Oceans and Climate Change: Synergy and Conflict in International Law

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ABSTRACT

The science is clear that climate change has profound impacts on oceans and vice versa. The Intergovernmental Panel on Climate Change (IPCC) states that climate change is projected to cause ocean warming and ocean acidification, among others. At the same time, oceans have the potential to contribute greatly to adaptation and mitigation efforts that will allow us to achieve the goals of the Paris Agreement. From the implementation of marine protected areas to the more controversial ocean fertilisation efforts, the global ocean, which covers 71% of the Earth's surface, has the potential to play a major role in climate action. Despite these strong linkages, the development of international law on oceans and climate change has been relatively slow. It was only in recent years that the United Nations Framework Convention on Climate Change (UNFCCC) has dedicated a work stream for oceans through the Ocean Pathway, an initiative which paved the way for the Ocean Dialogue, a recurring process with the purpose of strengthening ocean-based action. As these various environmental agreements come up with new policies and mandates, instances of legal conflict cannot be avoided. This paper will take an in-depth study of the current international legal frameworks governing oceans and climate change to determine where opportunities for synergy can be optimised and conflicts can be resolved by examining two cases of legal overlap.

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I. The Science: The Intergovernmental Panel on Climate Change (IPCC)

In 2016, the Intergovernmental Panel on Climate Change (IPCC) published a Special Report on the Ocean and Cryosphere in a Changing Climate[1] following two other Special Reports on Global Warming of 1.5°C[2] and on Climate Change and Land.[3] The report, the

[1] Intergovernmental Panel on Climate Change (IPCC). *Special Report on the Ocean and Cryosphere in a Changing Climate Summary for Policymakers*, edited by H-O Portner et al., 2019.

[2] IPCC. *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty,* edited by V Masson-Delmotte et al., 2018.

[3] IPCC. *Climate Change and Land: an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems,* edited by P Shukla et al., 2019.

findings of which are grounded in a thorough assessment of scientific evidence, stated with medium confidence that climate-induced projected shifts in fish distribution and abundance will affect income, livelihoods, and food security of communities that are dependent on marine resources.

The low-lying coastal zone is currently home to around sixty-eight million people and is projected to reach more than one billion by 2050.[4] These communities are particularly exposed to climate impacts such as sea level rise, rising ocean temperatures, and storm intensity that may lead to loss of livelihood, loss of lives, damaged assets, and a disruption of basic services.[5] This is compounded by the fact that the people with the highest exposure and vulnerability to climate change impacts are often those with lowest capacity to respond.[6]

On the other hand, the ocean may provide major opportunities for climate action, as it holds fifty times more carbon dioxide than the atmosphere and has absorbed more than 25% of emitted anthropogenic CO_2. It has also absorbed 90% of the atmospheric warming that has occurred in recent decades due to increasing greenhouse gases (GHGs).[7] Some climate models suggest that ocean-based mitigation actions could contribute up to 12% of the emission reductions required by 2030 to keep warming to less than 1.5℃ while ocean-based adaptation could alleviate the devastating impacts of climate change to marine biodiversity and coastal communities.[8]

Apart from its contribution to the climate system, the ocean and cryosphere offer various benefits to humanity. These benefits include the provision of food and water, renewable energy sources, as well as contributions to health, well-being, culture, tourism, trade, and transportation. Efforts to restore habitats on land and oceans, as well as ecosystem management tools such as relocating species and cultivating coral, can greatly improve local ecosystem-based adaptation. Reviving coastal green spaces like mangrove forests, salt marshes, and seagrass beds—also known as 'coastal blue carbon' habitats—shows promise in counteracting climate change by increasing carbon uptake and storing roughly 0.5% of global emissions each year.[9] Additionally, renewable energy sources from the ocean, including offshore wind power, tidal and wave energy, and energy from thermal and salinity gradients, as well as biofuels from algae, offer additional ways to mitigate climate change.[10]

As the rise in global average temperature threatens to surpass the 1.5℃ goal of the Paris Agreement with each passing year, the need to exponentially expand mitigation actions becomes more urgent, and innovative ways of addressing emissions become more attractive. The international legal system must be prepared to address these actions in a transparent and just manner that respects and upholds ecological integrity so as to avoid inadvertently causing more destruction to people and the environment.

II. **Climate Considerations under the International Law on Oceans and Marine Conservation**

A. *The United Nations Convention on the Law of the Sea (UNCLOS) and the Prevention, Reduction, and Control of Pollution of the Marine Environment*

The United Nations Convention on the Law of the Sea (UNCLOS) was a product of the 3rd UN Conference on the Law of the Sea which took place from 1973 to 1982. UNCLOS is often referred to as the "constitution for the oceans" as it deals with all matters relating to the law of the sea. It is a living instrument, designed to adapt to changing threats to the marine environment by taking account of current

[4] IPCC (n 1) *supra* at 5.
[5] ibid.
[6] ibid at p. 29, [C.1].
[7] "The Ocean – The World's Greatest Ally Against Climate Change." *United Nations Climate Action Webpage*.
[8] Trebilco, Rowan, et al. "Warming World, Changing Ocean: Mitigation and Adaptation to Support Resilient Marine Systems." *Reviews in Fish Biology and Fisheries,* vol. 32, no. 1, 2022, pp. 39-63.
[9] IPCC (n 1) *supra* at p. 30, [C.2.4].
[10] ibid.

scientific and technical realities to fulfil its object and purpose of addressing "problems of ocean space."[11]

Aside from overseeing the overall protection and conservation of the marine environment, UNCLOS also addresses land-based pollution, pollution from seabed activities subject to national jurisdiction, pollution from activities in the area, pollution by dumping, from vessels, and from and through the atmosphere. Article 207 under Section 5 (International Rules and National Legislation to Prevent, Reduce, and Control Pollution of the Marine Environment) requires States to adopt laws and regulations relating to the pollution of the marine environment from land-based sources.[12] States are also required under Art. 212 to adopt laws and regulations relating to pollution of the marine environment from or through the atmosphere.[13] In relation to pollution by dumping, Art. 210 requires States to adopt laws and regulations to prevent, reduce, and control such pollution.[14]

UNCLOS defines "pollution of the marine environment" in Article 1(1)(4) as: "the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality of use of sea water and reduction of amenities."[15] A cursory reading of this definition would put GHGs under the ambit of "pollution" however, as it is not specifically stated under the UNCLOS or any subsequent agreement, it is open for debate whether these provisions apply.

This is the subject of the case brought to the International Tribunal Court for the Law of the Sea (ITLOS) by the Commission of Small Island States on Climate Change and International Law (COSIS). COSIS argued that anthropogenic GHG emissions meet the definition of "pollution of the marine environment" under the Convention because GHG emissions bring both energy (heat) and substance (carbon) into the marine environment that results in damaging physical and chemical changes to the marine environment.[16] The Advisory Opinion (AO) requested by COSIS sought answers on the following: what are the specific obligations of State Parties to the UNCLOS to prevent, reduce, and control pollution of the marine environment as it relates to the impacts of climate change? Do Parties have an obligation to protect and preserve the marine environment in relation to climate change impacts?[17]

The AO of the ITLOS on this case was rendered and published on 21 May 2024. Remarkably, the ITLOS concluded that anthropogenic GHG emissions into the atmosphere are considered within the definition of "pollution of the marine environment."[18] The AO also states that while the UNFCCC and the Paris Agreement are the primary legal treaties on climate change, issues related to climate change are not exclusive thereto and that the obligations under the UNCLOS on pollution prevention will not be satisfied through compliance with the obligations under the Paris Agreement.[19] Furthermore, the standard of due diligence in complying with such obligations is stringent, commensurate to a State's capabilities and available resources, and based on best available science.[20]

[11] Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law (Case No. 31). *Written Statement of the Commission of Small Island States on Climate Change and International Law (COSIS)*, 16 June 2023, [51]-[52].
[12] United Nations Convention on the Law of the Sea (UNCLOS), 16 Nov. 1994, 1883 UNTS 3, Art. 207, Sec. 5.
[13] ibid at Art. 212.
[14] ibid at Art. 210.
[15] ibid at Art. 1(1)(4).
[16] COSIS (n 11) *supra* at Chapter 5.
[17] ibid at [6]-[7].
[18] *Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law*. Advisory Opinion, 21 May 2024, [179].
[19] ibid at [223].
[20] ibid at [241].

While the AO has been welcomed as a seminal step towards protecting both the oceans and the atmosphere,[21] it remains to be seen how this will be received by the UNFCCC and Paris Agreement Parties and translated into more ambitious emissions reduction commitments from Parties.

B. *The International Convention for the Prevention of Pollution from Ships (MARPOL) and the International Maritime Organization (IMO)*

The International Maritime Organization (IMO) is the United Nations specialised agency that oversees the safety and security of shipping and the prevention of marine and atmospheric pollution by ships. It sets international standards for the safety, security, and environmental impact of maritime transport.[22] Additionally, it serves as the administrative body for the International Convention for the Prevention of Pollution from Ships (MARPOL), which became effective in 1973.[23] In 2011, the IMO approved amendments to MARPOL Annex VI that introduced mandatory energy efficiency measures, both technical and operational, to lower CO_2 emissions from global shipping. The Energy Efficiency Design Index (EEDI), together with the Ship Energy Efficiency Management Plan (SEEMP), have been enforceable since 2013 and is the first global obligatory framework for reducing greenhouse gas emissions within an international industrial sector. The EEDI enforces standards for energy efficiency relative to cargo capacity for various types and sizes of vessels, while the SEEMP encourages shipowners and operators to adopt innovative technologies and methods to enhance a vessel's operational efficacy.[24]

In 2023, the IMO implemented its GHG Strategy aimed at lowering greenhouse gas emissions from ships. This strategy outlines a long-term vision and specific goals for lessening emissions within the international maritime sector, as well as the guiding principles. The document also details potential measures to be considered for the medium and long term, timelines, and potential effects on various countries. Additionally, it addresses obstacles to these goals and measures that could support them, such as capacity building, technical cooperation, and research and development. A key objective of the strategy is to achieve at least a 40% reduction in the carbon intensity of global shipping by 2030. Furthermore, it sets an ambitious target to increase the adoption of technology, fuels, and energy sources with zero or near-zero emissions to at least 5%, and aims for 10%, of the sector's total energy use by 2030.[25]

Since the first meeting of the UNFCCC COP, the IMO reports to the UNFCCC during sessions of its SBSTA.[26] These reports include the IMO's latest progress and achievements relating to GHG emissions from international shipping and are considered under the SBSTA agenda item on "emissions from fuel used for international aviation and maritime transport."

C. *The Treaty of the High Seas or the Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ)*

Newest in the legal arsenal for marine environment protection is the Treaty on the Marine Biodiversity of Areas Beyond National Jurisdiction, or the Treaty of the High Seas (BBNJ). The BBNJ, adopted on 19 June 2023, aims to better implement the principles of UNCLOS in protecting and conserving marine areas outside national jurisdiction through better cooperation and coordination of various

[21] *see* Khatri, Upsana, and Joie Chowdhury. "How a Historic Opinion on Climate Change and Ocean Protection Sets the Bar for Climate Action." *Centre for International Environmental Law*, 27 June 2024; "ITLOS Sets Groundbreaking Victory for Ocean and Climate Protection." *Greenpeace International*, 21 May 2024.
[22] "Introduction to the IMO." *International Maritime Organization (IMO) Webpage.*
[23] "Marine Environment." *IMO Web.*
[24] "Improving the Energy Efficiency of Ships." *IMO Web.*
[25] IMO Marine Environment Protection Committee, *2023 IMO Strategy on Reduction of GHG Emissions from Ships,* Annex 15 Resolution MEPC.377(80), MEPC 80/17/Add.1, 7 Jul. 2023.
[26] "Emissions from Fuels Used for International Aviation and Maritime Transport." *UNFCCC Webpage.*

stakeholders.[27] As of October 2024, the Treaty has been ratified by thirteen countries and has one hundred and five signatories.[28] In pursuit of its objectives, the BBNJ establishes a framework that governs access to marine genetic resources, including issues related to benefit-sharing.[29] It mandates the performance of environmental impact assessments for proposed activities[30] and the establishment of area-based management tools, such as marine protected areas, to support conservation and sustainable use of biodiversity.[31]

The Preamble and core provisions of the BBNJ stress the importance of confronting the decline of ocean biodiversity and the deterioration of marine ecosystems due to climate change impacts including ocean warming, reduced oxygen levels, and ocean acidification.[32] The Treaty also acknowledges concerns related to pollution, particularly plastic pollution, and unsustainable use, highlighting the need for targeted actions to mitigate these challenges.[33]

The BBNJ offers a platform for dialogue and integration, aligning efforts for biodiversity conservation and measures for climate change. The Group of 77 (G77) negotiating bloc, composed of developing countries, anticipates that BBNJ will solidify this connection, emphasizing the significant role of oceans in the carbon cycle and in climate change mitigation strategies. Additionally, BBNJ is expected to bolster scientific and technical capacities, providing SIDS with enhanced resources to comprehend and confront the impacts of climate change they are experiencing.[34]

III. **Oceans and Marine Conservation in the United Nations Framework Convention on Climate Change and Related Agreements**

The UNFCCC regime has been a laggard in addressing ocean-related concerns as it relates to climate change impacts and actions. The ocean is mentioned once in the text of the UNFCCC under Art. 4(1)(d) on sinks and reservoirs[35] while the Paris Agreement mentions it in the Preamble[36] and indirectly through reference in Art. 5(1) on sinks and reservoirs.[37] Clearly, this is an inadequate reflection of the critical role that the ocean plays in the climate system and could play in taking climate action. Moreover, recognition of the adverse impacts of climate change on the health of the ocean is not mentioned.

With the concerted efforts of the ocean community, the *Strategic Action Roadmap on Oceans and Climate: 2016 to 2021* was prepared and published by the International Expert Working Group on Oceans and Climate composed by thirty-seven experts and forty-six partner organizations of the Oceans Day at the UNFCCC COP 22 in 2016.[38] The Roadmap addresses six issue areas: The central role of oceans in regulating climate, role of oceans in mitigation, role of oceans in adaptation, displacement, financing, and capacity development.[39]

The Roadmap was followed by a report entitled *Assessing Progress on Ocean and Climate Action: 2018*, launched during COP 24. This report highlighted the issues and goals for the ocean and the progress achieved in the six issue areas of the Roadmap. The report provides examples of action or other

[27] *Agreement Under the UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ).* UNGA A/Conf.232/2023/4*, 19 June 2023.
[28] "Law of the Sea, BBNJ." *United Nations Treaties.*
[29] ibid at Part II, Arts. 9 to 16.
[30] ibid at Part IV, Arts. 27 to 39.
[31] ibid at Part III, Arts. 17 to 26.
[32] ibid at Preamble.
[33] ibid.
[34] Chandrasekhar, Aruna, and Guiliana Viglione. "Q&A: What Does the 'High Seas Treaty' Mean for Climate Change and Biodiversity." *Carbon Brief*, 8 Mar. 2023.
[35] UNFCCC, 1992, A/AC.237/18 (Part II)/Add.1; 31 ILM 849, Art. 4(1)(d).
[36] Paris Agreement to the United Nations Framework Convention on Climate Change (Paris Agreement), Dec. 12, 2015, TIAS No 16-1104, Preamble.
[37] ibid at Art. 5(1).
[38] "Sustainable Development, Roadmap to Oceans and Climate Action." *United Nations Department of Economic and Social Affairs Webpage*.
[39] Cicin-Sain, Biliana, et al., "Toward a Strategic Action Roadmap on Oceans and Climate: 2016 to 2021." *Global Ocean Forum*, 2016.

developments relevant to each issue area and describes the negative impacts of climate change on ocean ecosystems and coastal and island populations. This report goes further in discussing issues such as blue economy and the central role of NDCs in separate chapters.[40] The Oceans Pathway was also launched at COP 23 in 2017 as an initiative by the Fiji presidency to increase the role of the ocean considerations in the UNFCCC process and significantly increase action in the priority areas impacting by ocean and climate change.[41]

In 2019, responding to the UNFCCC's request, the IPCC published its *Special Report on the Ocean and the Cryosphere in a Changing Climate* that covers expected changes with ongoing global warming as well as the risks and opportunities these changes will bring to ecosystems and people. This is not the first time that the IPCC has included ocean-related considerations, having done so in its first to fifth Reports, each time highlighting the adverse impacts of climate change on oceans. In this Special Report, mitigation, adaptation, and governance options for reducing risks are also discussed.[42]

Also, at COP 25 in 2019, the Chile Madrid Time for Action was adopted which mandated the Ocean and Climate Change Dialogue.[43] Since then, there have been three Dialogues held in 2020, 2022, and 2023. The first Ocean and Climate Change Dialogue, held virtually in 2020 due to the pandemic, discussed how to strengthen adaptation and mitigation action on ocean and climate change under the UNFCCC and across the United Nations and at the national level, as well as cross-cutting support for action.[44] In 2022, the second Dialogue focused on strengthening and integrating national ocean climate action under the Paris Agreement and enabling ocean climate solutions and optimizing institutional connections.[45] The 2023 Dialogue on the other hand, focused on coastal ecosystem restoration, including blue carbon, and fisheries and food security.[46] The next Ocean and Climate Change Dialogue will be held in June 2024 alongside the 2024 Bonn Climate Change Conference and the 60th sessions of the Subsidiary Body for Implementation (SBI) and the SBSTA. The topics of the dialogue will be on (i) marine biodiversity conservation and coastal resilience and (ii) technology needs for the ocean / climate action, including financial links.[47]

Aside from these developments, Parties have incorporated marine and ocean-related actions into their adaptation and mitigation reports. NAPs for example, are guided by ocean-related supplementary information to the technical guidelines drafted by the Convention on Biological Diversity and the Food and Agriculture Organization. Currently, over 70% of new or revised NAPs address ocean and coastal zones.[48] The Nairobi Work Programme (NWP), which seeks to improve understanding and assessment of impacts, vulnerability, and adaptation, also has a focus area on the ocean, coastal areas, and ecosystems. The NWP's Thematic Expert Group on Oceans has published a supplement to the NAP technical guidelines in March 2022 to guide Green Climate Fund (GCF) proposal development.[49]

[40] ibid.
[41] "Ocean Pathway Launched at COP 23." *International Institute for Sustainable Development SDG Knowledge Hub,* 21 Nov. 2017.
[42] IPCC (n 1) *supra*.
[43] UNFCCC COP, Twenty-Fifth Session, *Chile Madrid Time for Action,* FCCC/CP/2019/L.10, 15 Dec. 2019, [31].
[44] "Ocean and Climate Change Dialogue to Consider How to Strengthen Adaptation and Mitigation Action Informal Summary Report by the Chair of the SBSTA." *UNFCCC SBSTA,* 29 Apr. 2021.
[45] "Ocean and Climate Change Dialogue 2022 Information Note by the Chair." *UNFCCC SBSTA,* 30 May 2022.
[46] "Ocean and Climate Change Dialogue 2023 Informal Summary Report by the Co-Facilitators of the Ocean and Climate Change Dialogue 2023-2024." *UNFCCC SBSTA,* 15 Sep. 2023.
[47] UNFCCC, *Message to Parties, United Nations Organizations and Intergovernmental and Non-Governmental Organizations Admitted as Observers and Other Non-Party Stakeholders, The Ocean and Climate Change Dialogue 2024.* 19 Apr. 2024, Ref ISCP/MTP/O/Ocean and Climate Change Dialogue 2024.
[48] "Ocean Action Under the UNFCCC." *UNFCCC.*
[49] "Oceans, Coastal Areas, and Ecosystems." *UNFCCC.*

As for mitigation, National Greenhouse Gas Inventories and REDD+ include information on and action for coastal wetlands and mangrove forests. The UNFCCC SBSTA also monitors the work of the IMO on bunker fuels used in shipping. Additionally, out of 148 countries that have submitted their NDCs as of 1 October 2023, ninety-seven have included coastal and marine nature-based solutions (NbS). Out of these ninety-seven, fifty-five countries recognized the mitigation and adaptation co-benefits of coastal and marine NbS, and forty-four noted the resultant socioeconomic benefits for coastal communities. There are also more references to the ocean in updated NDCs; certain countries further recognised ocean changes (for instance, acidification and coral bleaching) and / or climate-driven impacts on the ocean (for instance, sea-level rise and coastal erosion). Compared to the first set of NDCs, fourteen out of 142 countries have added such references. The outcome of the GST of the Paris Agreement that concluded during COP 28 also invited Parties to scale up ocean-based mitigation action, as appropriate.[50]

IV. **Conflicts in International Ocean and Climate Change Law: Case Studies**

The Secretary-General's report, prepared pursuant to General Assembly resolution 72/277 and titled *Towards a Global Pact for the Environment*, discussed the gaps and deficiencies of international environmental law (IEL). The Secretary-General found that customary IEL is limited, leading to implementation gaps, and that IEL is reactive, as demonstrated by the multitude of environmental treaties. These treaties disregard the interconnectedness and interdependence of the Earth's ecosystem and work in silos leading to fragmented implementation and multiple coordination challenges.[51]

Unfortunately, this is quite an accurate description of how the climate change and law of the sea regimes have worked over since the early 1990s. The UNFCCC has managed to avoid discussions relating to oceans until the past few years. This has led to many conflicts, and has wasted opportunities for joint implementation. This paper will focus on two issues that are currently debated and have delayed progress for climate action.

A. *Implementation of the Principle of Common but Differentiated Responsibilities (CBDR) under the IMO and UNFCCC*

1. CBDR under the UNFCCC

The climate change regime is distinguished in its practice and application of the Common but Differentiated Principle (CBDR). This principle recognizes and respects the different capabilities and responsibilities of each country in addressing climate change. This is a reflection of the historical responsibility held by developed countries who hold the largest share of historical and current global GHG emissions as compared with developing countries whose share is relatively and collectively low.[52] CBDR is enshrined under the Preamble of the UNFCCC where it acknowledges "that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions."[53]

Reflecting this principle, the UNFCCC divided countries into Annex I, Annex II, and non-Annex I countries. Annex-I countries include industrialized countries that were members of the Organization for Economic Cooperation and Development (OECD) in 1992 and

[50] UNFCCC Conference of the Parties, Twenty-Eighth Session. *Outcome of the First Global Stocktake.* UN Doc FCCC/PA/CMA/2023/L.17, 13 Dec. 2023, [35].
[51] UNGA Res A/73/419.
[52] Tian, Wang and Gao Xiang. "Reflection and Operationalization of the Common but Differentiated Responsibilities and Respective Capabilities Principle in the Transparency Framework Under the International Climate Change Regime." *Advances in Climate Change Research,* vol. 9, no. 4, 2018, pp. 253-263.
[53] UNFCCC (n 35) *supra* at Preamble.

countries with economies in transition (EIT), which included the Russian Federation, the Baltic States, and other countries from Central and Eastern Europe.[54] Annex II countries on the other hand, referred to developed countries under Annex I, but not EIT countries, while Non-Annex I consist mostly of developing countries.[55]

Under Articles 4.2 (a) and 4.2 (b) of the Convention, Annex I countries are individually or jointly obligated to return to their 1990 levels of GHG emissions by the year 2000.[56] Annex II countries are additionally required to provide financial resources and promote the development and transfer of environmentally friendly technologies to allow Non-Annex I countries to undertake mitigation and adaptation actions.[57]

This type of differentiation was further highlighted under the Kyoto Protocol, which legally bound Annex I countries to meet specific targets and reduce country emissions. Over the period of 2008-2012, the Protocol obligated Annex I Parties (thirty-seven countries) to reduce emissions based on legally binding targets amounting to a 5% reduction compared to the 1990 baseline.[58] Many found this quite problematic because, aside from not being ambitious enough, countries that were some of the largest emitters at that point in time, including the United States (US), who had not ratified the agreement, and developing countries, mainly China and India, were not bound by any reduction targets. By 2012, global GHG emissions had increased by 44% from 1997 levels, highlighting the failure of the Protocol to curb emissions. By the second commitment period, some countries, including Canada and Japan, encouraged by the American stance, pulled out of the Protocol adding more doubt as to its viability. This paved the way for talks of a second agreement that would bind all Parties to legal binding emission targets, and, in 2015, the Paris Agreement was adopted.[59]

Under the Paris Agreement, this type of classification was removed, and Parties can now individually determine their contribution to the global goals. However, the Agreement continues to differentiate developed and developing countries for some obligations. Article 2 clarifies that the Agreement is to be implemented in a way that reflects CBDR,[60] and this is exemplified in various articles such as in Article 4 where it is stated that peaking will take longer for developing country Parties and that developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets.[61] Developed countries are also expected to provide means of implementation including finance, capacity building, and technology development and transfer to assist developing countries in implementing the Paris Agreement. Article 9 states that "developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention."[62] Article 10 on the other hand, states that support, "including financial support, shall be provided to developing country Parties for the implementation of this Article, including for strengthening cooperative action on technology development and transfer at different stages of the technology cycle, with a view to achieving a balance between support for mitigation and adaptation."[63] On capacity building, Article 11 states that "all Parties should cooperate to enhance the capacity of developing country Parties to implement this Agreement. Developed country Parties should enhance support for capacity-building actions in developing country Parties."[64] This clearly shows that while the interpretation and strict

[54] ibid at Annex I.
[55] ibid at Annex II.
[56] ibid at Art. 4.2 (a) and Art. 4.2 (b).
[57] ibid at Art. 4(3).
[58] Kyoto Protocol to the United Nations Framework Convention on Climate Change, 11 Dec. 1997, 37 ILM 22, Art. 3(1).
[59] Bassetti, Francesco. "Success or Failure? The Kyoto Protocol's Troubled Legacy." *Foresight,* 8 Dec. 2022.
[60] Paris Agreement (n 36) *supra* at Art. 2 (2).
[61] ibid at Art. 4.
[62] ibid at Art. 9.
[63] ibid at Art. 10.
[64] ibid at Art. 11.

application of CBDR might have changed, and the obligations of developing countries have been expanded, it remains to be an important guiding principle of the Paris Agreement.

2. The IMO's Principles of Non-Discrimination, Equal Treatment, and No More Favourable Treatment

One of the IMO's aims, under Article 1 of the Convention on the International Maritime Organization, is "to promote the availability of shipping services to the commerce of the world without discrimination."[65] This is reflected under the principle of non-discrimination and equal treatment or the "flag neutrality principle." Unlike in the climate change regime where obligations are differentiated, IMO regulations are applied to all ships regardless of the flag it is using.[66]

Additionally, UNCLOS, under Article 5(7), extends the enforcement jurisdictions of coastal and port states over foreign flagged ships.[67] This is called the No More Favourable Treatment (NMFT) principle. It ensures that ships are not disadvantaged due to its flag state ratifying the IMO Convention. As such, when a country ratifies an IMO instrument, the regulations apply not only to ships registered under its flag but also to foreign-flagged vessels visiting its ports.[68] NMFT mandates equal treatment for all ships, irrespective of flag state, industrial development, or ownership. It aims to ensure fair standards for all ships, including those flying flags of convenience, without infringing on the sovereignty of non-party states.[69] An example of NMFT in application can be found under the port State control provisions of Title 5 of the Convention, which states that ships from all countries, regardless of whether they have ratified the Convention, can be inspected in any country that has ratified it. If these ships fail to meet the minimum standards outlined in the Convention, they may be subject to inspection and potential detention.[70]

Guided by the NMFT principle, the 2011 MARPOL Convention's mandatory technical and operational measures to improve ships' energy efficiency are applied equally to all ships regardless of their flag.[71] However, major developing countries expressed serious reservations, arguing that GHG regulations should only apply to Annex I parties in line with the CBDR principle. This debate regarding the interpretation and application of CBDR has persisted throughout the legislative process and has hindered efficiency and consensus in regulating GHG emissions from international shipping.[72] In 2011, after many lengthy discussions, the IMO adopted a new Chapter 4 on "regulations on energy efficiency for ships" to Annex VI of MARPOL.[73] Instead of specific emission reductions, new ships of 400 gross tonnage and above should meet minimum energy efficiency levels and follow certain operations to improve energy efficiency.[74]

In July 2023, the IMO adopted the *2023 IMO Strategy on Reduction of GHG Emissions from Ships*, incorporating, for the first time, a net-zero GHG emission goal from international shipping by or around the year 2050.[75] Significantly, the Strategy lists both NMFT and CBDR in its guiding principles and adds reference to a "just and equitable transition" in its Vision Statement.[76] While it adequately

[65] Convention on the International Maritime Organization, 17 Mar. 1958, Art. 1.
[66] Chen, Yuli. "Reconciling Common but Differentiated Responsibilities Principle and More Favourable Treatment Principle in Regulating Greenhouse Gas Emissions from International Shipping." *Marine Policy,* vol. 123, 2021, p. 104317.
[67] UNCLOS (n 12) *supra* at Art. 5(7).
[68] Chen (n 66) *supra* at p. 4.
[69] ibid.
[70] ibid.
[71] International Maritime Organization, *Amendments to MARPOL Annex XI on Regulations for the Prevention of Air Pollution from Ships by Inclusion of New Regulations on Energy Efficiency for Ships,* MEPC 62/24/Add.1 Annex 19, 15 Jul. 2011, Regulation 1.
[72] Chen (n 66) *supra* at p. 4.
[73] International Maritime Organization, *Amendments to the Annex of the Protocol of 1997 to Amend the International Convention for the Prevention of Pollution from Ships, 1973, As Modified by the Protocol of 1978 Relating Thereto,* Resolution MEPC.203(62), 15 Jul. 2011.
[74] ibid at [2].
[75] IMO (n 25) *supra* at [3.3].
[76] ibid at [3.5](1).

addresses the difficulties that developing countries would face to align with this Strategy and provides plans to develop information sharing programmes, financial support mechanisms, and capacity building, it remains to be seen how the Strategy will be implemented and how successful it will be in achieving its goals.

B. *Carbon Dioxide Removal under the London Protocol and the UNFCCC*

1. Carbon Dioxide Removal (CDR) as Climate Action

The IPCC, in its Special Report on Global Warming at 1.5℃, provided pathways on how to achieve this ambitious temperature goal. The report shows that carbon dioxide removal (CDR) of 100-1000 $GtCO_2$ will be required over the 21st Century, but notes that this accelerated level of removal is unprecedented and unproven, and that further work needs to be done on its feasibility and sustainability.[77] In the Synthesis Report for the 6th Assessment Report (AR6), the IPCC goes as far to say that CDR is "necessary to achieve net-negative CO_2 emissions."[78]

CDR technologies are tools aimed at reducing concentrations of atmospheric carbon dioxide.[79] The IPCC glossary classifies these types of technologies as a special type of mitigation.[80] CDR itself is an umbrella term for various types of technologies such as: afforestation and forest ecosystem restoration, direct air capture and storage, bioenergy with carbon capture and storage, enhanced weathering and ocean alkalinity, and ocean fertilisation.[81]

CDR projects may be implemented onshore or offshore. A coalition called Geoengineering Monitor, composed of the ETC Group, Biofuelwatch, the Heinrich Boell Foundation and the Global Forest Coalition, monitors active geoengineering projects all over the world. As of October 2024, there are a total of forty-seven ongoing ocean-based greenhouse gas removal projects and thirty-six planned projects.[82] This includes projects involving artificial upwelling, bioenergy with carbon capture and storage (BECCS), biochar, carbon capture and storage (CCS), carbon capture use and storage (CCUS), direct air capture, enhanced weathering, and ocean fertilisation.[83]

However, the IPCC also notes in AR6 that widespread use of CDR is associated with various feasibility and sustainability concerns.[84] This is echoed by Parties, in relation to the marine environment, during the 2022 Ocean and Climate Change Dialogue. The Information Note by the Chair states that the "urgent need to mitigate emissions has raised interest in ocean-based carbon dioxide removal or altering ocean albedo. Multiple approaches are under consideration, including macroalgal culture and sinking into the deep sea; alkalinity addition, ocean fertilisation, upwelling and downwelling approaches, and deep carbon dioxide injection into deep water and the deep ocean crust. Scientific research is needed to evaluate the effectiveness of these mitigation measures and their consequences for ocean ecosystems when applied at scale."[85] While Parties to the Paris Agreement generally do not directly mention CDR in their NDCs, some forms of CDR strategies are included such as those relating to soil and forest carbon. Parties also include CDR strategies in their optional Long-Term Low Emission Development Strategies reports that address scenarios beyond 2050.[86]

At COP 28 in 2023, Parties recognized the role of removal technologies in the GST outcome decision, stating that the need for deep, rapid, and sustained reductions in GHG emissions in

[77] IPCC (n 2) *supra* at [C.3].
[78] IPCC. *Synthesis Report of the IPCC Sixth Assessment Report (AR6),* edited by H Lee et al., 2023, [B.5.1].
[79] "Emerging Technologies Terminology – A Living Guide." *Carnegie Climate Governance Initiative.*
[80] IPCC (n 2) *supra*, Glossary.
[81] ibid.
[82] "Geoengineering Map." *Geoengineering Monitor.*
[83] ibid.
[84] IPCC (n 78) *supra* at [B.7].
[85] UNFCCC SBSTA (n 45) *supra.*
[86] Arlota, Carolina, and Korey Silverman-Roati. "Recent Developments on Carbon Dioxide Removal: Increasing Policy Support but Governance Issues Remain." *Climate Law: A Sabin Center Blog,* 2023.

line with the 1.5C pathways will need contributions in "accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement, and removal technologies such as carbon capture and utilization and storage, particularly hard-to-abate sectors, and low-carbon hydrogen production."[87] However, Parties at COP 28 failed to adopt recommendations on methodologies and removals from the UN's Art. 6.4 Supervisory Body. In effect, with these developments, the climate change regime seems to support the acceleration and roll out of removal technologies without any MRV requirements or methodologies.

2. Carbon Dioxide Removal under the London Protocol

Perhaps quite surprisingly, of all international legal frameworks relating to CDR, the London Protocol reacted most swiftly to amend instruments to address and regulate the implementation of these types of activities. In response to growing public concern regarding ocean fertilization activities, the States party to the London Convention and London Protocol published a statement of concern in 2007 about ocean iron fertilization and advised a process for a thorough evaluation of all proposals to ensure compliance with these agreements.[88] In 2009, the State Parties formally acknowledged that ocean fertilization fell within the scope of the London Convention and London Protocol and endorsed Resolution LC.LP.1 on the Regulation of Ocean Fertilisation. This classified ocean fertilisation for legitimate scientific research as distinct from mere disposal under the agreements and emphasised that such activities should be assessed individually. Additionally, the Resolution clarified that fertilisation activities that are not considered legitimate scientific research are not exempt from the definition of dumping under the London Convention and London Protocol and should be prohibited.[89] Later in 2010, the Assessment Framework for Scientific Research Involving Ocean Fertilisation was established by the Scientific Groups to the London Convention and London Protocol to help regulators determine whether proposals for ocean fertilisation constitute legitimate scientific research under the London Convention or Protocol.[90] While Resolution LC.LP.1 had not reached the requisite two-thirds acceptance to enter into force, the COP provisionally adopted the Resolution in 2019. This allows States who have adopted the amendment to proceed with transboundary export of CO_2 for CCUS activities. This list of States includes Norway, UK, Netherlands, Iran, Finland, Estonia, Sweden, Denmark, Korea, and Belgium, who have submitted their instruments of acceptance.[91]

The London Protocol has also sought to supervise sub-seabed storage for CCUS activities. In 2006, Parties adopted amendments to Annex I to regulate activities related to large point sources of CO_2 emissions.[92] In 2009, Parties also amended Art. 6 of the Protocol on the export of wastes for dumping purposes. This allowed transboundary sharing of sub-seabed geological formations for CCUS so long as the prescribed protection standards are met. However, as of publication, this amendment has not yet entered into force as it has not met the required two-thirds acceptance by Parties. Instead in 2019, Parties adopted a resolution that would allow the provisional implementation of this amendment and allow interested countries to deposit a formal declaration and export CO_2 for geological storage between them according to existing guidelines.[93]

This fragmented policymaking on CCUS within the international climate change and law of the sea regimes have led to confusion and have stunted the growth and roll out of equitable and environmentally safe technologies for

[87] UNFCCC (n 50) *supra* at [28](e).
[88] Scott, Karen. "Exploiting the Oceans for Climate Change Mitigation: Case Study on Ocean Fertilisation." *The Limits of Maritime Jurisdiction,* edited by Clive Schofield et al., Martinus Nijhoff Publishers, 2013.
[89] ibid.
[90] ibid.
[91] "Regulatory Barriers to A European Market for CO_2 Transport by Ship." *Slaughter and May Webpage*, 15 Feb. 2024.
[92] "Carbon Capture and Sequestration." *IMO.*
[93] ibid.

CCUS. At the same time, there is a dangerous lack of safeguards that can ably monitor and guide proponents. The risks involved in CCUS can be catastrophic, depending on the type of technology employed. Some uncalculated risks of sub-seabed storage include seismic activity and toxic brine displacement,[94] while ocean fertilisation could lead to eutrophication, widespread algal blooms, and loss of biodiversity.[95]

V. **Reconciling Conflict in International Ocean and Climate Change Law**

Given the wide scope and coverage of international climate change law and the limitations to the siloed approach to international environmental conservation law, instances of conflict and overlap are all but inevitable. By nature, ecological processes are interdependent and interlinked.[96] While it can be beneficial for legal regimes to recognize that some issues are out of the scope of their expertise and outsource it to institutions that are more adept at them, strong collaboration is needed to ensure that the end goals are still met and that foundational principles are respected.

The United Nations General Assembly (UNGA) in recent years has been promoting enhanced coordination, synergy, and interconnected implementation between the 2030 Agenda and the Sustainable Development Goals (SDGs) and the establishment of a Global Pact for the Environment that can consolidate principles of international environmental law for stronger implementation.[97] The Secretary-General said that "more efforts could be made to establish or strengthen mechanisms to harness interlinkages and promote synergies for more effective implementation."[98] Among other recommendations endorsed by the UNGA, a Resolution related to the creation of the Global Pact invited the scientific community to develop further research on the linkages and cross-cutting issues between multilateral environmental agreements. It also calls for increased policy coherence and improved implementation at the national and international levels between the different multilateral environmental agreements.[99]

Some efforts have also been made at the UN level to address this fragmentation, such as UN Oceans, an inter-agency mechanism established in 2014 that aims to improve coordination, coherence, and effectiveness of various agencies under the UN and the International Seabed Authority.[100] The UNFCCC Secretariat is a member of UN Oceans and regularly invites UN Oceans to hold side events at UNFCCC events.[101] However, it is questionable whether these efforts and the outcome of the collaboration impacts Parties. It is telling that within the UNFCCC Ocean Dialogue process, submissions by many stakeholders have advocated for more collaboration between norms, decision-making procedures, and organizations working on the same issues. In fact, institutional interactions were mentioned by 47% of all submissions while 77% mentioned normative interactions with the ocean system.[102]

In dealing with complexity in international environmental law, some ways that coherence can be achieved is by clarifying a form of hierarchy, coordinating efforts, and designating a division of labour.[103] At the offset, the general rule is that there is no

[94] Fendt, Lindsey, et al. "Deep Trouble, The Risks of Offshore Carbon Capture and Storage." *Center for International Environmental Law*, 16 Nov. 2023.
[95] Santos, Francisca, et al. "Negative Emission Technologies." *Bioenergy with Carbon Capture and Storage, Using Natural Resources for Sustainable Development,* edited by José Carlos Magalhães Pires and Ana Luísa Da Cunha Gonçalves, Elsevier, 2019.
[96] Wolfrum, Rudiger and Nele Matz. *Conflicts in International Environmental Law*. Springer, 2003.
[97] UNGA (n 51) *supra*.
[98] ibid at [80].
[99] UNGA Res A/73/333.
[100] "UN-Oceans." *UN System Chief Executives Board for Coordination*.
[101] "Ocean Action Coordination with UN and Non-Party Stakeholders." *UNFCCC*.
[102] Dobush, Bobbi-Jo, et al., "A New Way Forward for Ocean-Climate Policy as Reflected in the UNFCCC Ocean and Climate Change Dialogue Submissions." *Climate Policy,* vol. 22, no. 2, 2022, pp. 254-271.
[103] Bodansky, Daniel and Harro van Asselt. *The Art and Craft of International Environmental Law*. 2nd ed., Oxford University Press, 2024.

hierarchy between treaties,[104] and it cannot be said that the UNCLOS supersedes the UNFCCC or vice versa as they are equally binding to their respective Parties. Hierarchy in this context means understanding how the UNFCCC clarifies, complements, or amends the UNCLOS and vice versa to clearly identify and define Parties obligations.[105] This will allow the coordination of efforts to avoid duplication or conflicting rules of implementation and the designation of a clear mandates.

The ITLOS provided a noteworthy example on how such coherence can achieved between climate change and ocean governance in its Advisory Opinion (AO) as requested by the COSIS. As previously discussed, the AO concluded that anthropogenic GHG emissions constitute pollution of the environment under Art. 1[1] of UNCLOS. It further clarifies that while the UNFCCC and the Paris Agreement are the primary legal documents in addressing climate change and is relevant in interpreting and applying UNCLOS relating to marine pollution from GHG emissions, complying with the obligations and commitments under the Paris Agreement is not solely enough to satisfy obligations and commitments under UNCLOS.[106] Simply put, the Paris Agreement does not supersede the UNCLOS when it comes to the regulation of marine pollution from GHG emissions, but rather it provides guidance in its implementation. In deciding as such, the ITLOS provides clarity in the scope of UNCLOS and seeks to improve ways in which the treaty's overarching goals on marine conservation and protection could be achieved. At the same time, it respects the obligations that Parties have agreed to under both UNCLOS and the UNFCCC.

The ITLOS AO also defers to the IPCC as to best available science on climate change and ocean acidification,[107] and requires Parties to cooperate to promote studies, undertake scientific research, and encourage the exchange of information and data on marine pollution from GHG emissions.[108] This deference and trust built with the IPCC for authoritative assessments on the scientific knowledge on climate change will support coherence as it will ensure a common baseline and basis for policymaking on all issues relating to climate change and will further develop the UNCLOS' understanding and interpretation of ocean-climate science.[109] If there is any hierarchy to be made among outputs, one that is grounded on science rather than politics is the gold standard.

Coherence and collaboration, however, should not be limited to regime secretariats and Parties. Non-State actors who work in the intersection of oceans and climate change could also lessen the coherence gap significantly if they are given more avenues to participate and influence international discussions and negotiations. Interdisciplinary collaboration can lead to solutions that are more comprehensive and needs oriented. In the face of the triple planetary crisis and the growing urgency for action, only an integrated strategy and strong coordination can break through the silos that we have built around us.

[104] Seidl-Hohenveldern, Ignaz. "Hierarchy of Treaties." *Essays on the Law of Treaties, A Collection of Essays in Honour of Bert Vierdag,* edited by Jan Klabbers and Rene Lefeber, Brill, 1998, pp. 7-8.
[105] ibid at p. 9.
[106] ITLOS (n 18) *supra* at 80.
[107] ibid at 75.
[108] ibid at 111.
[109] Friar, Greta. *An Interdisciplinary Approach to Fighting Climate Change Through Clean Energy Solutions.* MIT Laboratory for Information and Decision Systems, 2023.