and the state has met its obligations, there will also be no liability (ITLOS, AO17, 2011, p. 58, para. 178).

Therefore, it is undeniable that a liability gap still exist elevating the importance of a solution for this and of the application of the Precautionary Principle in the meantime. Again, this will be addressed in the final chapter of our thesis.

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[113] See also the Rainbow Warrior Arbitration; The French Government opposed the New Zealand claim for relief as no damage had been suffered. In the end both parties agreed that in International relations an unlawful action against States' non-material interests (such as honour, dignity or prestige) will entitle that same state to receive reparations even if no material loss has been suffered (Rainbow Warrior Arbitration, 1990, pp. 266–267, paras. 107–110).

[114] ILC on Responsibility of States for Internationally Wrongful Acts with commentary, Article 2, commentary 9.

4.3.2. Liability Concerning Obligation to ensure

The general rule in international law is that the conduct of a private actor will not be attributable to a state to which private actors are linked to, for example, through either nationality or residence. According to the ILC, this is understandable as a way of "*limiting (the state's) responsibility to conduct which engages the State as an organization, and also so as to recognize the autonomy of persons acting on their own account and not at the instigation of a public Authority*"[115].

Nevertheless, there are exceptions, for example when a wrongful act is carried out by a state organ independently of its position in the organization of state, by entities exercising elements of a governmental authority or by organs placed at the disposal of a State by another State[116]. A state will also be held responsible for wrongful acts if the conduct that led to them was directed or controlled by that state[117]. This responsibility can also be treaty based. That is actually the case in the 1979 Agreement Governing the Activities of States on the Moon and the Other Celestial Bodies, Article VI, which states:

> *"States Parties to the Treaty shall bear international responsibility for national activities in outer space (…) whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty."*

Sadly, LOSC was not as clear as the UN Outer Space treaty having created the unusual figure of the Sponsoring State[118]. This figure has an obligation of conduct by which Sponsoring States must ensure that its sponsored contractors comply with the LOSC as well as related agreements and regulations. A breach of this obligation may entail liability.

[115] ILC on Responsibility of States for Internationally Wrongful Acts with commentary, Part 1, Chapter II, commentary 2.
[116]ILC on Responsibility of States for Internationally Wrongful Acts, Articles 4, 5 and 6.
[117] ILC on Responsibility of States for Internationally Wrongful Acts, Article 8.
[118] LOSC, Article 139 (2) and Annex III, Article 4 (4).

As we have mentioned, the liability of Sponsoring States relating to contractors finds itself in both the first and the second sentence of Article 139 (2) which reads:

> *"A State Party shall not however be liable for damage caused by any failure to comply with this Part by a person whom it has sponsored under article 153, paragraph 2(b), if the State Party has taken all necessary and appropriate measures to secure effective compliance under article 153, paragraph 4, and Annex III, article 4, paragraph 4."*

Due to this disposition, Sponsoring States may be responsible for the actions of a private party without it being empowered by the State to carry out those same actions or without its conduct being acknowledged by the State as its own (ITLOS, AO17, 2011, pp. 59-60, para. 182).

Even so the main issue that arises with this question is what type or degree of liability we are speaking of.

According to AO17:

> "*The liability of the sponsoring State arises from its own failure to comply with its responsibilities under the Convention and related instruments. (…) As has been established, the liability of the sponsoring State depends on the occurrence of damage resulting from the failure of the sponsored contractor. However, (…) this does not make the sponsoring State responsible for the damage caused by the sponsored contractor."* (ITLOS, AO17, 2011, p. 64, para. 204).

Therefore, because there must be causality between the failure of the Sponsor state to adopt "*laws and regulations and taken administrative measures which are, within the framework of its legal system, reasonably appropriate for securing compliance by persons under its jurisdiction*" (FREESTONE, 2011, p. 758) and the damage that the Contractor caused. Without this causal link, there is no liability. Therefore, the possibility of strict liability is immediately ruled out and we are left with "due diligence" obligation to ensure.

So, what about a scenario where for example, a Sponsoring State has taken all necessary and appropriate measures to secure an effective compliance by the sponsored Contractor with its obligations and there was damage anyway? Evidently the State will not be liable. But what happens if the Contractor proceeds to declare bankruptcy? In light of such a scenario we believe that a few lines should be spent in the discussion of the strict liability and residual liability hypothesis.

According to AO17 strict liability is out of the question as "*liability for damage of the Sponsoring State arises only from its failure to meet its obligation of due diligence. This rules out the application of strict liability." (*ITLOS, AO17, 2011, p. 61, para. 189).

However, we believe, like some scholars, such as Donald K. Anton that the arranged solution should have been one of residual liability (ANTON, 2011). Embracing due diligence alone when it comes to the responsibility of a Sponsoring State would mean that, in certain scenarios, such as those already mentioned, where, for example, the Contractor is unable to meet its liability in full due to bankruptcy, but there was no wrongful act or breach of due diligence by the Authority or the Sponsoring State), no one is liable for damages to the marine environment. As Anton states "if *residual liability was not available and the Contractor could not be held liable, then damage to the common heritage would go unremedied*." (ANTON, 2011, p. 250).

This is why, residual liability would be, in these cases, a viable solution. In fact, some argue that there could be a legal basis for this (ANTON, 2011, p. 249 *et seq.*). For example, Article 235 of the LOSC establishes general rules of responsibility and liability concerning the protection and preservation of the marine environment calling for compensation for environmental damage in full. Annex III, Article 22 states that liability within the context of deep-sea mining "*shall be for the actual amount of damages.*". The statute for contractual terms present in the Exploration Regulations repeats this stating in clause 16.1 the expression "*actual amount of damages*" will include "*damage to the marine environment, arising from wrongful acts or omissions*" (ANTON, 2011, p. 251, *et seq.*).

Nevertheless, this is not the position of the SDC which states in AO17 that what these Articles refer to could never be perceived as residual liability (ITLOS, AO17,

2011, p. 64, para. 204). We will address solutions for this in the last chapters of our thesis.

VIII. Specific Precautionary Measures

Throughout our thesis, we focused on understanding the regime of deep-sea mining as it is now and how it came to be. We analysed the role of the three main actors, their responsibilities and obligations and their relationship with the Precautionary Principle. We concluded that, even though this regime has come a long way since its genesis, there is still a big governance gap when it comes to the application of the Precautionary Principle to deep-sea mining and the liability regime under the LOSC is not one without its flaws.

Whether in the form of guidelines or pure hard law, this tendency must be counter acted if we are to preserve our common heritage. We will, therefore, devote the last part of our thesis to proposing specific measures for the application of the Precautionary Principle.

1. Moratorium in Deep-Sea Mining

The Moratorium is the ultimate precautionary measure, as it will consist of a legally authorized period of delay suspending or not allowing deep-sea mining to occur until certain objectives are achieved. This measure has been called for mainly by NGOs like the Deep-Sea Coalition, Seas at Risk, the High Seas Alliance and The Mining Project. In January 2018 their voices were joined by that of the EP also called for an international moratorium " *(…)on commercial deep-sea mining exploitation licences until such time as the effects of deep-sea mining on the marine environment, biodiversity and human activities at sea have been studied and researched sufficiently and all possible risks are understood*;"[119] and urged the Commission to call on "*Member States to stop sponsoring deep-sea mining exploration and exploitation licenses in Areas Beyond National Jurisdiction and on and not to issue permits for deep-sea mining on Member States' continental shelf;*"[120] As a clear manifestation of political will, we hope this resolution will have a clear impact in the shaping of future policies regarding this subject.

[119] EU Parliament resolution **2017/2055(INI))**, para. 119, para. 42.
[120] EU Parliament resolution **2017/2055(INI))**, para. 119, para. 40.

This is actually a measure that has gained some momentum since 2018 and has been adopted by some governments within their marine areas due to concerns about the uncertainty surrounding environmental impacts of deep-sea mining. This is especially true for areas where proposals for deep-sea mining have taken place such as Australia (Northern Territory) and Namibia where the precautionary approach has taken the form of a moratorium (SAFEGUARD OUR SEABED, 2018). In fact, Australia's Northern Territory territorial government has been prolonging a moratorium since 2012. In 2018, upon the third extension of the moratorium, the territorial government applied the Precautionary Principle, stating that:

> *"It is important that should there be any future development of our marine environment, it is sustainable and ensures its ongoing health. There is much more scientific analysis that needs to be done to fully understand the potential risks and impacts of seabed mining before it can be considered by Government. As such, the moratorium will remain in place until March 2021 to allow the Department of Environment and Natural Resources to undertake a comprehensive review of the actual or potential impacts of seabed mining on NT coastal waters"*[121].

In addition, at an EU level, the EP has called "*on the Commission to increase efforts at international level for the establishment of a coherent regulatory framework for the exploration and exploitation of deep-sea minerals, to be grounded in the Precautionary Principle.*"[122] In order to fully develop these regimes, it is necessary that the international community or the Authority declare a moratorium on this activity before we rush into an activity whose impacts we are still unsure of.

A measure such as a moratorium is essential for mining activities beyond national jurisdiction. Such a measure will give the international community time to build an effective legal framework. The Intergovernmental Conference on Marine Biodiversity

[121] See full statement in http://www.newsroom.nt.gov.au/mediaRelease/25646 last visited on 04/05/2018.
[122] EU Parliament resolution **2017/2055(INI))**, para. 119.

of Areas Beyond National Jurisdiction (BBNJ)[123] work group is striving to come up with such a regime.

Deep-sea mining is a very recent activity and has many specificities. Even so, it has the opportunity of learning from other similar industries about their own environmental management practices (for example EIAs, monitoring, mitigation, etc.), and to select and adopt good practices to its own reality from its outset (JONES, et al., 2019, p. 173). In addition, a moratorium will also be helpful and an incentive to gather more scientific knowledge about the potential impacts of this activity.

Finally, an international moratorium has already been endorsed by the International Community in 1967. Pardo's motivations were not the same ones as today as we have seen. However, the preservation of the ocean's as we know is a concern that was shared by us and this ambassador more than 50 years ago the reason why the International Community should stand behind another "*Moratorium Resolution*".

From our point of view, an international moratorium is the pathway to gather more information about this activity, make it available to all stakeholders, discuss it and through transparent processes adopt informed decisions.

2. Increasing Scientific Knowledge about the Deep-Sea

As we have established, in order to reduce the uncertainty that is associated with deep-sea mining more data is needed.

Part XIII of the LOSC addresses the rights and obligations of those who conduct marine scientific research in the different maritime zones. In areas beyond national jurisdiction Marine scientific research is considered to be one of the freedoms of the high seas. The drafters of the LOSC knew that marine research was important enough to be considered a freedom of the high seas and entitled and encouraged all States to carry it out.

[123] Intergovernmental Conference on an international legally binding instrument under the LOSC on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (General Assembly resolution 72/249). This instrument is predicted to come into force in 2020 - https://www.un.org/bbnj/ last visited on 20th of May 2019.

According to the LOSC[124] "*States Parties shall promote international cooperation in marine scientific research in the Area by: (…) (c) Effectively disseminating the results of research and analysis when available, through the Authority or other international channels when appropriate*". State Parties also have a role to play and should, therefore, create policies that favour Marine Scientific research both at a public and private level. There is not, however, much information on state practice regarding deep-sea marine research in areas beyond national jurisdiction. Nevertheless, the costs of marine investigation are quite elevated and increase according to the depth at which research takes place.

Despite this, there are ways of making all the information gathered by States available online by the researchers that conduct the studies and by their universities and institutes. Databases containing such studies include Biocean or the Petrological Database of the Ocean floor (UN, 2010, p. 32). Information sharing on the deep-sea amongst States is crucial to increase the knowledge mankind has of its own common heritage.

In addition to this, we believe that the Authority has a great part to play as well when it comes to Marine Scientific Research. As we have said, the mandate of the Authority includes the promotion and encouragement of scientific research in the Area[125].

As a way of pursuing this mandate, many workshops have been held by the Authority over the years to promote scientific knowledge of seabed resources. For example, in 1998 a workshop was held in China to develop guidelines for the assessment of potential environmental impacts arising from the exploration of polymetallic nodules. In 2004 another workshop was held on polymetallic sulphides and cobalt-rich ferromanganese crusts deposits (LÉVY, 2014, pp. 20 *et seq.*). In addition, the Endowment Fund[126] was created in 2006 in order to promote collaborative marine research with qualified scientists from developing States, allowing them to participate in data collection and scientific investigation.

[124] LOSC, Article 143, (3) (c).
[125] LOSC, Article 143.
[126] Endowment fund - https://www.isa.org.jm/Contractors/endowment-fund last visited on the 24th of May 2019.

However, the Authority is still not fulfilling its mandate completely. As we have mentioned, the Authority is a deposit of information on the deep-sea as Recommendation ISBA/19/LTC/8 asks that the contractors submit data which could be used for establishing environmental baselines[127]. Nevertheless, as we have also mentioned, this data has not been shared. It is our opinion that the next step for the Authority could be to analyse and share the information collected by Contractors in order to encourage the collaboration and exchange of information within the scientific community. This view is shared by the UN, which pointed it out the role the Authority still had to play in its Guide for Scientific Marine research (UN, 2010).

Since we are dealing with CHM it seems to us plausible that Contractors should be obliged to divulge publicly the data they have encountered. As we have stated one of the elements that form the CHM Principle is the fact that there must be an equal sharing of the benefits from the exploitation of resources. As we have also stated, these benefits do not have to be economic and could very well be scientific knowledge. Therefore, one could even argue, that the obligation to share scientific knowledge could derive from the CHM Principle[128].

We, therefore, believe that this could be an interesting point for decision makers to base policy on, whether it be through the UN, Authority or State Parties. In fact, even though the UN Law of the Sea Marine Scientific Research Guide is quite complete when it comes to research in areas within the jurisdiction of States, the same is not true for areas beyond that jurisdiction. This may all change with the recent proclamation of the UN Decade of Ocean Science for Sustainable Development (2021-2030) which aims to join science and policy so as to strengthen the management of our oceans. The Intergovernmental Oceanographic Commission (IOC) of UNESCO met in May 2019, and we are curious to see the outcome of this initiative[129].

[127] ISBA/19/LTC/8, paragraph 8 (c).
[128] Due to the scope of our thesis we will not fully explore this topic now, leaving it merely as possibility.
[129] UNESCO - **United Nations Decade of Ocean Science for Sustainable Development** - https://en.unesco.org/1st-global-planning-meeting last visited on the 24th of May 2019.

3. Adopting a Standard for Sponsoring State Legal Framework

This was the scope of the third question addressed in AO17, which reads:

> *"What are the necessary and appropriate measures that a Sponsoring State must take in order to fulfil its responsibility under the Convention, in particular article 139 and Annex III, and the 1994 Agreement?"* (ITLOS, AO17, 2011, p. 66, para. 212)

When addressing the "due diligence" obligation to ensure of Sponsoring States we concluded that in Article 139 of the LOSC we are before an obligation of conduct, which will be satisfied, if the Sponsoring State possesses a domestic legal framework that ensures that the Contractors respect part XI of the LOSC. What this means in practice, according to the AO17, is that *"Necessary measures are required and these must be adopted within the legal system of the Sponsoring State*" (ITLOS, AO17, 2011, p. 43, para. 118). However, two points are crucial for this to work.

Firstly, as we have mentioned, the concept of due diligence is a variable one. This means that the standard for due diligence will have to evolve according to technological and scientific discoveries regarding deep-sea mining.

Secondly, the obligation "*to ensure"* requires the Sponsoring State "*to take measures within its legal system and that the measures must be 'reasonably appropriate"*" (ITLOS, AO17, 2011, p. 44, para. 120).

When addressing the content of such measures we stated that the general opinion is that direct obligations must be present in the Sponsoring States' "due diligence" obligation to ensure and that the measures under such an obligation must be based on the direct obligations of Sponsoring States, including the Precautionary Principle.

In fact, according to AO17,

> "*the precautionary approach [sic.] is also an integral part of the general obligation of due diligence of Sponsoring States (…). This obligation applies in situations where scientific evidence concerning the scope and potential negative impact of the activity in question is insufficient but where there are plausible indications of potential risks. A*

> *Sponsoring State would not meet its obligation of due diligence if it disregarded those risks"* (ITLOS, AO17, 2011, p. 46, para. 131).

AO17 went on to state that this relationship between due diligence and the Precautionary Principle had already been pointed out by ITLOS (ITLOS, AO17, 2011, p. 46, para. 132) in the Southern Bluefin Tuna cases (ITLOS, Southern Bluefin, 2000, p. 20, para. 79 and 80).

This specific conclusion has been criticized by some scholars, namely Tanaka as according to him "*attention must be devoted to the differences between the obligation of due diligence and that of the precautionary approach*" (TANAKA, Y., 2014, p. 214). According to this author, while due diligence is linked to prevention and will be triggered by convincing evidence, the Precautionary Principle will be applied upon scientific uncertainty. Moreover, while due diligence protects States from the actions of other States, the Precautionary Principle protects the common interests of humanity in this case. Finally, according to this author, due diligence comes into action after damage while the Precautionary Principle comes before it happens (TANAKA, Y., 2014, p. 215). Regardless, it is necessary that the Precautionary Principle comes into play in the "due diligence" obligation to ensure. Indeed, that the application of the precautionary approach to concrete cases will not guarantee success if a standard does not exist. Since the State's obligations to ensure will always mean specific measures, there should be a minimum standard that States should have to achieve within their legal systems to consider the "due diligence" obligation to ensure is satisfied and that that embodies, at least, the Precautionary Principle. This would make sure that companies would not choose States with weaker legal frameworks to serve as Sponsoring States as there would be a minimum legal standard.

According to the Head of the Legal Office of the International Tribunal for the Law of the Sea, Ximena Hinrichs Oyarce:

> *"It would be mistaken to assert that sponsorship was established by LOSC as a tool to facilitate participation by developing States in activities in the Area through private entities, since otherwise they would be deprived from doing so due*

> *to lack of sufficient financial or technical capabilities."* (OYARCE, 2018, p. 318)

According to this author, many developed States have already acted as Sponsoring States for national companies (OYARCE, 2018, p. 318). Not only that but no provisions of LOSC offer a general clause considering the interests and needs of developing States as a special standard beyond part XI (TANAKA, Y., 2014, pp. 216-217). In fact, the SDC clarified in AO17, that all responsibilities and liability apply equally to all Sponsoring States, whether developing or developed by stating that:

> "*However, none of the general provisions of the LOSC concerning the responsibilities (or the liability) of the Sponsoring State "specifically provides" for according preferential treatment to Sponsoring States that are developing States. (…) There is no provision requiring the consideration of such interests and needs beyond what is specifically stated in Part XI. It may therefore be concluded that the general provisions concerning the responsibilities and liability of the Sponsoring State apply equally to all Sponsoring States, whether developing or developed*" (ITLOS, AO17, 2011, p. 53, para. 158).

Having established the deficient liability framework for all the main actors of deep-sea mining we believe that an example of a standard measure for the legal framework of Sponsoring States could be a Financial Clause for the cases referred to above, for example where the Contractor is unable to meet its liability in full due to bankruptcy.

With such a clause, the "*Sponsoring State would have the ultimate responsibility to ensure that financial resources were made available to remediate the environmental harm to the are*a." (ANTON, 2011, p. 256). This solution was also brought about by NGOs such as WWF and Greenpeace in their written statement to AO17 (ITLOS, AO17, Greenpeace and WWF, 2010, p. 15). This would contribute for the application of the Precautionary Principle as States would be extremely cautious about sponsoring Contractors and would have an incentive to ensure their compliance with the relevant legal provisions.

The LOSC itself opens the possibility of such a fund by when its states that:

> *"With the objective of assuring prompt and adequate compensation in respect of all damage caused by pollution of the marine environment, States shall cooperate in the (…) development of criteria and procedures for payment of adequate compensation, such as compulsory insurance or compensation funds."*[130]

Having said this, it is important to refer that there are very few examples of States that have adopted a specific legal framework for deep-sea mining being Germany[131], Singapore[132], and Japan[133] the best-known cases. In fact, Germany, during the AO17 written submissions phase, proposed its own model of what should be the standard for all States aspiring to become Sponsoring States (ITLOS, AO17, Germany, 2010, p. 6). We believe that for a framework to be considered complete its measures should reflect not only the Precautionary Principle but also the CHM Principle, measures that address the direct Protection and Preservation of Marine Environment as a whole, including cultural heritage, a standard of EIA (which will be addressed in the next chapter) and above all, measures that ensure transparency[134] of all processes like the publicity of contracts and access to the collected data.

4. The Standard for EIA

An EIA is perceived by many as a tool to apply the Precautionary Principle and it is also generally agreed upon that this Principle should be present during all the stages of the EIA (DURDEN, Jennifer M. *et al.*, 2018, p. 195). These are required in order to obtain a title of either exploration or exploitation issued by the Authority as they are considered to be both a direct obligation for States and a general obligation under customary international law (ITLOS, AO17, 2011, p. 50, para. 145). If properly conducted, they can be of great help to the application of the Precautionary Principle as the objective of EIAs is to gather the maximum possible information on the project

130 LOSC, Article 235 (3).
131 Meeresbodenbergbaugesetz Seabed Mining Act (1995).
132 Deep Sea Mining Act (2015).
133 Act on Interim Measures for Deep Seabed Mining (1982).
134 Unfortunately, due to the focus of our discussion we will not be able to address in full detail the inclusion of all these Principles in a standard regime for deep-sea mining of Sponsoring States. However, such a discussion along with a comparative analysis of the already existing deep-sea mining national regimes would be an extremely interesting topic.

and the site it is supposed to take place in, while assessing the impacts and risks related to that project and find how to mitigate them. Based on this document, decision makers will make the call we referred to earlier in our thesis: "*is the risk too great?"*

However, there is no standard of what a good EIA is at an international level. Articles 204 and 206 of the LOSC demand, it but there are no real compulsory legal standards regarding it. We believe that in order to consider that a state has met its standard of due diligence, measures concerning EIAs specific to the deep-sea must exist. So far, this is not true for most States. The European Commission established the MIN-guide project in the Horizon 2020 programme (MIN-GUIDE PROJECT, 2018) as a way to facilitate policy making regarding minerals legislation in order to guarantee a sustainable supply of minerals to the EU. To do so, it gathered information on the domestic framework of all EU States regarding EIAs in general and specific to mining operations which in some cases, in the absence of specific legislation, apply to deep-sea mining. The MIN-guide project found that the EIA legislation specific for deep-sea mining at a European level is at a virtually embryonic stage (MIN-GUIDE PROJECT, 2018, p. 21) and most of it does not address areas beyond national jurisdiction. At a non-European level, the example of the EIA that has, in fact, been done is the already mentioned Environmental Impact Statement produced by NM for the Solwara 1 mining site under Papua New Guinea's Environmental Act 2000 submitted to the Department of Environment and Conservation (NM, 2008).

Even though this means that there is still a long way to go, it is also a good thing because it means that we are faced with a clean slate. At least, in the beginning, a regional harmonization could be deemed achievable. In fact, in 2001 the Authority's Recommendations ISBA/19/LTC/8, paragraph 8 (c) states that:

> *"After approval of the plan of work for exploration in the form of a contract and prior to the commencement of exploration activities, the Contractor is required to submit to the Authority: (a) An impact assessment of the potential effects on the marine environment of all proposed activities, excluding those activities considered by the Legal and Technical Commission to have no potential for causing harmful effects on the marine environment (…)".*

This document also devotes its chapter 4 to defining what activities need an environmental impact assessment. However, no detail goes into the content of such an assessment.

If such a task were to be taken on by the Authority itself through the approval of a standard/model of EIA, even if not compulsory, States could do one of two things: Either approve an internal measure stating that an EIA according to the standards established by the Authority before the state could become Sponsoring State for this activity (which in our opinion would make the most sense) or see the Authority's standards for EIA's as a policy tool including it in its own framework. Establishing such a domestic requirement of his could both be perceived as standard measure of due diligence for Sponsoring States and also mean a revival of the Authority.

In the meantime, however, we believe that it is essential that all States approve deep-sea mining specific standards for EIAs in order to avoid a problem of "*framework shopping*".

5. Tackling the Liability Gap

Throughout our thesis, we repeatedly referred the frailty of the liability regime concerning deep-sea mining. For this reason, the application of the Precautionary Principle in this regime is essential. Dupuy felt the same, stating in 1991 that in fact "*Judging by the general terms used by the Convention this is a subject which will basically be decided on the application of the Convention by the competent courts.*" (DUPUY, 1991, p. 685). He goes on by addressing Annex III, Article 22 specifically, stating that due to its generality, the content of this Article should only be considered as "*essential criteria and basic standards*" (DUPUY, 1991, p. 685) and that "*its characteristics and specific implementation rules will be determined by the influence exercised on its interpretation by the case law and actual practice of the Authority as it develops*" (DUPUY, 1991, p. 685).

A form of ensuring compensation for such damage would be by establishing a trust fund within the Authority. In fact, the SDC did state that

> "*Taking into account that (…) situations may arise where a Contractor does not meet its liability in full while the Sponsoring State is not liable under article 139, paragraph*

> *2, of the Convention, the Authority may wish to consider the establishment of a trust fund to compensate for the damage not covered. The Chamber draws attention to article 235, paragraph 3 of the Convention which refers to such possibility.*" (ITLOS, AO17, 2011, p. 65, para. 205).

In fact, going back to the origins of the LOSC, the creation of a compensation fund to compensate land-based miners (who incidentally are located mainly in developing States) within the LOSC structure was a question raised during the negotiations of the LOSC. Even though its objective was one of equal distribution of wealth due to the CHM Principle, it is noteworthy to analyse how it would work. The UN Secretariat attempted to include such a disposition in the LOSC. However, once it was brought to a discussion, once again the tensions between developed and developing States arose with the first ones opposing such an idea, and the latter calling for such a fund. The G77 called for a fund that was composed of voluntary contributions along with compulsory contributions from Contractors (LÉVY, 2002, pp. 95-96).

Such a compensation fund exists in the LOSC in Article 171 (f), "*The funds of the Authority shall include: (…) (f) Payments to a compensation fund, in accordance with article 151 , paragraph 10, whose sources are to be recommended by the Economic Planning Commission.".* The idea was taken from previously created structures in other international bodies, such as the mechanism of financial compensation from the International Monetary Fund (LÉVY, 2002, p. 96). With the 1994 Agreement, the initial idea of a compensation fund was replaced with an economic assistance fund which would aid States with strong land-based mining productions (LÉVY, 2002, p. 100). This is understandable as developed States knew that all funding would inevitably be up to them. In later years however the Authority has established not one but two funds. The first one was established in 2002 and is called the *"Voluntary Trust Fund".* This fund aims at covering participation of members of the Legal and Technical Committee and from the Financial Committee that come from developing States to the meetings of both committees. Later in 2006, an endowment fund was created in order to finance the attendance of experts from developing States at marine scientific research programmes as well as their participation in scientific cooperation activities in the area (LÉVY, 2014, pp. 18-19).

If there is a possibility of such a fund existing, then the means for the creation of a fund exclusively destined at helping solve environmental damage due to activities in the seabed is also possible. The SDC suggests the creation of the Authority trust fund when confronted with cases such as:

> *"where a Contractor does not meet its liability in full while the Sponsoring State is not liable under article 139, paragraph 2, of the Convention, the Authority may wish to consider the establishment of a trust fund to compensate for the damage not covered."* (ITLOS, AO17, 2011, p. 65, para. 205).

As a legal basis, the SDC resorts to the general obligation of state responsibility towards the protection and preservation of the marine environment of Article 235 (3).

6. Increasing the Dialogue about Areas Beyond National Jurisdiction

Getting the input of all stakeholders is essential to fully apply the Precautionary Principle as listening to all sides of the discussion, and transparent decision-making will make it easier for all stakeholders to accept the final decision. This, of course, means involving Contractors and representatives of the industry as well as civil society, the scientific community and policy makers.

Besides, implementing measures that reflect the Precautionary Principle will inevitably ask for the coordination of all stakeholders.

Harmonizing legislation should be the goal, as we are dealing with resources that belong to mankind. Moreover, we are dealing with an activity that will occur in many different geographic locations, and that will have the same potential environmental impacts in all of them. In addition, these impacts will not know any barriers, and will be virtually impossible to contain due to the environment where these activities will be taking place. Therefore, as well as developing international harmonization of the legal framework regarding deep-sea mining, as Lodge *et al.* refer in "Seabed Mining: International Seabed Authority Environmental Management Plan for the CCZ. A Partnership Approach" it may also be important to innovate in environmental management by cultivating new and more strategic approaches (for example, at a

regional level) (*apud*. JONES *et al.* - Existing environmental management approaches relevant to deep-sea mining, p. 175).

During the Third UN Conference on the Law of the Sea in 1978, the Portuguese delegation attempted to propose a measure that envisioned an increase in the international dialogue about ocean affairs through periodic conferences every three years (PORTUGAL, 1973). When presenting this proposal, the Delegation of Portugal justified such a measure by stating that:

> *"In making its proposal, the Portuguese Government was guided by the consideration that the development of the uses of the sea and its resources was becoming increasingly rapid as a result of modern technologies which changed the nature of exploitation and gave rise to new problems of conservation. In the circumstances, intensified scientific activity and broader international cooperation were necessary. The purpose of the proposed periodic conferences would be to ensure a continuous dialogue among States"* (RUIVO, 1973).

Unfortunately, this proposal did make the final version of the LOSC.

As we have stated previously, many workshops have been held by the Authority over the years to address various topics enabling the dialogue amongst States. (LÉVY, 2014, pp. 20 *et seq*.). In addition, civil society has also taken it in its hands to facilitate as much as possible this dialogue. NGO's have done this, for example, by promoting events such as the recent Lisbon BBNJ Workshop (April 2019) where UN delegations of almost 40 nations gathered and discussed their views on the new Agreement before the Conference's second session. Workshops such as these allow for a more transparent process and for useful discussions that otherwise might not happen.

Another annual meeting that has emerged is the International Ministerial Meeting which strives to promote regional and international cooperation by all stakeholders in ocean affairs. Sharing knowledge about the ocean is one of the main goals of this meeting as this is seen as "cr*ucial for the development of common strategies to ensure the protection of Ocean resources and challenges States to permanently define global governance solutions to ensure a sustainable blue economy*" (OCEANS MEETING, 2019).

The dialogue between all relevant stakeholders is essential if there is to exist a robust and effective legal framework based upon the Precautionary Principle.

IX. Conclusion

Throughout this thesis, this author explored the many risks and the potentially irreversible damages caused by deep-sea mining and also established that this activity is surrounded by scientific uncertainty. For these reasons, the application of the Precautionary Principle is of paramount importance.

We have analysed how this Principle has already been applied through specific measures and regulations within the international deep-sea mining regime and have concluded that they still fall short of what is needed.

For this reason this author put forth six attainable measures based on the Precautionary Principle; an international moratorium; the increase of scientific knowledge in this area; the adoption of a standard for Sponsoring States' legal framework concerning deep-sea mining; an international standard for EIA; mechanisms to tackle the liability gap felt in the deep-sea mining regime; and finally, the increase in the international dialogue concerning deep-sea mining. We also believe that although all these measures are of extreme importance, there are some that are more urgent than others.

Firstly, the two immediate precautionary measures which should be taken are the adoption of an international moratorium combined with a clear incentive to scientific research in marine sciences. The objective would be to decrease the level of scientific uncertainty surrounding deep-sea mining.

Secondly, while the two abovementioned actions are being carried out, we believe that the focus should be on building standards of international and national law which include measures that are based on the Precautionary Principle.

Finally, all this should be done while encouraging the international dialogue as we are dealing with an interconnected ecosystem which, affects all of us.

Like Hölderlin wrote in his poem "Patmos", "*where danger lurks, the saving powers also grow*" (HÖLDERLIN, 1803). The international community must focus their efforts into making these possible solutions a reality.

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XI. Index