

Regulatory gaps in the Arctic legal framework regarding vessel-source pollution

The exclusion of harmful shipping pollutants such as black carbon and noise pollution from the Polar Code, from MARPOL, and from the IMO regime – an analysis of the present legal shortcomings in protecting the Arctic environment from vessel-source pollution

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1. Introduction

1.1 Statement of the problem and purpose of the thesis

Climate change is rapidly mutating the physical landscape of the Arctic. International shipping causes an increase in airborne pollutants like greenhouse gases (CO₂ and water vapors), SO_x, NO_x, and black carbon, as well as underwater noise pollution, consequently affecting the marine environment of the Arctic.¹ Atmospheric warming means that sea ice is rapidly thinning and melting, in part due to the ice-albedo effect, a development which is then worsened by products of anthropogenic activities such as shipping emissions.² There are four million people dispersed in areas governed by Arctic nation-states,³ whose chances of survival are hindered by any increase in the melting of ice as they rely on this sea ice for the harvesting and hunting of mammals.⁴ Atmospheric warming leads to more storms which aggravate the process of coastal erosion and accelerate the recession of sea ice, in turn forcing local communities to emigrate to safer areas.⁵ The area is also home to various endangered mammals, such as the polar bear, walrus, and whale, which are even more vulnerable to the impacts of climate change.⁶ The above airborne and underwater pollutants severely damage the Arctic ecosystem and environment, leading to global repercussions such as sea-level rise and the loss of biodiversity associated with climate change.⁷

¹ CO₂, methane, water vapor, nitrous oxide, SO_x, NO_x, and black carbon are natural gases which absorb long-wave sun radiations consequently trapping the sun's heat – this is known as the greenhouse effect. These natural gases are now present in important atmospheric quantities due to increased anthropogenic activities and this led to the further trapping of the sun's heat, causing temperatures to increase on both land and sea. See Robert W. Christopherson *Geosystems: An Introduction to Physical Geography* (8th edition, Prentice Hall, 2011) for a discussion on the greenhouse effect, p.90

² Darker water or land receives direct sunlight but absorbs the sunrays instead of reflecting them such as snow or ice would – this is known as the ice albedo effect. As sea-ice is retreating, more water is present contributing to more absorption rather than reflection which adds to the earth's warming – this then fuels the positive feedback loop of the ice-albedo effect. The particulates in the air, such as shipping emissions, then appear to enhance the albedo impact. See Christopherson (n 2), p.83

³ The Arctic nation-states are the United States, Canada, Sweden, Greenland (Denmark), Norway, Russian Federation, Finland, and Iceland. The indigenous people represent about 10% of the total population living in Arctic areas. See Paul Arthur Berkman, *Environmental Security in the Arctic Ocean*, Promoting Co-operation, and Preventing Conflict (1st Edition, Routledge, 2012), p.12

⁴ Mieke Coppes, "Indigenous Involvement in the COP21 Climate Change Talks" (Arctic Institute, 25th November 2015) <<https://www.thearcticinstitute.org/indigenous-cop-21-paris/>> accessed 06.06.2020

⁵ Oran R. Young, "The future of the Arctic: cauldron of conflict or zone of peace?" (2011) *Royal Institute of International Affairs*, Vol. 87, No. 1, p.185-193, p.191.

⁶ According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), GHG emissions have resulted in warming of the global ocean with the most dramatic rise in temperature near the surface. See the IPCC, *Climate Change 2014 Synthesis Report: Summary for Policymakers*, available at <https://www.ipcc.ch/report/ar5/syr/> Also see the Conservation of Arctic Flora and Fauna (CAFF) Report on the effects of the warming climate on Arctic terrestrial and marine mammals (2013), available at <http://www.caff.is/assessment-series/arctic-biodiversity-assessment/208-arctic-biodiversity-assessment-2013-chapter-3-mammals>

⁷ Scientists are considering an increase of at least 1.4-m in sea-level rise in this century, given Greenland's present losses and the global mountain glacial ice losses, see Christopherson (n 1), p. 289. Also, the Ilulissat declaration (2008) acknowledges these climatic changes as the five Arctic coastal states mention that "the Arctic Ocean stands at the threshold of significant

According to the 2007 IPCC report, Arctic warming in the next fifty years is in the range of three to four degrees Celsius, more than twice the global average.⁸ This Arctic warming is partly due to a recent growth in Arctic economic activities in remote areas which were previously ice, such as cost-effective and shorter shipping routes as well as the exploitation of natural gas and oil.⁹ Higher atmospheric temperatures trigger further ice-melts resulting in easier access to Arctic resources, which in turn stir diverging economic, political, and legal interests, prompting critical decisions from which indigenous communities are excluded.¹⁰

In this increasingly prosperous economic context, the Arctic remains threatened by vessel-source pollution as there is currently a lack of regulation limiting black carbon and underwater noise. Overall, there are international frameworks which apply to the Arctic which seek to reduce marine pollution¹¹ by controlling harmful substances dumped and emitted by ships,¹² and by regulating navigation and oceanic resources.¹³ Yet, there is a lack of binding environmental legislation which pointedly protects the Arctic from airborne and underwater noise pollution from vessels.¹⁴ Hence, a multilevel approach which encompasses both international and regional governance would be necessary to regulate these transboundary

changes. Climate change and the melting of ice have a potential impact on vulnerable ecosystems, the livelihoods of local Indigenous communities, and the potential exploitation of natural resources”, p.1, available at <https://cil.nus.edu.sg/wp-content/uploads/2017/07/2008-Ilulissat-Declaration.pdf>

⁸ IPCC 2007: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press, Cambridge, UK, and New York, NY, USA), available at https://www.ipcc.ch/site/assets/uploads/2018/03/ar4_wg2_full_report.pdf, p.33

⁹ USGS (2008) World Petroleum Assessment, the Arctic may be home to 13% of the world’s undiscovered oil and to 30% of its undiscovered natural gas, available at <https://energy.gov/OilGas/AssessmentsData/WorldPetroleumAssessment.aspx>

¹⁰ Commentary of Svein Vigeland Røttem in Polar Record (2011), Vol. 47, No. 2, p.185-190 on the book from Barry Scott Zellen, *Arctic Doom, Arctic Boom. The Geopolitical of Climate Change in the Arctic* (Praeger Publishers, 2009)

¹¹ Arctic shipping will enhance the ice-albedo positive feedback loop due to the increased amount of emissions as these will be deposited on snow and ice consequently darkening icy surfaces hence fastening the melting of snow and ice.

¹² The IMO has addressed air pollution from ships with new regulations and energy efficiency measures through *MARPOL Annex VI. Protocol of 1978 relating to the International Convention for the prevention of pollution from ships, 1973* (with annexes, final Act, and International Convention of 1973). Concluded at London on 17 February 1978, *United Nations Treaty Series*, Vol. 1340, No. 22484, p. 62 available at

<https://treaties.un.org/doc/Publication/UNTS/Volume%201340/volume-1340-A-22484-English.pdf>. [hereinafter *MARPOL*]

According to the IMO, there are four groups of emissions: emissions of exhaust gases, emissions of refrigerants, cargo emissions, and other emissions (see the Second IMO Study (2009)). This thesis focuses on the emission of exhaust gases.

¹³ *UNCLOS* offers a general framework for regulating freedom of navigation rights, territorial delimitation disputes, and the management of marine resources. United Nations Convention on the Law of the Sea (with annexes, final act, and procès-verbaux of rectification of the final act dated 3 March 1986 and 26 July 1993). Concluded at Montego Bay on 10 December 1982, *United Nations Treaty Series*, Vol. 1833, No. 31363, p. 397, available at

<http://treaties.un.org/doc/Publication/UNTS/Volume%201833/v1833.pdf> [hereinafter *UNCLOS*]

¹⁴ As this thesis will later discuss, the Polar Code omits the regulations of airborne and underwater noise pollution from vessels in the Arctic. International Code for Ships Operating in Polar Waters (Polar Code), Res. MSC.385(94), 21 November 2014, [hereinafter Code], available at

<http://www.imo.org/en/MediaCentre/HotTopics/polar/Documents/POLAR%20CODE%20TEXT%20AS%20ADOPTED.pdf> The Arctic Ocean has been excluded from a binding international framework as the region’s constant geographic mutations are difficult to regulate. See Laura Boone, “Development of an Environmental Chapter in the Polar Code: Introducing a New Player – Black Carbon” (2012), the Yearbook of Polar Law Online, Vol.4, No.1, p.541-560, p.544

shipping pollutants.¹⁵ For instance, the relationship between Article 234 *UNCLOS* and the Polar Code is proof of a successful multilevel approach as it enables Arctic coastal states to adopt further safety and environmental shipping measures in addition to the ones currently offered by the Code, giving these states a unique right of prescriptive action and of enforcement.¹⁶ The International Maritime Organization (IMO) has also recently pushed additional multilateral policies to protect the Arctic from vessel-source pollution, which includes the long-awaited Arctic ban on Heavy Fuel Oil (HFO), and the Initial Strategy which aims to curb greenhouse gases and other shipping emissions.¹⁷ Regarding noise pollution, other multilevel policies have been developed by the IMO such as the 2014 IMO Guidelines and the Particularly Sensitive Sea Area (PSSA) designations.¹⁸ Fostering regional and international cooperation in the Arctic is important as what happens in that region today is a showcase of the modern geopolitical paradigm and has far-reaching implications for the rest of the world.¹⁹

In light of the aforementioned Arctic framework, this thesis will discuss *MARPOL* Annex VI, the Polar Code, and the IMO, as well as analyze their regulatory omission of vessel source pollutants such as black carbon and underwater noise. First, a detailed analysis of *MARPOL* Annex VI and the Polar Code will be provided as these are the only two legislative instruments which regulate shipping emissions and shipping in polar waters. Simultaneously, amendments to the identified legal shortcomings will be proposed. Secondly, this thesis will assess the IMO's regime to reduce both airborne and underwater noise pollution in both international and Arctic waters, while offering potential IMO policy initiatives to regulate these pollutants further.

¹⁵ Aldo Chircop, "The Growth of International Shipping in the Arctic: Is a Regulatory Review Timely?" (2009) *The International Journal of Marine and Coastal Law*, Vol. 24, No. 2, p.355–380, p.379

¹⁶ This broad interpretation of Article 234 *UNCLOS* and the Polar Code is discussed by scholars as no international consensus has been reached. See Kristin Bartenstein, "The "Arctic Exception" in the Law of the Sea Convention: A Contribution to Safer Navigation in the Northwest Passage?" (2011) *Ocean Development & International Law*, Vol. 42, No. 1-2, p.22-52, p.37-39, and Erik J. Molenaar, "Options for Regional Regulation of Merchant Shipping Outside IMO, with Particular Reference to the Arctic Region" (2014), *Ocean Development & International Law*, Vol. 45, No. 3, p.272- 298

¹⁷ IMO "Roadmap for developing a comprehensive IMO Strategy on reduction of GHG emissions from ships" (the Roadmap) Resolution MEPC.304(72) (13 April 2018) [Hereinafter Initial Strategy]. For a discussion on the Arctic HFO Ban, see Emma Bennett "Ban on Heavy Fuel Oil in Arctic Shipping moves Forward" (February 2020)

<https://www.maritime-executive.com/editorials/ban-on-heavy-fuel-oil-in-arctic-shipping-moves-ahead> accessed 28.02.2020 and see Zhen Sun, "International Regulation of Heavy Fuel Oil Use by Vessels in Arctic Waters" (2019), *The International Journal of Marine and Coastal Law*, Vol. 34, No.3, p.513-536, for a discussion on the Arctic situation pre-HFO ban.

¹⁸ IMO "Guidelines for the Reduction of Underwater Noise from Commercial Shipping to Address Adverse Impacts on Marine Life", MEPC.1/Circ.833 (April 2014). PSSAs were established under two resolutions: IMO Assembly Resolution A. 927(22) (November 2001) and IMO Assembly Resolution A. 982(24) "Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas" (December 2005), which are based upon the first IMO Doc. A17/Res.720 "Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas" (6 November 1991). See paragraphs 1.2.1-2, 1.2.11, and 1.4

¹⁹ Council on Foreign Relations "The Emerging Arctic" (2014) <https://www.cfr.org/interactives/emerging-arctic#!/emerging-arctic> accessed 05.06.2020.

Overall, the desire to write about shipping pollutants such as black carbon and underwater noise has stemmed from the fact that the Arctic environment is particularly vulnerable to them even if this vulnerability is not translated within the Arctic legislative framework.²⁰ As a response to this regulatory omission, this thesis will take a proactive stance by suggesting legal amendments and policy initiatives in response to these shortcomings. All of these potential legal amendments and policy solutions which are aimed at reducing airborne and underwater noise pollution will be summarized in a proposed Environmental Annex to the Polar Certificate in the final section of this thesis. This thesis recognizes that Arctic shipping remains minimal to this day, but it nonetheless promotes a proactive legislative approach aimed at strengthening and developing environmental regulations to effectively hinder these threatening pollutants.²¹

1.2 Research Questions

In view of these observations, this thesis will fully elucidate upon the following:

- What are the current regulations and legislation tackling shipping emissions, black carbon, and underwater noise pollution from vessels in the Arctic?

Additionally, this thesis also aims to offer prospective solutions to the following question:

- In order to protect the environment and biodiversity of the Arctic, can the legal omission of these vessel-source pollutants be solved through legal amendments and policy-making?

²⁰ It is important to note that this thesis focuses on law as political sciences are beyond its' scope.

²¹ F. Lasserre et al, "Polar Seaways? Maritime Transport in the Arctic: An analysis of Shipowner's Intentions II" (2016), *Journal of Transport Geography*, Vol.19, No.6, p.1465-1473. A vast majority of the shipowners interviewed believe that environmental factors such as ice, weather, and remoteness are important operational constraints which would render costs too high. Moreover, the main reason that shipping companies invoke for turning away from the Arctic market is that it is not their core business, meaning they do not consider the Arctic market worth a diversification.

1.3 Methodology and structure of the thesis

To address these research questions, both sections of this thesis have a similar dual structure which combine a legal theoretical framework methodology and a normative approach.²²

The first section primarily uses a legal theoretical framework, or an analysis of the current regulatory frameworks which hinder vessel-source pollution in the Arctic. This analysis is conducted by utilizing legal literature including doctrines, concepts, and assessments of principles, which is then used to discuss legal omissions of certain vessel-source pollutants in *MARPOL* Annex VI and the Polar Code. The first section also introduces the normative approach, which offers potential amendments to current legal frameworks to resolve these shortcomings. Overall, this analysis is in accordance with the methodology and interpretation of international law such as provided by Article 38 of the International Court of Justice Statute and the Vienna Convention on the Law of the Treaties.²³

The second section of this thesis opens with a theoretical methodology which evaluates the regime of the main maritime actor – the IMO – in curbing greenhouse gases and black carbon as well as reducing underwater noise from vessels both in international and Arctic waters. The normative approach is then used to offer potential policy initiatives for the IMO which could quantitatively diminish these threatening pollutants.²⁴ In the final part of the second section, the potential amendments and policy measures which were expressed previously are drafted into an Environmental Annex to the Polar Certificate, itself annexed to the Polar Code. These potential policies and amendments to the current Arctic regulatory framework could be a strong incentive to further manage and monitor Arctic shipping in order to ensure efficient environmental protection of the region. When establishing these policies, various scholars and professionals in different fields were interviewed to discuss the possibility of drafting an Environmental Annex, as well as any ensuing potential political, legal, and commercial challenges which would follow.

²² In brief, the legal theoretical framework presents and discusses the current available legal framework while the normative approach aims to offer solutions to the identified legal gaps. See Paul Chynoweth, “Legal research” *Advanced Research Methods in the Built Environment* (Wiley-Blackwells, 2008), p.28-38

²³ United Nations, *Vienna Convention on the Law of Treaties*, 23 May 1969, Treaty Series, vol. 1155, 331, available at <https://treaties.un.org/doc/Publication/UNTS/Volume%201155/volume-1155-I-18232-English.pdf> and United Nations, *Statute of the International Court of Justice*, 18 April 1946, available at https://legal.un.org/avl/pdf/ha/sicj/icj_statute_e.pdf

²⁴ Chynoweth (n 22) p.28-38

1.4 The manifold ways of geographically defining the Arctic

The Arctic is an ocean basin surrounded by continents, circumpolar to the marine region North of the Arctic circle (66.5 degrees North), centered over the North Pole at 90 degrees North.²⁵ The seas associated with the Arctic Ocean are the Bering Sea, East Siberian Sea, Laptev Sea, Kara Sea, Barents Sea, Norwegian Sea, Greenland Sea, Labrador Sea, and Beaufort Sea. The Arctic zones include segments of Canada, the US, Greenland, Iceland, Finland, Norway, and Russia. As there is no international consensus over the Arctic geographical delimitations,²⁶ the definitions present in Article 234 *UNCLOS* and the Polar Code will be addressed. On the one hand, Article 234 *UNCLOS* presents a flexible and broad definition of the Arctic region as it mentions “ice-covered areas” thus encompassing any icy waters. On the other hand, the Polar Code refers to polar waters which are further defined as “Arctic waters or the Antarctic area”.²⁷ The term Arctic waters is presently defined as:

Arctic waters means those waters which are located north of a line from the latitude 58°00.0' N and longitude 042°00.0' W to latitude 64°37.0' N, longitude 035°27.0' W and thence by a rhumb line to latitude 67°03.9' N, longitude 026°33.4' W and thence by a rhumb line to Sørkapp, Jan Mayen and by the southern shore of Jan Mayen to the Island of Bjørnøya, and thence by a great circle line from the Island of Bjørnøya to Cap Kanin Nos and hence by the northern shore of the Asian Continent eastward to the Bering Strait and thence from the Bering Strait westward to latitude 60° N as far as Il'pyskiy and following the 60th North parallel eastward as far as and including Etolin Strait and thence by the northern shore of the North American continent as far south as latitude 60° N and thence eastward along parallel of latitude 60° N, to longitude 56°37.1' W and thence to the latitude 58°00.0' N, longitude 042°00.0' W.²⁸

It appears that the main difference between these two definitions is that Arctic 234 *UNCLOS* is flexible and incorporates the melting of ice while the Polar Code definition is based on the geographical location of the Arctic, irrelevant of climate change. The definition used in Article 234 *UNCLOS* will therefore be used in this thesis as it integrates the mutations of ice hence recognizing climate change as a legal variable.

²⁵ Katie Smith Matison, “The Polar Code: A Regime safeguarding Human Life and the Marine Ecosystems of Earth’s Frigid Zones” (2017), *Journal of Transportation Law, Logistics & Policy*, Vol, 83, No. 3, p.150-171

²⁶ Molenaar (n 16), p.273.

²⁷ Polar Code (n 14) and Adoption of Amendments to the International Convention for the Safety of Life at Sea, 1974, as amended”, “Chapter XIV Safety Measures for Ships Operating in Polar Waters”, [hereinafter Chapter XIV SOLAS], Regulation 1.4. See also Paragraph 2 and 5, Introduction of the Polar Code.

²⁸ Regulation 1.3, Chapter XIV SOLAS (n 27). For references linking this definition to the Polar Code, see also Paragraph 2 and 5 of the Introduction.

1.5 The growth of shipping activities, a challenge to the legal and jurisdictional framework of the Arctic

Historically, the Arctic has shifted from an age of exploration to exploitation as it mutated from a remote and exotic region of interest to anthropologists, biologists, and historians, to a “melting pot of global concern and interest”.²⁹ Simultaneously, the Arctic is submitted to a “dramatically mutating seascape” rapidly shifting from ice to water which consequently alter the Arctic economy and laws.³⁰

These shifts are especially relevant in the context of Arctic shipping with the opening of cost-effective and shorter shipping routes.³¹ The two most efficient routes are the North West Passage (NWP) and the North East Passage (NEP). Respectively, the NWP offers various routes through Canadian Maritime Zones, Beaufort Sea, Baffin Bay, Davis Strait, and Labrador Sea. This route would mainly be possible to use during the summer, being 9000km shorter than the Panama Canal route and 17,000km shorter than the Cape Horn Route. In turn, the NEP shortens the London-Yokohama voyage by 7,389 km, in comparison to the Suez Canal route.³² To this day, the usage of these routes remains seasonal due to the harsh Arctic conditions.³³

Currently, the Arctic jurisdictional system consists of land, internal waters, territorial seas, and exclusive economic zones (EEZs) which all are under the jurisdiction of one of the eight Arctic states.³⁴ The five adjacent countries surrounding the Ocean are limited to a territorial sea of 12 nautical miles (22km) and an exclusive economic zone (EEZ) of 200 nautical miles (370km).³⁵ However, the high seas above the Arctic Circle (ie. the North Pole and the Northern region of the Arctic Ocean) do not belong to any jurisdiction according to international law.³⁶ These jurisdictional delimitations have been drafted by *UNCLOS* and upon its’ ratification, a country has a ten-year period to make a claim to extend their continental shelf which would grant them

²⁹ Young (n 5), p.185

³⁰ Scott G. Borgerson “Arctic Meltdown: The Economic and Security Implications of Global Warming” (2008), *Foreign Affairs*, Vol. 87, No. 2, p.63-77, p.75

³¹ Aldo Chircop, "Regulatory Challenges for International Arctic Navigation and Shipping in an Evolving Governance Environment" (2014), *Ocean Yearbook Online* Vol. 28 No. 1, p.269-290, p.272

³² For a comparative analysis of all these routes, see Willy Østreng, et al. in *Shipping in Arctic Waters A comparison of the Northeast, Northwest, and Trans Polar Passages* (1st edition, Springer, 2013), p.50

³³ Arctic shipping is comprised of four principal types of vessels: commercial bulk shipping involving oil products, northern community supply, fishing, and tourism. The expense of commercial traffic in the Arctic is still too prohibitive for most commercial actors to find lucrative and profitable. See H Edwin III Anderson, “Polar Shipping, the Forthcoming Polar Code and Implications for the Polar Environments” (2012) *Journal of Maritime Law & Commerce*, Vol.43, p.59-83, p.62

³⁴ See (n 3) listing these Arctic states.

³⁵ Respectively Part II Section II and Part IV Article 56 of *UNCLOS* (n 13)

³⁶ For a discussion and general overview on these jurisdictional limitations, see the Fletcher Law School, “the Arctic and the LOSC” available at <https://sites.tufts.edu/lawofthesea/chapter-eight/> accessed 05.06.2020

exclusive rights to resources on or below the seabed if awarded.³⁷ When it comes to polar waters, Article 234 *UNCLOS* is useful for the interpretation of the provisions relating to shelves delimitation and for resolving navigational litigations.³⁸ When settling jurisdictional disputes, attention must also be brought to the principle of innocent passage applicable to both international and polar waters, as vessels must be able to navigate through another state's territorial waters without interference.³⁹

Nonetheless, jurisdictional disputes still arise in spite of *UNCLOS* for two main reasons: the first being the extension of the continental shelf beyond the EEZ of the five Arctic coastal countries, and the second being the political and legal status of Arctic maritime passages. First, Canada, Denmark, and Russia, all have territorial claims concerning the overlapping of the 2001 Russian submission regarding the potential Canadian and Danish continental shelves extension beyond 200 nautical miles. Secondly, the marine passages disputes are of similar nature as they oppose the US to Canada and Russia. For Canada, the NWP is part of its internal waters for historic reasons hence arguing that they should hold full sovereignty over them. For the US, the NWP is an international strait governed by *UNCLOS* and therefore there is a right of transit even if Canada is sovereign.⁴⁰ In addition, Canada and the US are also disagreeing on where to draw their common ocean boundary in the Beaufort Sea.⁴¹ Concerning Norway, they are facing disputes over their exclusive claim to control the Svalbard continental shelf resources.⁴² It is important to bear in mind that the hurry of coastal states to extend their continental shelf is due to the 10-year limit to submit a *UNCLOS* claim and not due to their profit thirst.⁴³

³⁷ Article 76(1) *UNCLOS* (n 13)

³⁸ Article 234, Section V, Part XII *UNCLOS* (n 13). For a discussion of Article 234 and the Polar Code, see Zhen Sun and Robert Beckman, "The Development of the Polar Code and Challenges to Its Implementation" in *The Development of the Polar Code and Challenges to Its Implementation* (Nijhoff Brill, 2018) ,p.303-325

³⁹ Innocent Passage is defined in Article 19(1), Part III of *UNCLOS* (n 13). Yet, this established principle is source of controversy as states disagree on its scope and interpretation. The rule of thumb is to assess the character of the passage which has been confirmed by the *Corfu Channel Case (United Kingdom v. Albania)*; *Assessment of Compensation*, 15 XII 49, ICJ, 15 December 1949

⁴⁰ They finished by settling with an implicit agreement of status quo between Ottawa and Washington with Canada refusing the US invitation to submit the issue to the International Court of Justice in 1970. See Frédéric Lasserre "The Geopolitics of Arctic Passages and Continental Shelves", *Public Sector Digest* (November 2011) for further information.

⁴¹ Another conflict is the Arctic land dispute of Hans Island. This island is in the middle of the Nares strait, between Canada and Denmark. The negotiations ended in 2012 by giving exact border description but without solving the split of the island.

⁴² Kurt M. Shusterich, "International Jurisdictional Issues in the Arctic Ocean" (1984), *Ocean Development & International Law*, Vol.14 No.3, p.235-272, p.245

⁴³ Indeed, many geologists believe that most offshore resources lie within the 200 nautical mile limit. See Lasserre (n 40)

As most of the jurisdictional tensions have been resolved, there seemingly is a political incentive to discuss Arctic resources in a peaceful manner, conforming to the regulations of *UNCLOS* and to the political mission of the Arctic Council,⁴⁴ which disregards the potential of a “scramble for territory and resources among the five arctic powers”.⁴⁵ In light of the recent growing economic interests, the five Arctic coastal states met in Ilulissat in 2008 to further discuss peaceful Arctic governance and shipping. They declared that there is a “need to future strengthen the search and rescue capabilities [...] around the Arctic Ocean”,⁴⁶ as the increase in Arctic shipping and the exploitation of resources will increase the risk of accidents.⁴⁷ However, they also mentioned that they “see no need to develop a new comprehensive international legal regime to govern the Arctic Ocean”,⁴⁸ as they regard the international shipping framework as sufficient for regulating Arctic shipping. The Ilulissat declaration is therefore seemingly proof of the five Arctic coastal state’s political will to peacefully resolve potential conflicts in both Arctic matters and waters.

In 2014, the IMO adopted a unified polar shipping framework to ensure navigational and environmental safety – the Polar Code.⁴⁹ The Code addresses ice navigation safety and certain vessel pollutants by requiring mandatory measures for ship design, equipment, manning, and crew training as well as for pollution prevention through existing IMO instruments such as *MARPOL*, *SOLAS*, *UNCLOS*, and *STWC*.⁵⁰ The Code also presents a binding pollution control regime for oil, noxious liquid substances in bulk, sewage, and garbage, while acknowledging that coastal communities and polar ecosystems are vulnerable to anthropogenic activities.⁵¹

⁴⁴ Young (n 5), p.187 and See Svein Vigeland Rottem, *The Arctic Council: Between Environmental Protection and Geopolitics* (Palgrave Pivot, 2019) for a further discussion on the Arctic Council and Arctic Governance (especially Chapter 1 & 3).

⁴⁵ Borgerson (n 30), p.64

⁴⁶ The Arctic Council created two agreements: The Agreement on Aeronautical and Maritime Search and Rescue in the Arctic (2013) available at <https://www.ifrc.org/docs/idrl/N813EN.pdf> and the Task Force and Agreement on Arctic Marine Oil Pollution Preparedness and Response (2013) available at <https://pdfs.semanticscholar.org/3a11/17b8830201ad4202f24bc8416f23281daec9.pdf>

⁴⁷ Ilulissat Declaration (n 7), p.1

⁴⁸ *Ibid.*, p.2

⁴⁹ The Polar Code and SOLAS amendments were adopted at the 94th session of IMO’s Maritime Safety Committee (MSC) (November 2014) while the environmental provisions and MARPOL amendments were adopted at the 68th session of the Marine Environment Protection Committee (MEPC) (May 2015)

⁵⁰ *SOLAS: International Convention for the Safety of Life at Sea, 1974* (with annex and final act of the International Conference on Safety of Life at Sea, 1974). Concluded at London on 1 November 1974, *United Nations Treaty Series*, Vol. 1184, No. 18961, p. 278, available at: <https://treaties.un.org/doc/Publication/UNTS/Volume%201184/volume-1184-I-18961-English.pdf> [hereinafter *SOLAS*]

STWC: International Maritime Organization, and International Conference on Training and Certification of Seafarers, 1993. STCW 1978: International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers, 1978: with resolutions adopted by the International Conference on Training and Certification of Seafarers, 1978 available at <http://www.imo.org/en/OurWork/HumanElement/TrainingCertification/Documents/34.pdf> [hereinafter *STWC*]

⁵¹ Polar Code (n 14) Preamble (4), p.5

1.6 The impacts of vessel-source pollution on the vulnerable Arctic environment

As a result of this economic growth, the Arctic Ocean and marine biodiversity is now facing additional threats from vessel-source pollution. According to *UNCLOS*, the definition of vessel-source pollution is two-fold: it is both accidental and operational. Accidental vessel-source pollution is self-explanatory but operational vessel-source pollution is pollution produced by the normal operation of ships, where it is defined 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 for use of sea water and reduction of amenities”.⁵²

This definition includes both the ecosystems and marine life while being defined as anthropogenic because it is “introduced by man”, both “directly or indirectly” “into the marine environment” referring to all maritime zones.⁵³ The use of the words “substances or energy” encompasses solid, liquid, gaseous materials objects, noise, vibrations, heat, and radiation.⁵⁴ In addition, this definition uses the expression “deleterious effects” which suggests that human activities must, or are likely to, present “significant” environmental impact.⁵⁵ Accordingly, shipping emissions (ie. mainly Greenhouse Gases (GHG)), black carbon, and underwater noise would be considered operational vessel-source pollution according to international law.

The Arctic environment is uniquely vulnerable to pollution as the effects of global warming in the Arctic are sharply more dramatic than elsewhere due the ice-albedo feedback loop.⁵⁶ Black carbon, GHGs, and particulates all enhance this feedback loop yet their atmospheric presence

⁵² Article 1(1)(4) *UNCLOS* (n 13)

⁵³ Yubing Shi, *Climate Change and International Shipping: The Regulatory Framework for the Reduction of Greenhouse Gas Emission*, (2016) Legal Aspects of Sustainable Development, Vol. 23 (1st edition, Brill/Nijhoff, 2016), p.34

⁵⁴ Alexandre Charles Kiss and Dinah Shelton, *International Environmental Law* (3rd ed, Transnational Publishers, 2004), p.176

⁵⁵ According to the International Law Commission (ILC), “significant” is defined by two factors: it must be appreciable but not substantial while leading to real detrimental effects on human health, industry, property, the environment or agriculture in other states, measured by objective standards”. See Pemmaraju Sreenivasa Rao, *First Report on the Legal Regime for Allocation of Loss in Case of Transboundary Harm Arising out of Hazardous Activities*, International Law Commission, 55th Session, 5 May–6 June and 7 July–8 August, 2003, UN Doc A/CN.4/531 (21 March 2003)

⁵⁶ See Martin Jakobsson, Ólafur Ingólfsson, Antony J. Long, Robert F. Spielhagen, “The dynamic Arctic” (2014), *Quaternary Science Reviews*, Volume 92, p.1-8 and see Christopherson (n 1)

is projected to increase due to the growth of Arctic shipping.⁵⁷ Shipping emissions and black carbon are loosely regulated although these pollutants represent an active threat to the marine environment in the Arctic.⁵⁸

With an acceleration in Arctic shipping, another type of pollutant emerges which lacks conclusive scientific data, research, and regulation – underwater noise. Arctic waters present a special noise environment mainly due to the presence and dynamics of ice.⁵⁹ Anthropocentric activities alter the sound waves and disturb the noise types in Arctic waters therefore disrupting marine mammals as well as fish.⁶⁰ Studies indicate that underwater noise can have adverse effects on marine mammals, fish, crustaceans, cephalopods, and bivalves even if the extent of these effects remain unknown.⁶¹ But it is safe to argue that such effects may include damage to auditory organs, injuries to other body tissues, eccentric behavioral responses, or even the death of specimens.⁶² Surprisingly, existing legal instruments do not address and regulate underwater noise pollution in Arctic waters.

This introduction provided an overview of Arctic shipping and the consequential increase in marine pollution due to the presence of additional vessel-source pollutants. It also presented the Arctic legal framework, jurisdictional system, and environmental vulnerability in light of the current environmental challenges brought by the growth of economic interests in the region. It is in this context that the legal framework of the Arctic will be analyzed and assessed in the next section with specific regards to *MARPOL* Annex VI and to the Polar Code.

⁵⁷ 6000 vessels operate during the shipping season. Arctic Council, edited by B. Ellis and L. Brigham, Arctic Marine Shipping Assessment Report (2nd printing, 2009), p.140-142, available at <http://hdl.handle.net/11374/54> [hereinafter AMSA Report]

⁵⁸ According to a study, aggressive reductions in black carbon emissions could result in lowering Arctic temperatures by 1.7°C within the next 15 years which would hinder the pace of ice-loss. See Mark Z. Jacobson, “Short-term Effects of Controlling Fossil-fuel Soot, Biofuel Soot and Gases, and Methane on Climate, Arctic Ice, and Air Pollution Health,” (2010) Journal of Geophysical Research, Vol. 115 (D14) and see Boone (n 14), p.550 for a discussion on it.

⁵⁹ Declaration on the Protection of the Arctic Environment (1991), Rovaniemi (Finland) available at http://library.arcticportal.org/1542/1/artic_environment.pdf p.17

⁶⁰ Protection of the Arctic Marine Environment (PAME), “Underwater Noise in the Arctic: State of the Knowledge Report” (2019), Key Findings 7, meeting in Rovaniemi (Finland) available at <http://hdl.handle.net/11374/2394>, accessed 15.05.2020.

⁶¹ Animal Welfare Institute, Ocean Noise: Turn it down, A Report on Ocean Noise Pollution published by IFAW (2008) 16-25 <<https://awionline.org/content/ocean-noise>> accessed at 13.04.2020

⁶² Till Markus and Pedro Pablo Silva Sanchez, “Regulating Ship-generated Noise as a New Form of Vessel-source Pollution”, (2018), Ocean Yearbook Vol. 33, p.487-452

2. An analysis of the Arctic legal framework regulating vessel-source pollution – a comparative evaluation of *MARPOL* Annex VI and the Polar Code

As mentioned in the methodology, the first part of this thesis analyzes the current Arctic legal framework (especially *MARPOL* Annex VI and the Polar Code) regarding shipping pollutants such as exhaust emissions, black carbon, and underwater noise. After a general overview of *MARPOL* Annex VI and of the Polar Code, this section discusses their accomplishments while also pointing out their regulatory gaps. As such, the sub-section on *MARPOL* Annex VI focuses on airborne pollution while the sub-section on the Polar Code targets both airborne and underwater noise pollution. The focus on these two legal instruments is justified by the fact that these are the only two instruments tackling shipping emissions and underwater noise pollution in both international and polar waters. Overall, this section also provides potential legal amendments to the identified regulatory shortcomings.

2.1 The efficiency of *MARPOL* Annex VI in hindering air pollution and black carbon

*2.1.1 Overview and purpose of *MARPOL* Annex VI*

MARPOL was adopted in 1973 by the IMO and it is the main international convention aimed at the prevention of pollution from ships caused by either operational or accidental causes.⁶³ It serves a dual purpose as it seeks to achieve the complete elimination of international pollution of the marine environment by minimizing the risk of accidental discharges of oil and other harmful substances.⁶⁴ In practice, *MARPOL* achieves these goals by regulating the process of shipping oil and other noxious substances while simultaneously reducing shipping pollution from ordinary navigation.⁶⁵ In 1992, major amendments to *MARPOL* were adopted concerning the design and construction of both new and existing tankers to reduce environmental damage caused by spills.⁶⁶ To ensure greater environmental protection,

⁶³ The 1978 Protocol was absorbed into the previous 1973 Convention and the combined instrument entered into force in 1983. Also see section 1.6 of this thesis

⁶⁴ *MARPOL* (n 12), preface at 1319

⁶⁵ Jeff B Curtis, "Vessel-Source Oil Pollution and *MARPOL* 73/78: An International Success Story" (1985) *Environmental Law School*, Vol. 15, No. 4, p.679-710, p.710

⁶⁶ These changes require that the tankers be built with a double-hull or any other effective alternative. They were controversial as they placed a great financial burden upon shipowners, who believed that there were other appropriate designs which would be less costly. See Andrew Griffin, "MARPOL 73/78 and Vessel Pollution: A Glass Half Full or Half Empty?" (1994), *Indiana Journal of Global Legal Studies*, Vol. 1, No. 2, p.489-513.

MARPOL set forth specific regulations for shipping and pollution which are contained within five annexes.⁶⁷ In 1997, a Protocol was adopted to amend *MARPOL* which added an Annex – Annex VI.⁶⁸ Annex VI is particularly interesting as it sets forth regulations for the prevention of air pollution from ships even if it remains non-binding and has not yet been incorporated into the Polar Code.⁶⁹ This is problematic as the prevention of vessel air pollution is necessary to considerably reduce emissions and black carbon to safeguard the Arctic environment.⁷⁰

In brief, Annex VI is concerned with regulating greenhouse gases emissions such as ozone-depleting substances, nitrogen oxides, and sulphur oxides.⁷¹ Each of these three emissions are regulated differently as they come from various sources, which respectively are; the heating or air conditioning onboard vessels, the normal operation of a vessel, and the by-product emission from the burning of fuel during a voyage.⁷² It is important to bear in mind that deliberate emissions of ozone depleting substances are prohibited while the emissions of nitrogen and Sulphur oxides are respectively regulated with International Air Pollution Certificate (IAPC) and a sulphur amount cap for vessel fuel.⁷³

First, to reduce ozone-depleting substances and NO_x emissions, Annex VI requires vessels that weight more than 400 gross tons to be surveyed in addition to obtaining an IAPC given by their flag-state.⁷⁴ Such surveying would ensure that no ozone depleting substances are being emitted and that vessel engines would be in compliance with the nitrogen oxide emission standards.⁷⁵ *MARPOL* puts flag-states in charge of policing oceans and they must thus monitor and survey vessels in their waters.⁷⁶ These flag states also have a great discretion over the manner of carrying out this duty, but they remain obliged to inspect tankers and larger ships.⁷⁷

⁶⁷ It must be noted that the flag-states are also responsible for the enforcement of the Convention and its' Annexes.

⁶⁸ *MARPOL* (n 12) presents six annexes; Annex I (oil pollution), Annex II (sea pollution by noxious liquid substances in bulk), Annex III (harmful substances carried by sea in packaged forms), Annex IV (Prevention of Pollution by Sewage from Ships), Annex V (Prevention of Pollution by Garbage from Ships), and Annex VI (Prevention of Air Pollution from Ships)

⁶⁹ Annex VI entered into force in May 2005. As of May 2011, the ratifications to Annex VI represent 89.92% of world tonnage.

⁷⁰ Today, seventy countries accounting for 90% of global shipping tonnage have ratified *MARPOL* which made marine oil pollution drop by 60% in the 1980s.

⁷¹ Yoshifumi Tanaka, "Protection of the Marine Environment", the International Law of the Sea (2nd ed, Cambridge University Press, 2015), p.291

⁷² Edwin Anderson (n 33), p.80

⁷³ Ibid

⁷⁴ *MARPOL* (n 12) Annex VI. Regulations 6, 7, and 8

⁷⁵ Ibid., Annex VI, Regulation 13 (3)

⁷⁶ Griffin (n 66), p.501

⁷⁷ If one ship fails the quality test (every five years), it cannot sail again until it has been fixed to fit *MARPOL*'s standards and until it no longer presents an unreasonable threat to the marine environment.

Secondly, Annex VI mentions that the sulphur content of any fuel used on board ships shall not exceed 4.5% (m/m), revised to 0.5% as of 1st January 2020.⁷⁸ In order to do so, Annex VI allows the IMO to designate Emission Control Areas (ECA)⁷⁹ and Sulphur Emission Control Areas (SECAs),⁸⁰ which would respectively further restrict the emissions of NO_x as well as SO_x and ban the burning of fuel that has a sulphur content greater than 1.5% (m/m).⁸¹ By implementing these designations in vulnerable Arctic zones, both black carbon and other emissions will be reduced.

2.1.2 The shortcomings of MARPOL Annex VI in combating air pollution and potential policy solutions

Before addressing Annex VI, the general weak link in *MARPOL* has been to trust nation-states as the main enforcement actor. States hold exclusive rights of inspection and certification over their vessels whilst being entirely responsible for investigating and punishing *MARPOL* breaches. This has led to a major issue – the flag of convenience (FOC).⁸² FOC are flags from a specific country making registration of vessels under these flags less tedious for foreign shipowner companies, which, in turn, have hindered *MARPOL*'s success in reducing pollution.⁸³ *MARPOL* thus needs to be strengthened as a legal instrument as no other framework has the legitimacy and political incentive to efficiently reduce pollution. To reinforce *MARPOL*, a solution would be to diminish the flag states authority and give coastal states a stronger role in *MARPOL* enforcement because the flag-states system creates disparities between the nation-states implementation of environmental regulations.⁸⁴ This shift of responsibility is a powerful political choice, but it would share the burden of enforcement more equally between flag-states and coastal states hence ensuring more accountability for environmental protection between countries.

⁷⁸ *MARPOL* (n 12) Annex VI, Regulation 14(1). For more detailed information, see IMO “The 2020 Global Sulphur Limits” available at

<http://www.imo.org/en/MediaCentre/HotTopics/GHG/Documents/2020%20sulphur%20limit%20FAQ%202019.pdf>

⁷⁹ *MARPOL* (n 12) Regulation 14, Annex VI

⁸⁰ *MARPOL* (n 12) Regulation 14(3) (a) designates "the Baltic Sea area... and the North Sea area..." as Sulphur Emission Control Areas. Regulation 14(3) (b) follows by allowing the designation "any other sea area, including port area, designated by the Organization [IMO] in accordance with criteria and procedures for designation of Sox emission control areas."

⁸¹ *MARPOL* (n 12) Annex VI Regulation 14 (4) (a) and Annex VI Regulation 14 (4) (b)

⁸² The Committee of Inquiry into Shipping describes a flag of convenience state as a "country of registry [that] has neither the power nor the administrative machinery effectively to impose any government or international regulations, nor has the country the wish or the power to control the companies themselves." See P.S. Dempsey & L.L. Helling, "Oil Pollution by Ocean Vessels-An Environmental Tragedy: The Legal Regime of Flags of Convenience, Multilateral Conventions, and Coastal States" (1980) *Denver Journal of International Law & Policy*, Vol.10, No.1, p.50-65

⁸³ Usually, flag state with the worst accident record suffers more than one hundred times more losses than a flag state with the best record.

⁸⁴ Griffin (n 66), p.507

Furthermore, one of the cardinal issues of Annex VI is that it is presently not binding, suggesting that countries can choose to ignore it. In fact, Annex VI is far from being a widely accepted regulation among coastal states as their adherence to the Annexes greatly varies.⁸⁵ This is problematic as it creates legal discrepancies and hinders the efforts unilaterally pursued by countries which have already ratified Annex VI. However, if the Code included mandatory provisions relating to air emissions such as Annex VI, it would mean that such provisions could apply to countries which have not yet ratified it. This would perhaps lead to a “backdoor” way of enforcement of Annex VI to non-signatories’ states but it would ensure better environmental protection.⁸⁶ Yet, as the IMO favors the tacit acceptance procedure for amending technical annexes, states would simply need to object to the passing of Annex VI amendments if any Party feared a backdoor implementation of the Annex.⁸⁷

As previously mentioned, ECAs should also be designated to certain vulnerable zones in the Arctic Ocean,⁸⁸ as to this day, the Arctic Ocean is not included within the few designated ECAs under Regulation 13 of *MARPOL* Annex VI.⁸⁹ As a brief reminder, Regulation 13 of *MARPOL* Annex VI applies more stringent requirements for specified air emissions (SO_x, NO_x, and Particular Matter (PM)) in vulnerable marine areas.⁹⁰ For instance, regarding the North American ECA, emissions from ships are expected to be reduced by 23% in NO_x, 86% in SO_x, and 74% in PM by 2020.⁹¹ Further to the ECAs, there are also Sulphur Emissions Control Areas (SECAs) and Nitrogen Oxide Emission Control Areas (NECAs) which the Arctic Ocean should also be benefiting from.⁹² These designations would not only curb black carbon and shipping

⁸⁵ Denmark, Norway, and Sweden are party to all six annexes but there are non-parties such as Iceland (Annex VI), Russia (Annex V) and the US (Annex III)

⁸⁶ Edwin Anderson (n 33), p.80

⁸⁷ See sub-section 2.2.2 for an explanation of this procedure and see the IMO “Adopting a convention, entry into force, accession, amendment, enforcement, tacit acceptance procedure”, available at : <http://www.imo.org/en/About/Conventions/Pages/Home.aspx#:~:text=Instead%20of%20requiring%20that%20an,received%20from%20a%20specified%20number>

⁸⁸ B. Baker “The Development of a Regional Regime for the Marine Arctic”, in *The Law of the Sea and the Polar Regions: interactions between Global and Regional Regimes* (1st edition, eds by E.J. Molenaar, Alex. G. Oude Elferink and Donald R. Rothwell, Brill, 2013), p.46

⁸⁹ These ECAs are the North American Area, the United States Caribbean Sea Area, the Baltic Sea Area, and the North Sea Area, available at <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Emission-Control-Areas-%28ECAs%29-designated-under-regulation-13-of-MARPOL-Annex-VI-%28NOx-emission-control%29.aspx>

⁹⁰ A Special Area is defined as an area where “where for [a] recognized technical reason in relation to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by oil is required”. See *MARPOL* (n 12) Annex I, Regulation 1(10)

⁹¹ United States Environmental Protection Agency “Designation of North American Emission Control Area to Reduce Emissions from Ships. Office of Transportation and Air Quality” (2010) available at <https://www.epa.gov/regulations-emissions-vehicles-and-engines/designation-north-american-emission-control-area-marine>

⁹² Setting up the Arctic Ocean as an ECA has been discussed by various scholars. See Lawrence P. Hildebrand, Lawson W. Brigham, Tafsir M. Johansson, *Sustainable shipping in a Changing Arctic* (1st edition, Springer, 2018), p.33 and see Iliana Christodoulou-Varotsi, *Marine Pollution Control, Legal and Managerial Frameworks* (1st edition, Lloyd’s Practical Shipping Guides, Routledge, 2018), p.182

emissions in the Arctic Ocean, it would also be more practical as Arctic coastal states have the infrastructure to enforce these special areas in their territorial waters instead of relying on the IMO.⁹³

To conclude, *MARPOL* Annex VI has been environmentally less effective than it should be, especially when tackling air pollution from vessels and black carbon. This is partly due to *MARPOL* being subjected to governmental wishes hence presenting legal discrepancies between states.⁹⁴ Consequently, if governments are unwilling to enforce *MARPOL*, disparities in enforcement will arise and pollution will not be hindered efficiently.⁹⁵ Nothing specific and mandatory has been approved regarding Arctic air pollution even if this area is particularly sensitive to anthropogenic sources of pollution. Accordingly, ECA's should be designated in the vulnerable zones of the Arctic Ocean and *MARPOL* Annex VI should be incorporated as a mandatory Annex to the Polar Code. It is important to note that even though this section focuses on air pollution, *MARPOL* remains nonetheless a suitable instrument for regulating noise pollution.⁹⁶ Accordingly, the control of regulating both airborne and underwater noise pollution emitted from vessels falls squarely within the mandate of the IMO, and consequently within the potential scope of *MARPOL*.⁹⁷

⁹³ Edwin Anderson (n 32), p.82

⁹⁴ Vessel-source pollution remains a source of conflict between maritime and coastal interests: "Coastal states have pushed for stricter environmental standards and greater authority over vessels in their coastal waters while maritime states have tried to protect their military and commercial interests in free navigation by arguing that vessels should be subject to flag state control" See Daniel Bodansky, "Protecting the Marine Environment from Vessel-Source Pollution: UNCLOS III and Beyond" (1991) *Ecology Law Quarterly*, Vol.18, No.4, p.719-778, p.725

⁹⁵ Rebecca Becker, "MARPOL 73/78: An Overview in International Environmental Enforcement" (1998) *Georgetown International Environmental Law Review*, Vol.10, p.625-642, p.633

⁹⁶ One possible way to create a legally binding document to reduce noise pollution would be to add a binding annex to *MARPOL*, which could consider data in sensitive areas and adjust the speed of vessels accordingly.

⁹⁷ Noise pollution can be regulated in *MARPOL*, but not in Annex VI. See Karen N. Scott, "International Regulation of Undersea Noise" (2004), *International & Comparative Law Quarterly*, Vol. 53 No.2, p.287-324, p.295

2.2 The Polar Code – the overarching regulatory framework for shipping in polar waters

2.2.1 An overview and background of the Polar Code

Prior to the Polar Code, the Arctic Ocean received the lowest level of environmental protection under *MARPOL* even if that region is substantially vulnerable to climate change. Consequently, the IMO published in 2002 *Guidelines for ships operating in Arctic Ice-covered Waters* based upon the recommendations of the IMO working groups.⁹⁸ These non-binding guidelines delineated the boundaries of Arctic waters and adopted several recommendations regarding ship construction, equipment, and environmental protection measures in the Arctic. Following these guidelines, the IMO adopted in 2009 *Guidelines for ships operating in Polar Waters*.⁹⁹ Then, ensuing from the 2009 AMSA Report, several Arctic states submitted proposals to the IMO's Maritime Safety Committee (MSC) for the mandatory application of the Polar Guidelines.¹⁰⁰ These guidelines became pivotal for the genesis of the Polar Code.¹⁰¹ Simultaneously, the increase in shipping traffic in polar waters raised environmental and safety concerns due to the potential of additional shipping accidents. In the same vein, the instability of polar environments affecting both mariners and passengers also perturbed.¹⁰² Given these sensitivities, it is surprising that polar waters did not benefit from particular legal attention in addition to the current international legislative regime.¹⁰³ These difficulties needed urgent addressing, which led to the drafting of the Polar Code by the IMO.¹⁰⁴ This Code was indeed intended to fill the legal gaps set forth by Arctic shipping through an additional set of regulations for both polar regions which focused on increasing shipping safety, on minimizing vessel pollution, and on improving crew training without infringing on domestic navigational

⁹⁸ IMO "Guidelines for Ships operating in Arctic ice-covered waters" MSC/CIRC 1056, MEPC/circ. 399 (December 2002)

⁹⁹ These guidelines are not applicable to cabotage voyages in the Arctic and it would be up to the Arctic countries to provide internal regulation for such voyages. IMO Guidelines for Ships Operating in Polar Waters" Resolution A 1024(26)

(December 2009), available at http://www.imo.org/blast/blastData.asp?doc_id=13816&filename=A%201024%2826%29.pdf

¹⁰⁰ IMO "Report of the Maritime Committee on its 86th session" MSC 86/26 (June 2009), Para 23.32. These are very similar to the 2002 non-mandatory Arctic guidelines, but instead of solely focusing on SOLAS, the 2009 guidelines add *MARPOL*, and instead of referring to Arctic ice-covered waters, the 2009 guidelines refer to "polar waters" so as to include Antarctica.

¹⁰¹ Working Group on the Development of a "Mandatory Polar Code for ships Operating in Polar Waters" DE 54/WP.3 (October 2010), Para.4

¹⁰² Other threats include but are not limited to low air temperatures, rapidly shifting weather conditions and ice accretion.

¹⁰³ American Bureau of Shipping (ABS) (2016) releases IMO Polar Code Advisory where this point was raised (p.2), available at https://ww2.eagle.org/content/dam/eagle/advisories-and-debriefs/ABS_Polar_Code_Advisory_15239.pdf

¹⁰⁴ These concerns were raised following the Exxon Valdez oil spill in March 1989 which severely polluted Alaskan Coastal waters by releasing 37,000 metric tons of crude oil affecting 2,100km of coastline. This spill clearly presented a lack of preparedness in dealing with Arctic oil accidents as ice is far more difficult to clean up, see Christina Nunez, "What happens when Oil Spills in the Arctic" 24.04.2014. <<https://www.nationalgeographic.com/news/energy/2014/04/140423-national-research-council-on-oil-spills-in-arctic/>> accessed 21.05.2020

rules.¹⁰⁵ Arguably, the drafting of a mandatory Code is proof of an integrated approach to Arctic shipping as it was the most important initiative for the development of adequate safety measures and environmental regulations in polar waters.¹⁰⁶

The structure of the Code itself consists of an introduction and two parts. Part I-A consists of shipping safety and crew training measures which are mandatory for vessels certified under *SOLAS* and *STWC* while environmental regulations under Part-II A apply pursuant to their respective Annexes in *MARPOL*.¹⁰⁷ At the IMO's meeting in 2014, the MSC added a new chapter to *SOLAS* for ships traveling through Polar Waters (Chapter XIV) to Part I-A of the Code. At the 68th session of the IMO's Marine Environment Protection Committee (MEPC) in 2015, new environmental regulations to *MARPOL* Annexes I, II, IV, and V were included to Part II-A of the Code. Parts I and II both entered into force on January 1st, 2017.¹⁰⁸



Title: geographical scope of the Arctic as defined in SOLAS Chapter XV
Source: IMO Doc. MEPC 68/21/Add.1, Annex 10

¹⁰⁵ Brigham W. Lawson, "The emerging international polar navigation Code: bi-polar relevance?" in *Protecting the Polar Environment: Law and Policy for Pollution Prevention* (eds Davor Vidas) (Springer Cham, 2014) p.244-251, p.251

¹⁰⁶ Chircop (n 31), p.283

¹⁰⁷ *SOLAS & STWC* (n 50)

¹⁰⁸ These provisions apply to new ships constructed on or after January 1, 2017 while existing ships are not required to comply until the earlier of January 1, 2019.

Essentially, the Code presents another regulatory layer to polar shipping in addition to other international regulatory frameworks, irrelevant of geography, such as *UNCLOS*, *SOLAS*, *MARPOL* and *STCW*.¹⁰⁹ This additional layer of protection is proof of a broader legislative scope as the Code applies to “the full range of shipping-related matters relevant to navigation in waters that surround the two poles – ship design, construction and equipment; operational and training concerns [...] and equally important, the protection of the unique environment and eco-systems of the polar regions”.¹¹⁰ This clearly shows the dual goal of the Code and confirms that the Code took inspiration from the 2002 and 2009 non-binding Polar Guidelines by incorporating both the safety and environmental requirements hence broadening their scope.¹¹¹

2.2.2 A brief mention of the Polar Code’s strengths and accomplishments

Previously atomized and disparate, the Code provides a single regulatory framework for Arctic shipping.¹¹² It aims to reduce risks by harmonizing mandatory safety measures and training, which in turn, inevitably protects the Arctic environment by hindering the risk of vessel accidents while acknowledging “that coastal communities in the Arctic could be, and that polar ecosystems are, vulnerable to human activities”.¹¹³

What is truly interesting about the Code is the tacit agreement procedure which facilitates the modification of international law through amendments to *SOLAS* and *MARPOL*. In many conventions, amendments come into force only after a percentage of Parties, usually two thirds, have approved them.¹¹⁴ The functioning of the passing of amendments is different for the Code as this procedure mentions that unless conventions are objected to by enough states, these amendments enter into force rapidly.¹¹⁵ This procedure also allowed the Code to become mandatory as it incorporated *SOLAS* and *STWC* into Part I-A and *MARPOL* into Part II-A, without having to wait for the two-thirds acceptance.¹¹⁶

¹⁰⁹ Lawson (n 105), p.251 and see Polar Code (n 14), Preamble (1)

¹¹⁰ Arctic Portal, “Polar Code summary” (2017) <https://arcticportal.org/ap-library/news/1943-shipping-in-polar-waters> accessed 17.02.2020.

¹¹¹ Edwin Anderson (n 33), p.72

¹¹² Laurent Fedi, “Arctic Shipping Law: from Atomised Legislations to Integrated Regulatory Framework: The Polar Code (r)evolution?” in *Arctic Shipping. Climate Change. Commercial Traffic and Port Development* (eds. Lasserre, F.Faury, Routledge, 2019), p.118

¹¹³ Polar Code (n 14), p.5

¹¹⁴ J. Ashley Roach, “A Note on Making the Polar Code Mandatory”, in *International Law and Politics of the Arctic Ocean*, (Brill Nijhoff, 2015), p.126

¹¹⁵ Churchill, R.R. & Lowe, A.V, *The Law of the Sea* (3rd Edition, Manchester University Press, 1999), p.272. Moreover, this functioning strongly resembles the “persistent objector” international principle which allows countries to persistently object to a newly emerging norm of customary law from which they will be exempt when it crystallizes into law.

¹¹⁶ For discussions of tacit acceptance procedures for technical amendments, see: J. Brunnée, “Treaty Amendments,” in *The Oxford Guide to Treaties*, (ed. D. Hollis, Oxford University Press, 2012), p.356–360.

Another accomplishment worth noting is the creation of the Polar Certificate, which is primarily focused on certifying the vessel requirements and operational limitations for polar navigational safety.¹¹⁷ The Code sets forth the concept of “operational limitations” of a vessel using polar waters, and for instance, ice and freezing temperatures are considered hazardous and not operational limits.¹¹⁸ In addition to the assessment of operational limitations, the certificate also requires vessels to fulfill mandatory requirements set forth in Part I-A of the Code such as specific construction, design, and equipment measures. The certificate also ensures that vessels have been adequately surveyed, that they have received their ice class (A,B,C) according to their ice-navigation capacities,¹¹⁹ and that a precise procedural assessment was established for each vessel in case of hazardous conditions.¹²⁰ This certificate is an accomplishment as it ensures a minimal threshold of shipping safety therefore contributing to better environmental protection in the Arctic.

In addition to these safety measures, certain pollution prevention proceedings are mandatory which are thus required to obtain the Polar Certificate. For instance, the Code bans the pollution of polar waters by oil, noxious liquid substances, harmful substances, sewage, and the dumping of garbage. These prohibitions include a ban all discharges of oil residuals from ship engines and chemicals used for cleaning up vessels, and require that food waste is grounded and disposed at a minimum of fourteen miles from land or the nearest ice-formation.¹²¹ Yet, these prohibitions are general and not absolute as sewage, in addition to food waste, can still be dumped if it complies with regulation 11.1.1 of *MARPOL* Annex IV.¹²² These preventive measures are proof that the Code sets out necessary standards of environmental protection.

Another noteworthy regulatory accomplishment of the Code is that the Arctic countries are not entirely bound by these standards as they can adopt stricter environmental regulations. This is not clear in the Code itself but when read in accordance with Article 234 *UNCLOS*, it can be interpreted that ice-covered nation-states can regulate pollution further in their EEZ without infringing on the minimal regulations of the Code.¹²³ Article 234 *UNCLOS* reads as:

¹¹⁷ Polar Code (n 14), Part I-A paragraph 1.3.1

¹¹⁸ ABS Report “Low temperature operations, Guidance for Arctic Shipping”, p.17 available at <https://maddenmaritime.files.wordpress.com/2016/12/lowtemperatureoperations.pdf>

¹¹⁹ Fedi (n 112), p.125

¹²⁰ The methodologies used for evaluating operational capabilities are based on the “Polar Operational Limit Assessment Risk Indexing System” (POLARIS), developed by the International Classification Societies (IACS) and Arctic Nations.

¹²¹ Polar Code (n 14), respectively Part II-A paragraph 1.1.1. and 5.2.1.

¹²² *Ibid.*, Part II-A, chapter 4, para 4.2.1.1 and 4.2.1.2.

¹²³ See Molenaar (n 16), p.281

“Coastal states have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction, and control of marine pollution from vessels in ice-covered areas within the limits of the EEZ where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence”.¹²⁴

This article grants further unilateral power to coastal states in regulating their own EEZ, as long as they do not fall below the threshold of the Code or other international navigational requirements.¹²⁵ Seemingly, the coastal states have a right to draft their own regulations and enforcement mechanisms without the approval of the IMO. Yet, there are certain limitations to the scope of Article 234 as some scholars debate if “within the limits of the EEZ” includes territorial seas consequently dictating if states are allowed to adopt more stringent regulations.¹²⁶ For instance, it could be said that Article 234 is limited to the EEZ thus not granting equal rights to states within their territorial waters, suggesting that the right of innocent passage should be upheld.¹²⁷ Other scholars suggest that Article 234 must be interpreted broadly as it simply delimits its’ scope to the outer limits of the EEZ thus not excluding territorial waters.¹²⁸ In a similar vein, other scholars subscribe to a similar interpretation by mentioning that the article “refers to that part of the sea extending from the outer limits of the coastal State’s exclusive economic zone to that State’s coastline”.¹²⁹ For the purpose of this thesis, Article 234 will be interpreted broadly so as to include the waters inside the inner limits of the EEZ as such an interpretation would allow states to apply their own standards in terms of construction, manning, equipment, and pollution. This broad interpretation is in line with both state practice, and developments of the IMO, particularly with the aforementioned Arctic Guidelines as several parts relate to ship design, construction, manning, and equipment.¹³⁰ This broad interpretation of Article 234 would allow states to adopt more stringent environmental regulations by promoting further national legislation.¹³¹

¹²⁴ Article 234 *UNCLOS* (n 13)

¹²⁵ Shabtai Rosenne & Alexander Yankov, *United Nations Convention on the Law of the Sea, 1982: A Commentary*, Vol. IV, (Martinus Nijhoff Publishers, 1991), p.396.

¹²⁶ This is dependent on how “due regard to navigation” (within Article 234 *UNCLOS*) is interpreted, see paragraph below.

¹²⁷ D.M McRae & D.J. Goundrey, “Environmental Jurisdiction in Arctic Waters: The Extent of Article 234” (1982), *University of British Columbia Law Review*, Vol. 16, Issue 2, 1982, p.197-228, p. 221.

¹²⁸ Pharand, Donat, “The Arctic Waters and the Northwest Passage: A Final Revisit” (2007), *Ocean Development & International Law*, Vol. 38, Issue 1-2, p. 3-69, p. 47 and see Molenaar (n 16), p.276

¹²⁹ Shabtai & Yankov (n 125), p. 397

¹³⁰ Douglas. R. Brubaker, *The Russian Arctic Straits*, *International Straits of the World*, Vol. 14, (Martinus Nijhoff Publishers, 2005), p. 57-58 and see Polar Guidelines (n 93 & 94)

¹³¹ See Molenaar (n 16), p.277 which discusses how Canadian and Russian legislation has done so.

According to Article 234, the potential coastal states right to adopt further regulations is also dependent on the interpretation of “due regard to navigation”.¹³² There are three main forms of navigation which respectively depend on the nation-states due regard to different navigational scenarios: either the state has due regard to the freedom of navigation within the EEZ and the high seas, or to the innocent passage within territorial seas, or to the right of transit passage within international straits. Respectively, the freedom of navigation suggests that coastal states have to take due regard to navigation that normally applies in the EEZ, but this would contradict the aim of the article which is to protect the Arctic marine environment further.¹³³ Moreover, some scholars argue that the states additional regulatory powers should be kept conditional as “due regard to navigation” could imply that coastal states cannot adopt regulations in the EEZ which are not applicable to the territorial sea, meaning that their right of innocent passage should be upheld.¹³⁴ Yet, Article 234 does not define which navigation it refers to, but it is safe to assume that the measures taken by coastal states must nevertheless be reasonable.¹³⁵ Interpreting “within the EEZ” as including the waters inside the inner limits of the EEZ would grant the coastal states a right to apply their own additional regulations in terms of ship design, construction, manning, equipment, and pollution within their territorial waters up to the outer limits of the EEZ while still having “due regard to navigation.”

Lastly, the regulations adopted by the coastal state through the interpretation of Article 234 must be non-discriminatory even if it remains unclear whether non-discrimination applies solely amongst foreign vessels or to all vessels. Accordingly, Article 234 could be read in accordance with Article 227 of *UNCLOS* as it mentions that discrimination “against vessels of any state” is prohibited.¹³⁶ In turn, this suggests that the regulations based on Article 234 cannot discriminate against any vessels, which is an interpretation in line with state practice.¹³⁷ It also implies a higher threshold of environmental protection which is necessary to reduce threatening pollutants hence protecting the Arctic marine environment further.¹³⁸ When the Polar Code is read in accordance with Article 234 *UNCLOS*, then the environmental provisions under the Code can be seen as representing the minimal environmental threshold suggesting that stringent measures could be welcomed instead of being frowned upon.

¹³² Brubaker (n 130)

¹³³ McRae & Goundrey (n 127), p. 221

¹³⁴ *Ibid.*, p. 221-222. This is consistent with their interpretation of “within the EEZ” in the paragraphs above.

¹³⁵ *Ibid.*, p. 56

¹³⁶ Article 227 *UNCLOS* (n 13)

¹³⁷ Rosenne & Yankov (n 125), p. 396-397, and Chircop (n 15), p. 371

¹³⁸ Bartenstein (n 16), p. 41

2.2.3 *The Polar Code's regulatory gaps – the exclusion of a binding environmental framework to reduce air and noise pollution from vessels*

Even though the Code expands the scope of international environmental protection to polar waters, its' framework is insufficient to protect the Arctic environment from airborne and underwater noise pollution from vessels.¹³⁹ The mandatory measures expressed in Part II-A portray an international initiative to safeguard the Arctic environment but the fact that the Code simply reinstates *MARPOL* Annexes into Part II-A shows a lack of clear mandate within the MEPC, and is proof of numerous unfruitful negotiations between lobbying groups.¹⁴⁰

As the Code is meant to be read in accordance with other law of the sea frameworks, then *UNCLOS* requirements are also applicable to the Code.¹⁴¹ As Article 194(1) *UNCLOS* requires states to take all measures which are “necessary to prevent, reduce and control pollution of the marine environment from any source”,¹⁴² then fact that the Code presents environmental shortcomings seemingly contradicts Article 194(1) as well as other *UNCLOS* measures.¹⁴³ *UNCLOS* expresses a general obligation for states to cooperate, either directly or through the “competent international organization”,¹⁴⁴ to establish vessel-source pollution standards.¹⁴⁵ Hence, there is a general duty to adopt laws and regulations to prevent, reduce, and control pollution from multiple sources which the Code and states must abide to, even if the content and extent of this duty remains unclear.¹⁴⁶ These standards provide the minimum threshold for national legislation on preventing pollution, ranging from the obligation to “take into account” international standards for air-borne marine pollution, to the “at least have the same effect” obligation applicable to vessel-source pollution.¹⁴⁷ *UNCLOS* therefore adopted a broad definition of “pollution to the marine environment” which encompasses pollution from vessels,

¹³⁹ Appendix II of this thesis provides two figures: one explaining how the Polar Code protects the marine environment and the other explaining the effects of vessel underwater noise on mammals.

¹⁴⁰ T. Henriksen, “The Polar Code: Ships in cold water – Arctic issues examined”, CMI Yearbook (2014, CMI), p.332–344

¹⁴¹ Polar Code (n 14), Preamble (1)

¹⁴² Article 194(1) *UNCLOS* (n 13) should be read with Article 211 as it states vessel pollution as a type of marine pollutant.

¹⁴³ Yet, according to Article 31 in the *Vienna Convention on the Law of Treaties* (n 23): “A Treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose”, meaning that the Code and its' incorporation of various treaties shall interpret these pollution prevention measures similarly and to the same standard.

¹⁴⁴ There is a discussion over the interpretation of “competent international organization” as it is argued whether this solely applies to the IMO or if it incorporates other decision-making bodies. See David A. Fitch, “Unilateral Action Versus Universal Evolution of Safety and Environmental Protection Standards in Maritime Shipping of Hazardous Cargoes” (1979), *Harvard International Law Journal*, Vol.20, No.1, p.144–45

¹⁴⁵ Article 211 of *UNCLOS* (n 13) and Fitch (n 144), p.353

¹⁴⁶ Article 197 *UNCLOS* (n 13) and see LOSI Conference Papers “Securing the Ocean for the Next Generation” (2012), Papers from the Law of the Sea Institute, UC Berkeley–Korea Institute of Ocean Science and Technology Conference, held in Seoul, Korea (Proceedings edited by Prof. Harry N. Scheiber, LOSI and Director Moon Sang Kwon, KIOST), p.32, available at [https://www.law.berkeley.edu/files/Table_of_contents\(1\).pdf](https://www.law.berkeley.edu/files/Table_of_contents(1).pdf)

¹⁴⁷ Respectively Article 207(1), 212(1) and 211(2) *UNCLOS* (n 13)

confirming the failure of the Code to uphold *UNCLOS* standards as the Code omits the regulation of shipping emissions and underwater noise.¹⁴⁸

Accordingly, certain legal gaps left by the Code need urgent addressing, specifically regarding air pollution caused by shipping.¹⁴⁹ The Code does not presently include any provisions on air pollution as it does not incorporate *MARPOL* Annex VI within its framework. The silence of Part II-A regarding black carbon is also problematic as the Arctic marine environment and ecosystems will suffer if this threat is not legally acknowledged.¹⁵⁰ Even if the IMO has recently pushed international regulations such as their Initial Strategy to curb shipping emissions, the IMO fails to incorporate the Initial Strategy within a binding regulatory framework implying that airborne pollution such as exhaust emissions and black carbon is not on the IMO's priority agenda.¹⁵¹

Another pollutant which the Code fails to directly mention is underwater noise. Yet, as the Code incorporates *MARPOL*, then harmful substances can be defined as “any substance which, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea”.¹⁵² This definition seemingly encompasses noise pollution as it is an anthropogenic pollutant, introduced into the sea, and it harms living marine life.¹⁵³ However, neither the Code or *MARPOL* regulates noise pollution from vessels even if the international legal regime recognizes it as a pollutant.¹⁵⁴

¹⁴⁸ Part XII of *UNCLOS* and Articles 207 – 212 (n 13)

¹⁴⁹ The Code does not address carbon dioxide (NO_x) and Black Carbon (BC) yet commercial vessels are still burning poor quality fuels. See Fedi (n 112), p.128

¹⁵⁰ Tanaka (n 71), p.321 and see Boone (n 14), p.556-558 discussing the possibility of including black carbon in the Code.

¹⁵¹ IMO Roadmap (n 17), see section 3.2.1 of this thesis for a discussion on it.

¹⁵² Definition under *MARPOL* (n 12), Definition (2), p.5. Moreover, the Polar Code (n 14) uses the same definition as *MARPOL*, as mentioned in the Codes' introduction (2): “terms used in part II-A, but not defined in this section shall have the same meaning as defined in article 2 of *MARPOL*.”

¹⁵³ Scott (n 97)

¹⁵⁴ *SOLAS* (n 50) solely regulates noise-pollution on board vessels for the safety of seafarers. On 1 July 2014, *SOLAS* will be amended to make the “Code on Noise Levels on Board Ships” (the Noise Code) Resolution MSC.337(91) (30th November 2012) mandatory for new vessels.

2.2.4 Potential Polar Code amendments regulating vessel-source pollutants

After having presented the regulatory omissions of the Code with specific regard to its' silence on airborne and underwater noise pollution, this sub-section focuses on offering potential amendments to partially resolve some of these legal shortcomings.

One of the potential short-term solutions to combat airborne pollution in the Arctic is to change the status of *MARPOL* Annex VI to a binding legal document by incorporating it in Part-II A of the Code.¹⁵⁵ Indeed, enforcing *MARPOL* Annex VI as a binding instrument would be a smooth amendment as the IMO can tacitly amend the Code to strengthen Arctic environmental regulations. This procedure is a legal *tour the force* which ensures swift passing of technical amendments as it is highly improbable that multiple Parties would object to better technical standards. Moreover, if a Party persistently objects without justification to an amendment hence acting in bad faith, the Party risks getting removed from that IMO convention or treaty.¹⁵⁶

As the Code does not currently present any regulations tackling vessel-noise pollution, simple amendments to reduce vessel speed could be passed to both Part I-A and Part II-A of the Code.¹⁵⁷ By simply reducing vessel speed to a maximum of 14 knots, shipping safety in the Arctic would be increased and air pollution would be reduced thanks to slower vessels emitting less amounts of harmful airborne substances.¹⁵⁸ As there is currently no mention of noise pollution in the Code, *MARPOL* and the IMO regime might be more adequate to include and adopt maximum vessel speeds in the Arctic Ocean.

Moreover, attention must be brought to the relationship between the Code and Article 234 *UNCLOS* as it could resolve certain legal gaps left by the Code as well as offer guidance for future policies and laws.¹⁵⁹ Article 234 *UNCLOS* was seemingly drafted to partly ensure that the coastal states, which are the ones most affected by pollution, have sufficient powers to legislate while maintaining due regard for navigation.¹⁶⁰ When regulating pollutants, states

¹⁵⁵ See Fedi (n 112), p.128 and see sub-section 2.2.2 of this thesis

¹⁵⁶ According to Art. 38 (1) (c) of the ICJ Statute, when treaties or customary law cannot be used, recourse is made to the general principles of law, which notably encompasses the principle of good faith as it underpins many international legal rules. See S. Reinhold, "Good Faith in International Law" (2013), UCL Publication, available at <https://discovery.ucl.ac.uk/1470678/1/2UCLJLJ40%20-%20Good%20Faith.pdf>

¹⁵⁷ One can argue that the presence of ice is a natural deterrent to vessel speed yet incorporating maximum knot speed into a binding regulatory framework would still ensure additional shipping safety and environmental protection in the Arctic.

¹⁵⁸ See the discussion in Section 3.2. of this thesis on the IMO's role.

¹⁵⁹ See the discussion on Article 234 and the Polar Code in section 2.2.2 of this thesis.

¹⁶⁰ McRae and Goundrey (n 127), p.227

should cooperate to promote multilateral action which is most appropriate when tackling transboundary marine pollution such as oil spills and discharges of waste.¹⁶¹ The Arctic coastal states should therefore cooperate on the usage of Article 234 within themselves and with the IMO to achieve higher shipping standards. As Chircop mentions, “no one level of governance is equipped to address all these challenges at its level alone”.¹⁶²

By further coordinating their legislative behavior, the Arctic coastal states would put pressure on the international community to develop stricter global rules and standards in addition to the Code hence instigating discussions with the IMO regarding Arctic shipping regulations. To avoid solely relying on national and regional policies, it is thus in the interest of both Arctic states and the international community to ensure that Arctic shipping regulations form an integral part of the international regime (ie. such as the Code).¹⁶³ Extending Arctic shipping regulations beyond the Code will therefore enhance legal certainty as well as foster commercial activity while broadening the framework of vessel-source pollution in order to further protect the Arctic environment.¹⁶⁴

Thus, the Code seemingly presents a rather reactive legal approach to preventing pollution by offering an insufficient regulatory framework to tackle airborne and underwater noise pollution in the Arctic. Nevertheless, unless a state persistently objects, the tacit acceptance procedure could smoothly amend the Code as to include technical amendments reducing both these pollutants.¹⁶⁵

¹⁶¹ Chircop (n 31) and Bartenstein (n 16), p.46

¹⁶² Chircop (n 15)

¹⁶³ *Ibid.*, p.379

¹⁶⁴ Indeed, the IMO admits that “it’s not a perfect regulatory instrument and industry collaboration is not finished” and it should thus welcome both legislative and political change. See ABS (n 103), p.49

¹⁶⁵ Churchill & Lowe (n 115)

3. The IMO's role in promoting potential policy solutions to amend the exclusion of certain vessel-source pollutants from the Arctic regulatory framework – the drafting of an annex

The aim of this section is to explore the role of the IMO, a quasi-legislative body, in reducing shipping emissions, black carbon, and noise pollution in both international and Arctic waters. This section also offers the IMO diverse policy initiatives that they could implement to fight these pollutants. Moreover, the final part of this section focuses on the drafting of an Environmental Annex to the Polar Certificate which encompasses all the policy proposals mentioned in this thesis. The goal of this annex is to limit these threatening vessel-source pollutants without infringing on the Law of the Sea. It is a difficult balance to strike, but if done appropriately, this annex will ensure greater environmental protection in the Arctic while promoting commercial relations. The Arctic Council will not be discussed in this thesis as it does not currently hold legislative powers.¹⁶⁶

3.1 The IMO's special quasi-legislative role and relationship with *UNCLOS*

The IMO is a leading UN specialized agency created in 1948 for regulating, monitoring, and developing international shipping and law, with the general aim of “promot[ing] safe, secure, environmentally sound, efficient and sustainable shipping through cooperation”.¹⁶⁷ The IMO holds a semi-legislative power as its' six main bodies are concerned with both the drafting and adoption of Conventions.¹⁶⁸ These bodies can in turn use the tacit agreement procedure to expedite the process of updating technical annexes, particularly those concerning the geographic mutations of the marine environment due to climate change.¹⁶⁹ The IMO partial legislative role is also attested by the fact that it is the Diplomatic Conference which proposes laws, which are later then debated within a conference of independent states generally party to the IMO.¹⁷⁰

¹⁶⁶ Rottem (n 44), p.51: “the Arctic Council is a consensus body, where all the states must [agree] before action is taken and projects are implemented. It is not an international organization that can make binding decisions.”

¹⁶⁷ IMO Assembly Resolution A.1037(27), of 20 December 2011, “Strategic Plan for the Organization (for the six-year period 2012 to 2017)”, available at: <https://docs.imo.org/Shared/Download.aspx?did=70193> Section 1.1.

¹⁶⁸ The two committees of main relevance for this thesis are the MSC, which tackles safety matters related to shipping, and the MEPC, which addresses prevention and control of marine pollution by ships.

¹⁶⁹ For a discussion on the tacit agreement procedure, see Churchill & Lowe (n 115)

¹⁷⁰ Article 2(b) of the Convention on the International Maritime Organization mentions that the “IMO provides for the drafting of conventions, agreements or other suitable instruments; provides machinery for consultation among Members and exchange of information; facilitates technical co-operation”, available at <https://cil.nus.edu.sg/wp-content/uploads/formidable/14/1948-Convention-on-the-International-Maritime-Organization.pdf>

The IMO is seemingly recognized as the main competent body to tackle marine pollution and it therefore has a duty to create policies for the prevention of vessel pollution.¹⁷¹ While *UNCLOS* incorporates standards prescribed in other international legal instruments under its' scope, the IMO's duty is to specify "how State jurisdiction should be exercised so as to ensure compliance with safety and shipping anti-pollution regulations".¹⁷² *UNCLOS* uses rules of referencing such as the "generally accepted rules and standards" (GAIRS), which usually refer to the IMO conventions, even if there is scholarly debate over their meaning and scope in terms of marine pollution measures.¹⁷³ This authority given by *UNCLOS* to the IMO allows a coastal state to prescribe and enforce standards present in a particular environmental convention from the IMO "which has attained 'sufficiently general acceptance', even if the flag state of a particular foreign ship is not a party to that convention".¹⁷⁴

In addition, *UNCLOS* promotes the IMO's legislative powers by affirming that:

"Although IMO is explicitly mentioned in only one of the articles of *UNCLOS* (article 2 of Annex VIII) in connection with the adoption of international shipping rules and standards in matters concerning maritime safety efficiency of navigation and the prevention and control of marine pollution from vessels and by dumping [...] several provisions in the Convention refer to the "competent international Organization" [which] applies exclusively to IMO."¹⁷⁵

The terms "rules and standards" broaden the scope of the IMO instruments as the MSC or the MEPC may now also adopt a resolution introducing technical rules and standards not mentioned in IMO treaties. Accordingly, *UNCLOS* created a "dynamic opportunity for the IMO to develop international regulations for the protection of the marine environment".¹⁷⁶ Thus, the IMO appears to be a "competent international organization" which can efficiently regulate threatening pollutants from vessels such as exhaust emissions, black carbon, and underwater noise.¹⁷⁷

¹⁷¹ See Art. 211(1) of *UNCLOS* (n 13) which lays down a general obligation for states to establish international rules and standards regarding vessel-source pollution.

¹⁷² IMO, Implications of the United Nations Convention on the Law of the Sea for the International Maritime Organization, IMO Doc LEG/MISC.7 (19 January 2012), p. 12

¹⁷³ *UNCLOS* (n 13), arts 211(2), 211(5), 211(6) and 226 (1). For a presentation of this debate, see AK-J Tan, *Vessel-source marine pollution: the law and politics of international regulation* (Cambridge University Press, 2006)

¹⁷⁴ Saiful Karim, *Prevention of Pollution of the Marine Environment from Vessels: The Potential and Limits of the International Maritime Organization* (1st edition, Springer, 2015), p.34

¹⁷⁵ IMO (n 167)

¹⁷⁶ Saiful Karim (n 174), p. 35

¹⁷⁷ It is important to bear in mind that the IMO remains dependent on coastal states for enforcement of their policies.

3.2 The responsibility of the IMO in curbing harmful gases and reducing underwater noise pollution from vessels in international and Arctic waters

3.2.1 *The current IMO role in regulating airborne and underwater noise pollution from vessels in international waters*

Prior to the IMO's strong political commitment to reduce airborne pollution, the IMO introduced technical and operational measures through amendments to *MARPOL* Annex VI,¹⁷⁸ and it received its' mandate to regulate GHG emissions from Article 2(2) of the Protocol to the UNFCCC.¹⁷⁹ The IMO is seemingly increasingly committed to reducing GHG emissions from international shipping as evidenced by their recent recognition and incorporation of global environmental efforts such as the Paris Agreements and the United Nations 2030 Agenda for Sustainable Development (SDG 13) into their own framework.¹⁸⁰ Today, the IMO is subject to post-Paris Agreement tensions which compelled them to set out a "Roadmap for developing a comprehensive IMO Strategy on reduction of GHG emissions from ships (the Roadmap)" approved at the 70th MEPC meeting.¹⁸¹

Overall, the IMO Initial strategy presents a reduction in carbon intensity from international shipping by at least 40% by 2030, and by 50% by 2050 compared to 2008.¹⁸² One of the first requirements set forth by the Strategy is the introduction of minimum energy efficiency standards for new ships in the form of an index added to *MARPOL* Annex VI (the Energy Efficiency Design Index (EEDI)).¹⁸³ The Initial Strategy also mentions the principle of non-discrimination as well as the principle of no more favorable treatment previously enshrined in *MARPOL* and the principle of common but differentiated responsibility (CBDR), also present in the UNFCCC, the Kyoto Protocol, and the Paris Agreement.¹⁸⁴ In doing so, the IMO establishes their role against vessel-air pollution even if these measures remain insufficient due to the growth in international trade.¹⁸⁵ As the only competent shipping actor, the IMO can instigate

¹⁷⁸ Shi (n 53), p.79

¹⁷⁹ Article 2 of the Convention states its ultimate objective, which is to stabilize the concentration of greenhouse gases in the atmosphere "at a level that would prevent dangerous anthropogenic (human) interference with the climate system". See UN General Assembly, *United Nations Framework Convention on Climate Change*, 20 January 1994, A/RES/48/189, available at <http://unfccc.int/>

¹⁸⁰ Annex 11 IMO (n 17), p.4

¹⁸¹ Resolution MEPC.278(70) (n 17)

¹⁸² IMO (n 17), p.3

¹⁸³ IMO Resolution MEPC.203(62) (July 2011), introducing a new Chapter IV to *MARPOL* Annex VI

¹⁸⁴ Respectively, the Resolution MEPC.304(32) and the Resolution MEPC.67(37), see Henrik Ringbom "Regulating Greenhouse Gases from Ships - Some Light at the End of the Funnel?", in S. Veierud Busch, E. Karlsen, I. Jacobsen (eds.), *The Law of the Sea and Climate Change - Part of the Solution or Representing Constraints?*, Cambridge University Press, 2020 (forthcoming, on file with author), p.13

¹⁸⁵ *Ibid.*, p.8

change and regulate pollutants further thanks to international environmental law therefore suggesting that the IMO has a responsibility in not only joining, but leading the shipping sectors' fight against climate change.

In recent years, the IMO has also discussed black carbon as they introduced international regulations reducing emissions such as nitrogen oxides and sulphur dioxide.¹⁸⁶ At the 60th MEPC, Norway, Sweden and the United States submitted a document discussing the impacts of black carbon from shipping on the Arctic climate in addition to identifying potential reduction strategies.¹⁸⁷ This submission included various opportunities “to reduce fuel consumption as a way to reduce vessel-source BC emissions, such as vessel speed reduction, reducing fuel consumption by making alterations to the vessel and propeller design, use of alternate power technologies and measures to improve ships routing”.¹⁸⁸ In addition to this submission, further efforts to reduce black carbon from shipping have been pursued,¹⁸⁹ as discussions at a Bulk, Liquid, and Gases meeting in 2012 established informational submissions including suggestions for definitions, appropriate measurement techniques, and the establishment of a working group to reduce black carbon.¹⁹⁰ However, these sessions are proof that not much has been legally done to tackle black carbon.¹⁹¹

When it comes to noise pollution, the IMO has adopted Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas (PSSA Guidelines) in 1991.¹⁹² These guidelines were meant to help national governments in safeguarding sensitive areas, with protective measures taken by coastal states, including special discharge standards for vessels under *MARPOL*, special routing measures to restrict shipping traffic under *SOLAS*, and special areas to be avoided (the General Provision on ships routing).¹⁹³ Even though none

¹⁸⁶ Arctic Council: Expert Group On Black Carbon And Methane, Summary Of Progress And Recommendations 2017, available at https://oaarchive.arctic-council.org/bitstream/handle/11374/1936/EDOCS-4319-v1-ACMMUS10_FAIRBANKS_2017_EGBCM-report-complete-with-covers-and-colophon-letter-size.pdf?sequence=5&isAllowed=y

¹⁸⁷ IMO “Prevention of Air Pollution from Ships: Reduction of Emissions of Black Carbon from Shipping in the Arctic” MEPC 60/4/24 (2010)

¹⁸⁸ *Ibid.*, at 7-9 and Boone (n 14), p.552

¹⁸⁹ IMO Report of the MEPC on its 62nd Session, Annex 19, MEPC 62/24/Add. 1 (July 2011)

¹⁹⁰ IMO Report “Investigation of Appropriate Control Measures (Abatement Technologies) to Reduce Black Carbon Emissions from International Shipping” (2012), p.11

¹⁹¹ Laura Boone, “Reducing Air Pollution from Marine Vessels to Mitigate Arctic Warming: Is it Time to Target Black Carbon” (2012) *Carbon & Climate Law Review*, Vol 6 No.1, p.13-20, p.13

¹⁹² IMO (n 18)

¹⁹³ IMO “General Provisions on Ships’ Routing” (A.572(14)) (20 November 1985) and PSSA Guidelines 2005 (n 18), paras. 3.4–3.7. For a discussion on these guidelines, see Harm M. Dottinga, Alex G. Oude Elferink, “Acoustic Pollution in the Oceans: The Search for Legal Standards” (2010), *Ocean Development & International Law*, Vol. 31, No. 1-2, p.151-182, p.164

of these measures are specifically tailored to reduce Arctic noise pollution, they can be applied to Arctic zones with high concentrations of marine mammals or to important migratory routes.¹⁹⁴ In addition to the early 1992 Guidelines and to *MARPOL*, the IMO has published recommendations in 2014 on vessel-noise pollution.¹⁹⁵ These mainly focus on technical design standards and references (such as the building of the hulls and the design of the propellers) and simply present general advice that ship-operators, ship-owners, and ship designers should consider. The IMO therefore regulates vessel-noise pollution minimally through *MARPOL* and through operational and construction guidelines for vessels.¹⁹⁶

3.2.2 *The current IMO role in regulating airborne and underwater noise pollution from vessels in Arctic waters*

Besides the Code and earlier guidelines, the IMO has done very little regarding Arctic air pollution. The IMO regulations seemingly focused on reducing GHG internationally whilst increasing navigational, operational, and maintenance safety of vessels in polar waters. As such, the Arctic seemingly does not benefit from special black carbon regulations *per se*. In 2004, the Arctic released approximately 1,180 metric tons of black carbon, representing a small proportion of the estimated 71,000 to 160,000 metric tons released annually but the region-specific effects of black carbon indicate that even small amounts could have a potentially disproportionate impact on ice melt and warming in the region.¹⁹⁷ Nevertheless, the IMO's recent Arctic HFO ban has been a long-awaited policy measure which will limit black carbon and consequently air pollution in the Arctic even if ships flying the flag of an Arctic coastal state as well as operating in those states' sovereign waters get a waiver until July 1st of 2029.¹⁹⁸

Moreover, both Arctic and international underwater noise pollution has been legally ignored even if the Arctic is historically known as a “quiet” place.¹⁹⁹ Indeed, the IMO has created the 2014 Noise Pollution Guidelines and PSSAs designations yet nothing legally specific has been tailored for Arctic underwater noise-pollution.

¹⁹⁴ Karen N. Scott “Sound and Cetaceans: A Regional Response to Regulating Acoustic Marine Pollution” (2007), *Journal of International Wildlife Law and Policy*, Vol.10 No.2, p.175-199, p.188

¹⁹⁵ IMO (n 18)

¹⁹⁶ Submission on IMO's work on anthropogenic underwater noise to the 19th meeting of the United Nations Open-Ended Informal Consultative Process on Oceans and the Law of the Sea on "Anthropogenic underwater noise" (18-22 June 2018) available at <http://www.imo.org/en/MediaCentre/HotTopics/Pages/Noise.aspx>

¹⁹⁷ AMSA Report (n 57), p.140-142

¹⁹⁸ For further information on decarbonization of shipping, see Daniel Lack, “The Impacts of an Arctic Shipping HFO Ban on Emission of Black Carbon” (2016), *Transport emissions: Air quality and Climate consulting*, p.8-9 and see Sun (n 18)

¹⁹⁹ World Wildlife Fund “Underwater noise from Arctic shipping: Impacts, regulations and recommendations” 2017, available at and accessed 25.04.2020

awsassets.wwf.ca/downloads/170412_underwaternoiseuetoshipping.pdf?_ga=1.31906808.735604524.1468957492

3.2.3 *Potential policies from the IMO reducing airborne and underwater noise pollution from vessels in Arctic waters*

This section will introduce three potential policy measures which the IMO could adopt to reduce airborne and underwater noise pollution in Arctic waters. These are the implementation of ECA's and PSSA's in vulnerable zones of the Arctic Ocean, the drafting of additional regional policies, and the implementation of "softer" NDC's from the IMO's Initial Strategy.

3.2.3.1 Implementing ECA's and PSSA's in vulnerable Arctic Ocean zones

Following the recommendations from the AMSA Report, ECA's should be implemented in the Arctic Ocean to curb harmful emissions.²⁰⁰ On the one hand, the 2020 IMO regulations limit the sulphur fuel amount to 0.5% m/m, which will likely result in a 10% reduction in emissions. On the other hand, assigning ECA status to certain Arctic marine areas will keep the sulphur fuel content to 0.1% m/m, resulting in a 50% reduction in black carbon emissions.²⁰¹ Therefore, the IMO should designate vulnerable marine areas in the Arctic under ECAs to reduce black carbon emissions from shipping before the HFO ban enters into force.²⁰² As Norway, Sweden, and the United States pointed out at the 60th session of the MEPC; "because shipping is a contributor to black carbon emissions, and because [Arctic] shipping traffic is expected to grow substantially [...] it is important that IMO considers actions".²⁰³

Regarding noise pollution in the Arctic Ocean, a noteworthy measure is the setup of a Particularly Sensitive Sea Areas (PSSA).²⁰⁴ Combined with the general obligation to reduce pollution under Part XII of *UNCLOS*, it is suggested that where noise has, or is likely to, harm marine mammals and other forms of biodiversity, states, together with the IMO, *must* designate PSSAs and regulate noise within those areas so as to minimize its' impact.²⁰⁵ Just as *MARPOL's* ECA system, PSSA could include special areas where acoustic pollution will be controlled and mitigated with the adoption of noise reduction technologies.²⁰⁶ According to a case study regarding Marine Protected Areas in the Channel Islands, sanctuaries should adopt

²⁰⁰ The AMSA Report (n 57) recommended designating *MARPOL* special areas under the various convention annexes as to identify areas of heightened ecological significance to protect them from shipping impacts, p.7

²⁰¹ Daniel Lack (n 198), p.12

²⁰² In 2015, 57% of the total of fuel consumed by vessels navigating the Arctic Ocean used HFO. See Hendrik Schopmans, "Revisiting the Polar Code: Where Do We Stand?" (June 2019) <https://www.thearcticinstitute.org/revisiting-polar-code/> accessed 28.03.2020 for further information.

²⁰³ Arctic Council (n 186) and IMO (n 187), p.5

²⁰⁴ PSSAs are considered as a useful mechanism to implement the special areas provision of Article 211(6) *UNCLOS* (n 13)

²⁰⁵ Scott (n 97), p.296

²⁰⁶ *Ibid.* p.295

the PSSA designations as they are “the best protection against noise pollution from commercial ships”.²⁰⁷ PSSA designations would not only raise the Arctic Ocean to a higher protection status but it would also ensure that the IMO protects the Arctic environment from the acoustic impacts of anthropogenic activities.

Overall, reducing vessel speed would also benefit the marine environment by curbing shipping emissions and black carbon.²⁰⁸ Indeed, these measures on noise pollution are closely linked to emissions as slower vessel speeds reduce the amount of emissions in the atmosphere.²⁰⁹ In addition to slower vessel speeds, the IMO could adopt protective measures such as the designation of special discharge restrictions, the adoption of vessel routing systems, and the identification of areas which should be avoided altogether.²¹⁰

3.2.3.2 Additional drafting of regional policies and furthering of Arctic cooperation

The current framework governing airborne and underwater noise pollution from shipping is dominated by regulations adopted at the IMO, yet also includes the *UNEP*, the *IPCC*, the *UNFCCC*, the EU, and the USA.²¹¹ Given this multi-layering of frameworks, Arctic pollution seems to require a multilevel approach with regionally enforceable mechanisms in addition to international regulations.²¹² For instance, the Arctic Council could create a task force identifying actions related specifically to shipping that should be taken outside the scope of the IMO to protect Arctic people and the Arctic marine environment.²¹³ This way, the Arctic Council and its’ potential task forces could pressure the IMO to adopt binding regulations tackling airborne and underwater noise pollution from vessels in the Arctic.²¹⁴

²⁰⁷ Angela M. Haren, “Reducing Noise Pollution from Commercial Shipping in the Channel Islands National Marine Sanctuary: A Case Study in Marine Protected Area Management of Underwater Noise” (2007) *Journal of International Wildlife Law and Policy*, Vol.10 No.2, p.153-173, p.172

²⁰⁸ Arctic WWF (n 196)

²⁰⁹ Arctic WWF, “Open letter to the IMO on speed reduction” (23rd October 2018)

<<https://arcticwwf.org/newsroom/news/open-letter-to-the-imo-on-speed-reduction/>> accessed 12.01.2020

²¹⁰ IMO Res. A.982(24) (2005), paras. 6.1 to 6.3

²¹¹ Christodoulou-Varotsi (n 92), p.183

²¹² The Arctic Council holds a significant part in Arctic Governance as their work on drafting guidelines contributes to the development of international standards and rules. See Alf Håkon Hoel, “Do We Need a New Legal Regime for the Arctic Ocean?” (2009), *The International Journal of Marine and Coastal Law*, Vol. 24, No. 2, p.443-456, p.455

²¹³ Kari Birdseye, “Melting of Arctic isn’t on Radar Screen of the Arctic Council” (2011), EarthJustice available at <https://earthjustice.org/blog/2011-may/melting-of-arctic-isn-t-on-radar-screen-of-arctic-council> 19.04.2020. See bottom of blog page to access the background reports on the Arctic Council and the Polar Code.

²¹⁴ For instance, the ACIA reports have brought an enhanced global understanding of the consequences of climate change in the Arctic, see the *Arctic Climate Impact Assessment* (Cambridge University Press, Cambridge, 2005)

Regarding noise pollution, an efficient regional policy could be to promote slower shipping speeds thanks to financial incentives. For instance, this policy has already been implemented in the Haro strait as the Vancouver Fraser Port promotes lower vessel speeds (11 knots) in the summer to protect endangered mammals through financial rewards.²¹⁵ It is thus feasible to install speed limits without interfering with the Law of the Sea, especially to protect sensitive migratory areas of endangered species.²¹⁶ The IMO could use a similar approach and give financial rewards to encourage shipowners to comply with slower shipping speeds, hence reducing underwater noise in the vulnerable areas of the Arctic Ocean.

3.2.3.3 The IMO's Initial Strategy and implementation of "softer" NDC's

The IMO noted that "many accidents [...] giving rise to damage to the environment are due to failure to comply with existing standards and procedures".²¹⁷ In the view of shipping professionals and operators, the IMO is seemingly the most competent and legitimate body to curb shipping emissions as it arguably holds the best technical and operational knowledge in shipping. So, to further mitigate the environmental damages caused by a failure to comply with existing standards, the IMO must reinforce its' global engagement to environmental law.²¹⁸

The recent adoption of the Paris Agreement has guided the IMO's fight in curbing emissions from international shipping.²¹⁹ Accordingly, the IMO's Roadmap mention of "levels of ambition" (ie. the international shipping sector reduction targets) seemingly mirror the Nationally Determined Contributions (NDC's) from the Paris Agreements.²²⁰ NDC's are global efforts and ambitions set by each state to reduce national emissions according to their context and capabilities, with the general aim of keeping temperatures below 1.5°C.²²¹ The NDC's further require each party to prepare and maintain successive NDC's that it intends to achieve according to their "common but differentiated responsibility" (CBDR).²²²

²¹⁵ The Port gives 500\$ to every ship regulating its' speed to 11 knots, see the Columbian Associated Press "Ships slow down to protect orcas" (2017) <https://www.columbian.com/news/2017/sep/03/ships-slow-down-to-protect-orcas/> 18.03.2020

²¹⁶ *UNCLOS* authorizes the adoption of laws and regulations to conserve marine living resources and the marine environment with the designation of sea lanes and traffic separation, see Articles 21(1) and 22 *UNCLOS* (n 13)

²¹⁷ IMO "Guidelines on Incorporating the Precautionary Approach" Resolution MEPC 67(370) (1995), p. 3

²¹⁸ The development of CO₂ reduction strategies must remain a top priority for the IMO. Yet, considering the long atmospheric residence time of CO₂, black carbon regulations should equally be pursued. See Boone (n 14), p. 559

²¹⁹ Paris Agreement (Dec. 13, 2015), in UNFCCC, COP Report No. 21, Addendum, at 21, U.N. Doc. FCCC/CP/2015/10/Add. 1 (Jan. 29, 2016) [hereinafter Paris Agreement]

²²⁰ Roadmap (n 17), p.5

²²¹ Paris Agreement (n 219), respectively Article 4 (1), 4(2) and 4(3) and Article 2(1) and 2(2)

²²² For a discussion on the CBDR and the NDC's, see Christina Voigt, & Felipe Ferreira "'Dynamic Differentiation': The Principles of CBDR-RC, Progression and Highest Possible Ambition in the Paris Agreement" (2016) *Transnational Environmental Law*, Vol. 5, No. 2, p.285-303

As suggested by these levels of ambitions, the IMO could produce a similar mechanism where states would make their own NDC's to consistently reduce their emissions from vessels.²²³ The international shipping sector would become the first to adopt an international centralized top-down climate regulation by developing these “softer” NDC's.²²⁴ Regarding their implementation, numerous countries have already ratified the Paris Agreement, meaning that this policy initiative will most likely get approved.²²⁵ Yet, there is no consensus on these “levels of ambition” as some developed states and small island states highlighted that these would “provide a basis for the selection of short-, mid- and long-term future measures”,²²⁶ whilst developing states would prefer an overall GHG emissions shipping cap over national targets.²²⁷ Moreover, the IMO's “softer” NDC's cannot be separated from the Paris Agreement NDC's as this would cause a carbon leakage and distort the competitiveness of the shipping sector.²²⁸

However, the IMO Initial Strategy represents a substantial difference on the levels of ambition in comparison to the Paris Agreement NDC's for three main reasons. First, it is expected that the carbon intensity of ships would decline thanks to the EEDI for new ships. Secondly, as previously stated in this thesis, the carbon intensity of shipping is expected to decline by at least 40% by 2030 and by 70 % by 2050 compared to 2008. Thirdly, GHG emissions are expected to peak to then decrease to reduce the annual GHG emissions by at least 50 % by 2050, simultaneously pursuing efforts consistent with the Paris Agreement. Overall, the Initial Strategy provides a non-exhaustive list of measures, with some based on enhancing the already existing regulations and practices.²²⁹ The revised Strategy that shall be adopted in 2023 will be subject to periodic review every five years after adoption, which should preferably correspond with the global stock take to synchronize actions taken under the IMO and the climate regime.²³⁰

²²³ Yubing Shi & Warwick Gullett, “International Regulation on Low- Carbon Shipping for Climate Change Mitigation: Development, Challenges, and Prospects” (2018), *Ocean Development & International Law*, Vol. 49, No. 2, p.148

²²⁴ Daniel Bodansky, “The Paris Climate Change Agreement: A New Hope?” (2016), *American Journal of International Law* Vol.110, No.2, p.288-319, p.290.

²²⁵ Ratification by 55 UNFCCC parties accounting for 55% of global GHG emissions, with over 195 signatures and 189 parties.

²²⁶ The Level of Ambition of the Comprehensive IMO Strategy on Reduction of GHG Emissions from Ships, MEPC 71st Session, Agenda Item7, IMO Doc. MEPC 71/7/4 (28 April 2017), at para. 11; Important First Steps for a Successful Interim GHG Strategy, submitted by Greenpeace International, WWF, Pacific Environment and CSC, MEPC 71st Session, Agenda Item 7, IMO Doc. MEPC 71/7/14 (12 May 2017), at paras. 4–8.

²²⁷ Shi & Gullett (n 223), p.148

²²⁸ Ibid.

²²⁹ For instance, maximizing both the EEDI and the SEEMP.

²³⁰ Aldo Chircop, Meinhard Doelle and Ryan Gauvin, *Shipping and Climate Change: International Law and Policy Considerations* (2018), available at <https://www.ssrn.com/abstract=3113274> p. 48

The 2030 and 2050 aforementioned emission targets presented in the Initial Strategy appear to be based on what the IMO member States presently consider feasible as there is no presently evidence that these targets are based on a unbiased analysis of what would be a fair contribution to the global effort. As the Initial Strategy is non-binding, the fact that the Strategy targets are based on what member States believe achievable rather than on what would constitute a “fair contribution” is problematic. Consequently, this derogation creates a discrepancy from the approach presented in the Paris Agreement as this Agreement sets forth clear collective targets and individual commitments, both scrutinized over time to hinder their disparities, instead of low and biased emission targets.²³¹ Despite all of this, the IMO Initial Strategy objectives are still politically relevant in reducing shipping emissions even if they remain non-binding.

²³¹ Meinhard Doelle and Aldo Chircop “Decarbonizing International Shipping: Potential Roles of the IMO’s Initial Strategy and the UN Climate Regime” (2018) available at <https://ssrn.com/abstract=3275574> p.6

3.3 A potential Environmental Annex to the Polar Certificate – striking the balance between shipping activities and the protection of the Arctic environment

After having discussed and assessed potential legal amendments and policy solutions to reduce air and noise pollution from vessels throughout this thesis, this section focuses on the drafting of an environmental Annex to the Polar Certificate. This Annex encompasses most of the policy solutions presented in this thesis into a single comprehensive binding document, which will be passed as an amendment to the Code via the tacit agreement procedure. Overall, this Annex would provide a minimal threshold of protection from airborne and underwater noise pollution in the Arctic without hindering economic activity.

The IMO would have to award this Annex because the Arctic Council has no legislative authority.²³² The IMO is seemingly one of the only adequate institution for regulating shipping in the Arctic as the Arctic states have stated so:

“We will take steps in accordance with international law both nationally and in cooperation among the five states and other interested parties to ensure the protection and preservation of the fragile marine environment of the Arctic Ocean. In this regard we intend to work together including through the International Maritime Organization to strengthen existing measures and develop new measures to improve the safety of maritime navigation and prevent or reduce the risk of ship-based pollution in the Arctic Ocean”.²³³

According to this declaration, the Arctic coastal states seem open to further regulations which might improve the safety of shipping hence hindering the risk of pollution in Arctic waters. This is proof that a potential Annex protecting the Arctic environment from harmful emissions, black carbon, and underwater noise might be welcomed and not politically frowned upon.

The content of this Annex would be a small bundle of environmental regulations, which would avoid the mutation of Arctic seaways into commercial highways without infringing upon Law of the Sea. These regulations are the policy measures previously discussed, which are:

- Designating ECAs and PSSAs for the marine vulnerable zones in the Arctic Ocean
- Changing the status of *MARPOL* Annex VI to a binding Annex to the Code

²³² See.Rottem (n 40) The Council is a “consensus body, where all the States must be in agreement before action is taken and projects are implemented. It is not an international organization that can make binding decisions” (51)

²³³ Ilulissat Declaration (n 7)

- Reducing ship speeds to maximum 14 knots in the Arctic Ocean, with slower speeds in the vulnerable marine zones (ie 11 knots)
- Pushing the IMO to draft softer NDC's for vessels and/or flag-states
- Encouraging the IMO to promote regional policy-making and international environmental law in Arctic governance

Overall, the long-term goal would be for both airborne and underwater noise pollution to have their own stand-alone treaty or protocol to an already established framework.²³⁴ There is currently a comprehensive framework based on *UNCLOS* operating as a matrix where additional treaties and agreements can be added onto meaning that the legal inclusion of these pollutants could be feasible.²³⁵ Attention must also be brought to the fact that nation-states cannot unilaterally act when tackling marine pollution due to its' transboundary nature and therefore broader collective actions of prevention are necessary.

These are rather small amendments, yet they hold important political challenges for the IMO. Nonetheless, the IMO should take responsibility in reducing air and noise pollution from vessels, specifically in the Arctic, as reversing environmental damage is not possible. In doing so, the IMO must ensure that the Arctic coastal states, port states, and flag states can also keep monitoring and approving vessels entering their ports by holding random compliance checks with this new Annex amendment and with general international standards and rules.

With all of this said, Appendix I of this thesis presents an illustration of the potential Environmental Annex to the Polar Certificate.

²³⁴ Jeremy Firestone & Christina Jarvis "Response and Responsibility: Regulating Noise Pollution in the Marine Environment" (2007), *Journal of International Wildlife Law and Policy*, Vol. 10, No. 2, p.150

²³⁵ Alf. H. Hoel (n 212), p.455

4 Conclusions

The main purpose of this thesis was to analyze and assess the current environmental framework in the Arctic for reducing vessel-source pollutants such as black carbon and underwater noise, with particular focus on *MARPOL* Annex VI, the Polar Code, and the IMO regime. Moreover, this thesis also aimed to offer potential legal amendments and policy initiatives to resolve the shortcomings of the Arctic environmental framework.

MARPOL Annex VI limits international shipping emissions by establishing regulations to reduce the amounts of GHG, SO_x, NO_x, and Particulate Matter (PM) in vessel fuel. Although this Annex is not binding, it still offers the possibility of establishing an ECA to curb harmful emissions which would protect marine areas in the Arctic. Moreover, this Annex applies to all waters inclusive of the Arctic, yet it does not provide a sufficiently high threshold of environmental protection to safeguard the Arctic Ocean from these emissions. Hence, this thesis argues that Annex VI should be made mandatory via the tacit acceptance procedure and that vulnerable areas in the Arctic Ocean should be designated as an ECA in order to benefit from stronger environmental protection.

In addition to *MARPOL*, the Polar Code is a comprehensive regulatory framework especially drafted for shipping in polar waters. The first part of the Code codifies navigational measures such as ship construction, training, manning, and equipment requirements presented under *SOLAS* while the second part incorporates pollution prevention measures offered by *MARPOL*. The Code aims to enhance shipping safety in the Arctic by reducing vessel accidents thus minimizing the risk of spills of harmful substances. This thesis has put forth an overview of environmental accomplishments and shortcomings of the Polar Code and has juxtaposed the Code, in the sea of other available regulatory frameworks, with the discussion on the Code's relationship with Article 234 of *UNCLOS*. Nonetheless, the silent omission from the Code of airborne and underwater noise pollution from vessels are important shortcomings which must be legally addressed.

Overall, the IMO has both the authority and legitimacy to reduce airborne and underwater noise pollution from vessels. Recently, the IMO has drafted an Initial Strategy to curb greenhouse gases internationally which undoubtedly benefits the Arctic due to the transboundary nature of air pollution. However, the IMO's discussions on the potential regulation of black carbon, which date from the early 2010s, is currently on hiatus. In the last twenty years, the IMO has

also issued a few guidelines and recommendations regarding underwater noise pollution yet it still lacks a mandatory regulatory framework in both international and Arctic waters. This thesis acknowledges all of these necessary policy efforts presently pursued by the IMO which are proof of the IMO's role and responsibility in addressing climate change.

Nevertheless, this thesis defends a legally proactive approach which led to the drafting of potential IMO policies and propounds the adoption of an environmental Annex to the Polar Certificate. For instance, these policies include but are not limited to: designating ECAs and PSSAs in vulnerable areas of the Arctic Ocean, promoting regional cooperation, and forming "softer" NDCs for the shipping industry. By implementing these suggested policies, the IMO would protect the international community from both airborne and underwater noise pollution emitted from shipping and contribute to the fight against climate change.

Rather than painting an overly dramatic picture of the Arctic, this thesis has sought to accurately analyze and assess the environmental challenges faced by the Arctic in a time of increased shipping activity and economic growth. As the Arctic environment is already submitted to pressure stemming from harmful pollutants, capitalist interests, and geopolitical tensions, it is relatively less important whether or not Arctic shipping remains minimal because the haste with which ice is melting is already threatening the regions' survival. Without an adequate regulatory framework for reducing harmful pollutants both internationally and locally, the world at large as well as indigenous communities of the Arctic will increasingly face growing dire environmental consequences such as sea-level rise, novel diseases, and a general loss of land and marine biodiversity. In light of this environmental and regulatory crisis in the Arctic, offering potential legal amendments and policy initiatives in this thesis seemed not only interesting, but necessary.

Appendix I

Mandatory Environmental Annex to the Polar Certificate

<i>Definitions</i>	This annex uses the same definitions of the Arctic, marine pollution, and emissions mentioned in both <i>MARPOL</i> and the Polar Code.
<i>Fuel use and Airborne pollutants</i>	Complete ban of HFOs with immediate effect Incentives to use biofuels
<i>Speed</i>	14 knots maximum in the Arctic Ocean 11 knots in PSSA's and ECA's
<i>Mandatory requirements</i>	The incorporation of <i>MARPOL</i> Annex VI in Part II-A of the Polar Code (ratified by all IMO Parties) The IMO should deliver their own NDCs on their own vessels for the current IMO Roadmap to curb GHG emissions (based on Article 4 of the Paris Agreement) Ratification of the Paris Agreement for all Parties to the IMO Delimitation of ECA's and PSSA's according to the best available science and evidence (possibility of setting an Arctic Council task force to determine these most vulnerable Arctic Ocean Areas)

Appendix II

HOW THE POLAR CODE PROTECTS THE ENVIRONMENT

OIL

DISCHARGES
Discharge into the sea of oil or oily mixtures from any ship is prohibited

STRUCTURE
Double hull and double bottom required for all oil tankers, including those less than 5,000dwt (AVS ships constructed on or after 1 January 2017)

HEAVY FUEL OIL
Heavy fuel oil is banned in the Antarctic (under MARPOL). Ships are encouraged not to use or carry heavy fuel oil in the Arctic

LUBRICANTS
Consider using non-toxic biodegradable lubricants or water-based systems in lubricated components outside the underwater hull with direct seawater interfaces

SEWAGE

DISCHARGES I
No discharge of sewage in polar waters allowed (except under specific circumstances)

TREATMENT PLANTS
Discharge is permitted if ship has an approved sewage treatment plant, and discharges treated sewage as far as practicable from the nearest land, any fast ice, ice shelf, or areas of specified ice concentration

DISCHARGES II
= Sewage not comminuted or disinfected can be discharged at a distance of more than 12nm from any ice shelf or fast ice
= Comminuted and disinfected sewage can be discharged more than 3nm from any ice shelf or fast ice

GARBAGE

PLASTICS
All disposal of plastics prohibited (under MARPOL)

FOOD WASTES I
Discharge of food wastes onto the ice is prohibited

FOOD WASTES II
Food wastes which have been comminuted or ground (no greater than 25mm) can be discharged only when ship is not less than 12nm from the nearest land, nearest ice shelf, or nearest fast ice

ANIMAL CARCASSES
Discharge of animal carcasses is prohibited

CARGO RESIDUES
Cargo residues, cleaning agents or additives in hold washing water may only be discharged if: they are not harmful to the marine environment; both departure and destination ports are within Arctic waters; and there are no adequate reception facilities at those ports. The same requirements apply to Antarctic area under MARPOL

INVASIVE SPECIES

INVASIVE AQUATIC SPECIES
Measures to be taken to minimize the risk of invasive aquatic species through ships' ballast water and biofouling

CHEMICALS

DISCHARGES
Discharge of noxious liquid substances (NLS) or mixtures containing NLS is prohibited in polar waters

BACKGROUND INFO

- THE INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS (POLAR CODE) WILL ENTER INTO FORCE ON 1 JANUARY 2017
- IT APPLIES TO SHIPS OPERATING IN ARCTIC AND ANTARCTIC WATERS; ADDITIONAL TO EXISTING MARPOL REQUIREMENTS
- IT PROVIDES FOR SAFE SHIP OPERATION AND PROTECTS THE ENVIRONMENT BY ADDRESSING THE UNIQUE RISKS PRESENT IN POLAR WATERS BUT NOT COVERED BY OTHER INSTRUMENTS

DEFINITIONS

SHIP CATEGORIES
Three categories of ship designed to operate in polar waters in:
A) at least medium first-year ice
B) at least thin first-year ice
C) open waters/ice conditions less severe than A and B

FAST ICE: Sea ice which forms and remains fast along the coast, where it is attached to the shore, to an ice wall, to an ice front, between shoals or grounded icebergs

ICE SHELF: A floating ice sheet of considerable thickness showing 2 to 50m or more above sea-level, attached to the coast

INTERNATIONAL MARITIME ORGANIZATION

Source: IMO “How the Polar Code Protects the environment”, available at <https://safety4sea.com/how-the-polar-code-protects-the-environment/>

THE EFFECTS OF VESSEL UNDERWATER NOISE ON WHALES AND WHAT MARINERS CAN DO ABOUT IT

SOURCES OF NOISE

While there are plenty of naturally occurring sounds in the ocean, an increase in commercial vessel traffic is the main reason for increased underwater noise.

In the North Pacific Ocean, underwater noise has been **DOUBLING** in intensity **EVERY DECADE** for the past

60 YEARS



Sound travels **4.5 TIMES** FASTER in water than in air.

WHERE VESSEL NOISE COMES FROM

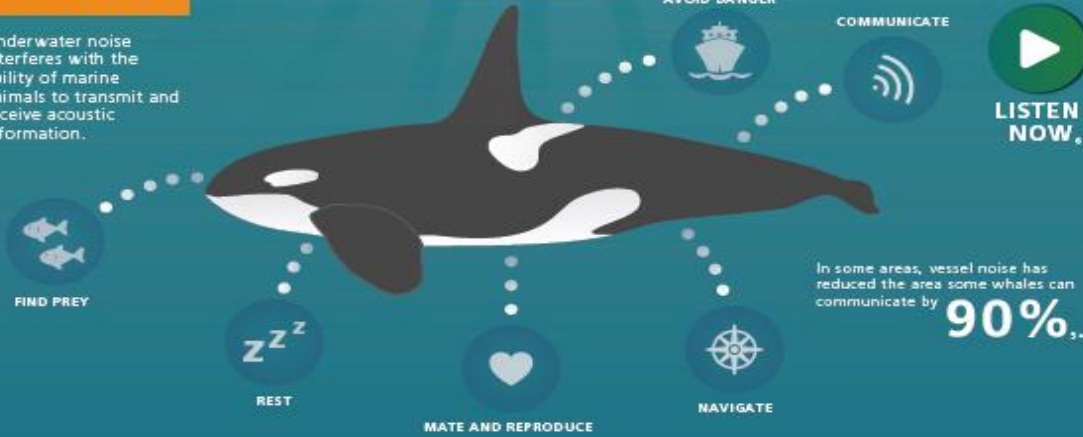
- ENGINE AND ONBOARD MACHINERY
- DRAG FROM POOR HULL MAINTENANCE
- BOW/STERN THRUSTERS
- PROPELLER
- CAVITATION

Most underwater noise from large vessels is caused by propeller cavitation.

IMPACTS

Underwater noise interferes with the ability of marine animals to transmit and receive acoustic information.

VESSEL NOISE CAN AFFECT THE ABILITY OF MARINE ANIMALS TO...



In some areas, vessel noise has reduced the area some whales can communicate by **90%**.

WHAT YOU CAN DO

In 2014, the International Maritime Organization (IMO) recognized that underwater noise associated with shipping is something that can be mitigated.

READ THE GUIDELINES
WWW.IMO.ORG



Options to reduce ship noise underwater already exist!

SLOW DOWN

MAINTAIN

OPTIMIZE

DESIGN

REROUTE



Source: IMO “The Effects of Vessel Underwater Noise on Whales and what Mariners can do about it”, available at <http://www.imo.org/en/MediaCentre/HotTopics/Pages/Noise.aspx>

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- *SOLAS*; International Convention for the Safety of Life at Sea, 1974 (with annex and final act of the International Conference on Safety of Life at Sea, 1974). Concluded at London on 1 November 1974, *United Nations Treaty Series*, Vol. 1184, No.18961, available at <http://www.imo.org/ourwork/facilitation/documents/solas%20v%20on%20safety%20of%20navigation.pdf>
- *UNCLOS*: United Nations Convention on the Law of the Sea (with annexes, final act and procès-verbaux of rectification of the final act dated 3 March 1986 and 26 July 1993). Concluded at Montego Bay on 10 December 1982, *United Nations Treaty Series*, Vol. 1833, No. 31363, available at https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf
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