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ARTICLE



## The Polar Code and Canada's regulations on Arctic navigation: shipping companies' perceptions of the new legal environment

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### ABSTRACT

In 2017, the Polar Code, negotiated under the auspices of the IMO, came into force. Later that same year, Canada issued new regulations applicable to navigation in the Canadian Arctic. In this paper, we investigate how this new legal environment is perceived by shipping companies. We conducted a survey, asking companies, both active and not active in the Arctic, how they assess the impact of the legal changes on their operations. Using a qualitative methodology, we coded and analysed 99 questionnaires. Our research shows that companies not active in the Arctic are, as could be expected, largely unaware of the Polar Code and often unwilling to respond to our survey, showing a limited interest in the Arctic shipping market. Companies active in the Arctic and well aware of the issues of safety of navigation and environmental protection generally welcomed the Polar Code. Respondents were less familiar with the new Canadian regulations, arguably corroborating findings according to which the Northwest Passage is not currently considered a potential regular shipping route.

### KEYWORDS

Polar code; Arctic Shipping Safety and Pollution Prevention Regulations; IMO; Arctic shipping; Qualitative Analysis

## Introduction

In January 2017, the International Code of Safety for Ships Operating in Polar Waters, better known as the Polar Code, entered into force.<sup>1</sup> This new set of specific international legal standards for navigation in the harsh and fragile polar environments was negotiated under the auspices of the International Maritime Organization (IMO). Its development was prompted by two disastrous oil spills, caused by the 1989 groundings of the *Exxon Valdez* in the sensitive south-Alaskan Prince William Sound and of the *Bahia Paraiso* in Antarctic waters.<sup>2</sup> The necessity for specific legal standards on safety of navigation and pollution prevention in polar waters has subsequently been confirmed time and again by infamous incidents, including the 1989 near sinking of the cruise ship *Maxim Gorky* off

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<sup>1</sup>International Code of Safety for Ships Operating in Polar Waters (Polar Code), IMO Resolution MSC.385(94), 21 November 2014, effective 1 January 2017; Amendments to the International Convention for the Safety of Life at Sea, 1974, IMO Resolution MSC.386(94), 21 November 2014, effective 1 January 2017; Amendments MARPOL Annexes I, II, IV and V, IMO Resolution MEPC.265(68), 15 May 2015, effective 1 January 2017.

<sup>2</sup>For an historical overview see Brigham, *The emerging International Polar Navigation Code: bi-polar relevance?*, 244, particularly 246 ff.

Greenland as well as the sinking of the cargo ship *Finn Polaris* in the Canadian archipelago in 1991, of the passenger ship M/V *Explorer* in Antarctica in 2007 and of the small excursion vessel *Inuk II* off Greenland in 2016.<sup>3</sup> In the context of melting ice caused by global warming, substantial growth of mining, fishing, oil and gas exploitation and shipping activities in the Arctic has been predicted.<sup>4</sup> Ship traffic in the Arctic has been examined from various angles, ranging from its operational costs and environmental impact to actual growth figures.<sup>5</sup> A less investigated aspect is the impact caused by the legal framework intended to limit the risk of incidents in a vulnerable region where response capacity remains limited.

International negotiations of binding rules and standards for polar navigation were launched at the IMO in 1991 by a German proposal according to which 'ships intended for service in polar waters should have suitable ice strengthening for polar conditions in accordance with the rules of a recognized classification society'.<sup>6</sup> The development of comprehensive binding obligations for flag states proved arduous and the first tangible milestones, reached in 2002 and 2009, were mere recommendatory guidelines.<sup>7</sup>

Negotiation took place against a complex legal background. One prominent source of disagreement in the Arctic has been the status of its passages. While Canada and Russia claim full sovereignty over what they consider internal waters, the United States in particular insists on the respect of freedom of navigation in what it considers 'international straits'.<sup>8</sup> In addition, article 234 of the 1982 United Nations Convention on the Law of the Sea (or UNCLOS) provides coastal States with jurisdiction to adopt and enforce laws and regulations for the prevention and control of marine pollution from vessels in areas covered with ice for most of the year within the limits of their exclusive economic zone.<sup>9</sup> Despite issues related to the scope and breadth of article 234,<sup>10</sup> it has long been the basis of robust legal regimes imposed by Canada and Russia on international navigation off their Arctic coasts.<sup>11</sup>

<sup>3</sup>Fedi and Faury, *Les principaux enjeux et impacts du Code polaire OMI*, 81, Kikkert, 'Promoting national interests and fostering cooperation: Canada and the development of a polar code', Jensen, 'Arctic shipping guidelines: towards a legal regime for navigation safety and environmental protection?.'

<sup>4</sup>Borgerson, 'Arctic Meltdown: The Economic and Security Implications of Global Warming', –, 'The Coming Arctic Boom: As the Ice Melts, the Region Heats Up', Howard, *The Arctic gold rush the new race for tomorrow's natural resources*, O'Leary, 'The New Ice Age: The Dawn of Arctic Shipping and Canada's Fight for Sovereignty Over the Northwest Passage'.

<sup>5</sup>Beveridge et al., 'Interest of Asian shipping companies in navigating the Arctic', Chircop, 'Sustainable Arctic Shipping: Are Current International Rules for Polar Shipping Sufficient?', Fedi and Faury, Fedi et al., 'The impact of the Polar Code on risk mitigation in Arctic waters: a "toolbox" for underwriters?', Fu et al., 'Towards a probabilistic model for predicting ship besetting in ice in Arctic waters', Henriksen, 'The Polar Code: ships in cold water—Arctic issues examined', Lajeunesse, 'A New Mediterranean: Arctic Shipping Prospects for the 21st Century', Lasserre, 'Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector', Lasserre and Pelletier, 'Polar super seaways? Maritime transport in the Arctic: an analysis of shipowners' intentions', PAME, *Arctic Marine Shipping Assessment 2009 Report*.

<sup>6</sup>Germany, 'Requirements for Ships Intended for Polar Waters', 12 April 1991, IMO doc. MSC 59/30/32.

<sup>7</sup>*Guidelines for Ships Operating in Arctic Ice-covered Waters*, IMO Doc MSC/Circ.1056 – MEPC/Circ.399, 23 December 2002 and *Guidelines for Ships Operating in Polar Waters*, IMO Resolution A.1024(26), 2 December 2009, Annexe.

<sup>8</sup>Lalonde and Lasserre, *Droit de la mer et souveraineté sur les passages arctiques*, Bartenstein and Chircop, *Chapter 18: Polar shipping law*.

<sup>9</sup>United Nations Convention on the Law of the Sea, 10 December 1982, 1833 UNTS 396, article 234.

<sup>10</sup>Bartenstein, 'The "Arctic Exception" in the Law of the Sea Convention: A Contribution to Safer Navigation in the Northwest Passage?.'

<sup>11</sup>See Bartenstein and Chircop, note 8.

However, the 2009 Arctic Marine Shipping Assessment (AMSA) report prepared by the Protection of the Arctic Marine Environment (PAME) working group of the Arctic Council rightly highlighted the continued 'dearth of mandatory international standards specifically designed for navigation in the Arctic' and the benefit of uniform standards.<sup>12</sup> It also documented the risks to which ships are exposed as well as the dangers vessels pose to the environment and provided recommendations on three main policy areas, that is, on enhancing Arctic maritime safety; on protecting Arctic people and the environment; and on building Arctic marine infrastructure. The report proved highly influential on the course of IMO negotiations towards global flag state obligations for polar shipping.

A quarter century after the *Exxon Valdez* and *Bahia Paraiso* disasters, these negotiations finally came to a conclusion. The IMO Maritime Safety Committee (MSC) adopted the Polar Code's safety provisions in November 2014, while the IMO Marine Environment Protection Committee (MEPC) adopted the environmental provisions in May 2015. The requirements were made mandatory through amendments to the SOLAS, MARPOL and STCW conventions and the STCW Code and entered into force on 1 January 2017.<sup>13</sup> As stated in its Preamble, the Polar Code aims to 'increase the safety of ships' operation and mitigate the impact on the people and environment in the remote, vulnerable and potentially harsh polar waters'.<sup>14</sup>

Although the Polar Code provides uniform requirements to be imposed upon vessels engaged in polar shipping by their respective flag State, Arctic coastal States, such as Canada and Russia, may still impose their own regulations on international navigation off their coasts under Article 234. Canada recently overhauled its Arctic shipping regulations with the aim to transpose the international requirements into domestic law and to modernise its pre-existing shipping regime.<sup>15</sup> Apart from a few exceptions, the new Canadian regulatory regime is aligned with the Polar Code.<sup>16</sup> Russia made some, but much less comprehensive changes to its domestic law.<sup>17</sup>

Although the main responsibility for compliance of the vessel is borne by its flag State,<sup>18</sup> practical implementation of the Polar Code and coastal State requirements rests ultimately with the shipping companies. The recent regulatory changes therefore raise a number of questions regarding shipping companies' perceptions of the new legal environment and its impact on their (potential) operations. This paper aims to take stock of the perceived operational advantages and challenges associated with the implementation of the Polar Code, awareness and knowledge of the new Canadian regulations and their perceived consistency with the Polar Code as well as the shipping sector's assessment of the overall relevance of the Polar Code for safe Arctic navigation.

<sup>12</sup>PAME, p. 50–69, in particular at p. 67.

<sup>13</sup>See note 1. The Polar Code entered into force following the tacit acceptance procedure.

<sup>14</sup>Polar Code, Preamble, note 1.

<sup>15</sup>Arctic Shipping Safety and Pollution Prevention Regulations, CRC, c 354 [ASSPPR].

<sup>16</sup>Bartenstein, 'Between the Polar Code and Article 234: The Balance in Canada's Arctic Shipping Safety and Pollution Prevention Regulations'.

<sup>17</sup>For a comparative assessment of these changes, see Bartenstein and Lalonde, *Shipping in the Canadian and Russian Arctic: Domestic legal responses to the Polar Code*.

<sup>18</sup>UNCLOS, see note 9, article 94.

## Literature review

Evolution of maritime traffic and port infrastructure in the Arctic has been the subject of several comprehensive studies,<sup>19</sup> putting the notion of a new maritime highway into perspective.<sup>20</sup> Increase of traffic<sup>21</sup> is far from the drastic growth conjured up by many media. It is mainly fuelled by destination traffic of tankers, bulk carriers and general cargo servicing communities or mining and hydrocarbon exploitation sites.<sup>22</sup>

Several studies highlight the costs of Arctic shipping, such as operational costs in Lasserre<sup>23</sup> and insurance costs in Sarrabezoles et al.<sup>24</sup> Others underscore the risk of navigating in a treacherous, fragile environment<sup>25</sup> with limited rescue infrastructure.<sup>26</sup> A number of studies draw attention to the increased risk of accidents in the Arctic, which is 19 times higher than in other regions, and emphasise the need for specific regulations for safe navigation in these waters.<sup>27</sup> Several studies examine the political, regulatory and legal aspects of the development,<sup>28</sup> implementation and consequences of the Polar Code.<sup>29</sup> Fedi et al.,<sup>30</sup> for example, provide an empirical analysis of the role of the Polar Code for Arctic shipping insurance, framing the Code as a 'toolbox' for operational risk management. Sun and Beckman discuss the development of the Polar Code at the IMO and explore its relationship with UNCLOS and Canadian and Russian regulations on Arctic shipping.<sup>31</sup> Kirchner presents a critical view of the Polar Code's provisions on human safety.<sup>32</sup>

As mentioned multiple times in the literature, the objective of an internationally binding Polar Code was to provide a specialised set of uniform minimum standards for Arctic and Antarctic shipping with respect to issues of safety of navigation, discharge of pollutants and emergency preparedness.<sup>33</sup>

As for the shortcomings of the Polar Code, it has been noted that the lack of infrastructure and internet connectivity due to limited satellite coverage remains a

<sup>19</sup> Dalaklis et al., *The future of Arctic shipping business and the positive influence of the Polar Code*, Furuichi and Otsuka, 'Examining quick delivery at an affordable cost by the NSR/SCR-combined shipping in the age of Mega-ships', Jensen, Khon et al., 'Perspectives of Northern Sea Route and Northwest Passage in the twenty-first century', Lasserre and Faury, *Arctic Shipping: Climate Change, Commercial Traffic and Port Development*, PAME.

<sup>20</sup> Beveridge et al, Lasserre, -, "Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector" [Transport. Res. Part A Pol. Pract. 66 (2014) 144–161]: A rejoinder', Leppälä et al., *Challenges in Arctic Navigation: the User Perspective*.

<sup>21</sup> Dawson, *Arctic Shipping: Future Prospects and Ocean Governance*, Lasserre, 'La navigation dans l'Arctique 2019: l'épreuve de la réalité'.

<sup>22</sup> -, 'Navigation arctique: Renforcement du trafic de destination'.

<sup>23</sup> -, 'Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector'.

<sup>24</sup> Sarrabezoles et al., 'Arctic shipping insurance: towards a harmonisation of practices and costs?'

<sup>25</sup> Dalaklis et al, Emmerson and Lahn, *Arctic Opening: Opportunity and Risk in the High North*, Lam and Lassa, 'Risk assessment framework for exposure of cargo and ports to natural hazards and climate extremes'.

<sup>26</sup> Kum and Sahin, 'A root cause analysis for Arctic Marine accidents from 1993 to 2011'.

<sup>27</sup> AGCS, *Safety and Shipping Review*, Fedi et al, Fu et al, Kum and Sahin, Loughnane et al., 'Arctic tanker risk analysis project', Tikka et al., 'Tanker design considerations for safety and environmental protection of Arctic waters: Learning from past experience'.

<sup>28</sup> Bai, 'The IMO Polar Code: the emerging rules of Arctic shipping governance', Bognar, 'Russia and the polar marine environment: The negotiation of the environmental protection measures of the mandatory Polar Code', Brigham, 'An international polar navigation code for the twenty-first century', Jensen, Kikkert.

<sup>29</sup> Fedi and Faury, Henriksen, Scassola, 'An International Polar Code of Navigation: Consequences and Opportunities for the Arctic', Sun and Beckman, *The Development of the Polar Code and Challenges to Its Implementation*.

<sup>30</sup> Fedi et al.

<sup>31</sup> Sun and Beckman.

<sup>32</sup> Kirchner, 'Beyond the polar code: enhancing seafarer safety along the Northern sea route'.

<sup>33</sup> Dalaklis et al, Sun and Beckman, Fedi, *The Polar Code (r)evolution? Arctic shipping law: from atomised legislations to integrated regulatory framework*, Fedi et al, Fedi and Faury, Scassola, Bartenstein and Chircop.

major security challenge that is not sufficiently taken into account.<sup>34</sup> It has further been stressed that the Polar Code only applies to ships engaged in an international voyage in polar waters.<sup>35</sup> The fact that it only applies to vessels subject to the SOLAS and MARPOL conventions and that State and fishing vessels as well as pleasure boats are exempted has also been criticised, considering the significant share of the two latter categories in polar shipping.<sup>36</sup> The geographical scope of application of the Polar Code to the Arctic Ocean, excluding, as shown in [Figure 1](#), the Greenland Sea, the Norwegian Sea, the South Barents Sea, the waters surrounding Iceland and the Baltic Sea, has been questioned given the increase of drifting ice in these waters.<sup>37</sup> Other authors voiced the opinion that the Polar Code is not strict and comprehensive enough to ensure adequate shipping safety, as a number of more complex issues had to be put aside to gain support from the flag states.<sup>38</sup> Dawson, in this regard, argues that the consensus-based negotiations led the Polar Code to be ‘watered down to the lowest common denominator’.<sup>39</sup> Other authors also questioned the scope of the Polar Code and note that its enforceability may be problematic despite its mandatory character.<sup>40</sup>

Canada’s new regulatory regime applying to ships navigating in its Arctic waters and its decision to maintain some of its stricter pre-existing rules and standards have been analysed in depth, as has been Russia’s decision to adopt only minor changes to its regime.<sup>41</sup> Bogнар-Lahr concludes that both States sought to protect their domestic regimes during the Polar Code negotiations and used the Polar Code, as she posits, to buttress their international legal basis.<sup>42</sup> Several recent studies examine how the Polar Code has been implemented by the five Arctic coastal states, such as Chircop and Czarski.<sup>43</sup> Others only focus on Russia’s implementation of the Polar Code, such as Todorov, who analyses its shortcomings from a Russian perspective.<sup>44</sup> Vylegzhanin *et al* focus on the NSR and the interaction between Russian and international law, examining the current legal regime of the passage.<sup>45</sup> In two different studies, Bartenstein and Fraser analyse how Canada transposed the

<sup>34</sup>Brigham, *The Changing Maritime Arctic and New Marine Operations*, Browning, *What Does the Polar Code Mean for Arctic Ship Monitoring?*.

<sup>35</sup>Sun and Beckman.

<sup>36</sup>Excluded from the regulation are warships and troopships, cargo ships of less than 500 tons gross tonnage, ships not propelled by mechanical means, wooden ships of primitive build, pleasure yachts not engaged in trade and fishing vessels (SOLAS, Chapter I – General Provisions – Part A – Application, Definitions). Ibid.

<sup>37</sup>‘In the South, all waters south of 60 ° S are covered, while the geographical scope is more limited in the Arctic. There the southern limit of the Polar Code in principle also follows 60 ° N, with the exceptions of a series of lines from 58 ° N 42 ° W (south of Cape Farewell), between Iceland and Greenland, roughly along Jan Mayen and Bjørnøya to the Russian cape of Kanin Nos, about 200 nautical miles east of Murmansk [...] arguably because they benefit from warmer temperatures due to the Gulf Stream’ Kirchner, 367.

<sup>38</sup>Snider, *A mandatory Polar Code – How does it affect shipping?*

<sup>39</sup>Dawson, 489.

<sup>40</sup>Ghosh and Rubly, ‘The emergence of Arctic shipping: issues, threats, costs, and risk-mitigating strategies of the Polar Code’, Wanerman, ‘Freezing out noncompliant ships: why the Arctic Council must enforce the Polar Code’.

<sup>41</sup>Bartenstein, ‘Between the Polar Code and Article 234: The Balance in Canada’s Arctic Shipping Safety and Pollution Prevention Regulations’, Bartenstein and Lalonde, Chircop *et al.*, ‘Canada’s implementation of the Polar Code’, Roach, *The Polar Code and Its Adequacy*, Sun and Beckman.

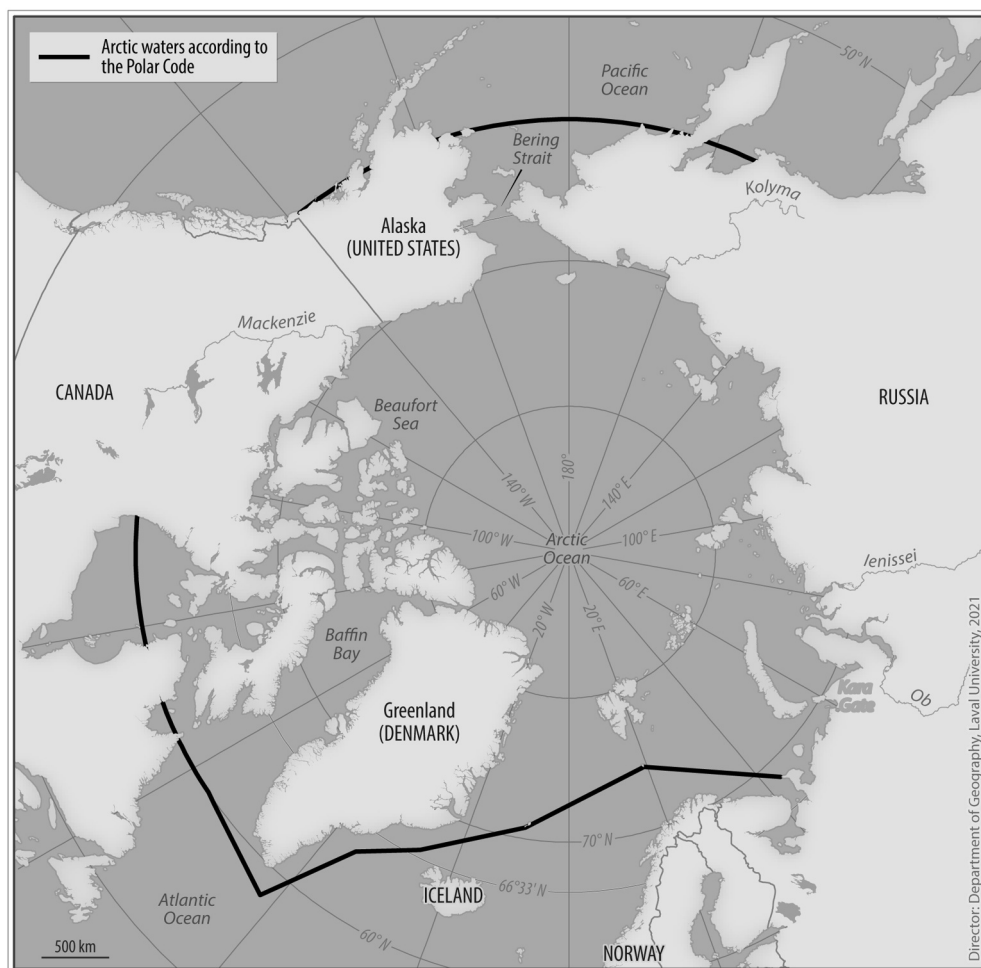
<sup>42</sup>Bognar, ‘Russian Proposals on the Polar Code: Contributing to Common Rules or Furthering State Interests?’, Bognar-Lahr, ‘In the Same Boat? A Comparative Analysis of the Approaches of Russia and Canada in the Negotiation of the IMO’s Mandatory Polar Code’.

<sup>43</sup>Chircop and Czarski, ‘Polar Code implementation in the Arctic Five: has harmonisation of national legislation recommended by AMSA been achieved?’.

<sup>44</sup>Todorov, ‘Coping with deficiencies in the Polar Code: a Russian perspective’, – .

<sup>45</sup>Vylegzhanin *et al.*, ‘Navigation in the Northern Sea Route: interaction of Russian and international applicable law’, – .





**Figure 1.** Extent of Arctic waters as defined in SOLAS regulations XIV/1.2 and XIV/1.3, respectively, and MARPOL Annex I, regulations 1.11.7 and 46.2; Annex II, regulations 13.8.1 and 21.2; Annex IV, regulations 17.2 and 17.3; and Annex V, regulations 1.14.7 and 13.2. *Source: IMO, MEPC 68/21/Add.1 Annexe 10, page 8.*

Polar Code into domestic law.<sup>46</sup> Perspectives of non-Arctic States have also been investigated, shedding light on a developing interest in Arctic shipping.<sup>47</sup>

## Legal requirements of Arctic navigation

### *The polar code*

Before the entry into force of the Polar Code, Arctic navigation did not take place in a legal vacuum. In fact, a number of international conventions applied to the vessels engaged in

<sup>46</sup>Bartenstein, 'Between the Polar Code and Article 234: The Balance in Canada's Arctic Shipping Safety and Pollution Prevention Regulations', Fraser, *A Change in the Ice Regime: Polar Code Implementation in Canada*

<sup>47</sup>Kobzeva, 'Strategic partnership setting for Sino-Russian cooperation in Arctic shipping', Gao and Erokhin, 'China-Russia collaboration in arctic shipping and maritime engineering', – .

Arctic shipping, including the MARPOL and SOLAS conventions. However, none of these conventions provided requirements to address the specific risks of navigation in ice and cold temperatures. The stated goal of the Polar Code 'is to provide for safe ship operation and the protection of the polar environment by addressing risks present in polar waters and not adequately mitigated by other instruments of the [IMO]'.<sup>48</sup> Its two parts, related respectively to safety of navigation and pollution prevention, are each composed of a set of mandatory and a set of recommendatory provisions.

A particular feature of the Polar Code is the 'Polar Ship Certificate', which vessels operating in polar waters need to carry and which attests compliance with the Polar Code requirements upon assessment of the ship and its crew.<sup>49</sup> It also indicates the vessel's operational capabilities and limitations based on an accepted risk assessment methodology that takes into account the anticipated range of operating conditions and hazards the ship may encounter in the polar waters.<sup>50</sup> One such methodology is the 'Polar Operational Limit Assessment Risk Indexing System' (POLARIS), but others can be used, including the Canadian 'Arctic Ice Regime Shipping System' (AIRSS).<sup>51</sup> Although the certificate can be issued by the flag State, it is usually issued by a classification society recognised by the flag State.<sup>52</sup>

Ships sailing in polar waters are also required to have on board a ship-specific Polar Water Operational Manual (PWOM),<sup>53</sup> a practice-oriented tool designed to support on-board decision-making processes and strongly backed by industry. Shipping companies bear the practical responsibility for implementing the Polar Code in the sense that they need to ensure that the vessel complies with the Polar Code requirements and obtains certification.

### **Canadian regulatory requirements**

In response to the Polar Code, Canada revised its regulatory regime and adopted the Arctic Shipping Safety and Pollution Prevention Regulations (ASSPPR), which entered into force at the end of 2017.<sup>54</sup> The ASSPPR mainly align Canada's domestic law with the Polar Code, but include some 'Canadian modifications'<sup>55</sup> as well. These 'modifications' notably include more stringent discharge restrictions and extend the scope of application of the ASSPPR to smaller vessels that do not fall under the Polar Code requirements. The ASSPPR apply to Canadian-flagged vessels, as intended by the Polar Code.<sup>56</sup> However, a particular feature is that they also apply to foreign vessels navigating in Canadian 'Arctic waters'. This is not problematic as far as they are modelled on the Polar Code. As for the 'modifications', they are arguably covered by Canada's coastal state jurisdiction over ice-covered waters under article 234.<sup>57</sup>

<sup>48</sup>Polar Code, note 1, Introduction, Article 1.

<sup>49</sup>Polar Code, note 1, Part I-A, Regulations 1.3.1 and 1.3.2.

<sup>50</sup>Polar Code, note 1.

<sup>51</sup>Stoddard et al., 'Making sense of Arctic maritime traffic using the Polar Operational Limits Assessment Risk Indexing System (POLARIS)'.

<sup>52</sup>Possibility explicitly provided for by Polar Code, Part I-A, Regulation 1.3.4.

<sup>53</sup>Polar Code note 1, Part I-A, Chapter 2.

<sup>54</sup>See note 15.

<sup>55</sup>Transport Canada, *New Arctic Shipping Safety and Pollution Prevention Regulations*.

<sup>56</sup>Polar Code, note 1, Part I-A, Regulation 1.3.4.

<sup>57</sup>UNCLOS, note 9, article 234. See also Bartenstein, 'Between the Polar Code and Article 234: The Balance in Canada's Arctic Shipping Safety and Pollution Prevention Regulations'.



## Methodology

Research on shipping companies' perceptions of the impact of the Polar Code on their activities is scarce and, to our knowledge, limited to research on the perceived impact of the Polar Code on insurance premiums.<sup>58</sup> This paper seeks to address this gap. It also aims to investigate the perception of the new Canadian regulation. Assessment of shipping companies' awareness is timely as this domestic regulatory change followed on the heels of the adoption of the Polar Code. Also, while Russian regulations are at times criticised by shipping companies for being obscure,<sup>59</sup> better understanding of the perception of Canada's new regulations seems in order.

### Qualitative approach

We adopted a qualitative methodology that was modelled on the second triangulation method described by Denzin.<sup>60</sup> More specifically, we implemented the investigator triangulation, which consists in several evaluators analysing the survey replies following the method of discourse analysis described by Hastings,<sup>61</sup> Miles et al.<sup>62</sup> and Paillé and Muchielli.<sup>63</sup> As a first step, the survey was designed so that it could be sent by email, which provides greatest convenience.<sup>64</sup> The survey (see Appendix 1), designed as a semi-structured interview, includes a series of ten questions. The aim was to receive a set of comparable answers, while allowing respondents to add details or elements, should they feel the need to do so.<sup>65</sup> The survey targeted shipping companies, both active and not active in the Arctic. The objective was to obtain a comprehensive view of the companies' perception of the new regulatory environment.

The concepts used in the survey are very common and understood by all companies, whether or not they operate in the Arctic. They are as follows:

- Seasonal Route Change (appearing in answers to Question 1 and consistent with occasional service): this is a widely used concept in Arctic navigation, both in the literature and within the industry.<sup>66</sup> It refers to the need to adjust shipping routes twice yearly to avoid ice that builds up in winter.
- Destination and transit traffic (Question 2): destination traffic in the Arctic refers to ships calling at an Arctic port or stopping in the Arctic to perform economic activities. Transit traffic refers to ship merely passing from a high seas area to another without stopping at any point.<sup>67</sup>

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<sup>58</sup>Parsons, *Marine Insurance and the Polar Code*.

<sup>59</sup>Lasserre et al., 'Polar seaways? Maritime transport in the Arctic: An analysis of shipowners' intentions II'.

<sup>60</sup>Denzin, *The research act: a theoretical introduction to sociological methods*.

<sup>61</sup>Hastings, *Triangulation*.

<sup>62</sup>Miles et al., *Qualitative data analysis: a methods sourcebook*.

<sup>63</sup>Paillé and Mucchielli, *L'analyse qualitative en sciences humaines et sociales*.

<sup>64</sup>Meho, 'E-mail interviewing in qualitative research: A methodological discussion'.

<sup>65</sup>Arksey and Knight, *Interviewing for Social Scientists*, Baxter and Eyles, 'Evaluating Qualitative Research in Social Geography: Establishing "Rigour" in Interview Analysis', De Vaus, *Surveys in social research*, Hay, *Qualitative research methods in human geography*, McDowell, *Interviewing: Fear and Liking in the Field*.

<sup>66</sup>Lasserre, *Arctic Shipping: A Contrasted Expansion of a Largely Destination Market*, Lasserre et al, Lasserre and Pelletier.

<sup>67</sup>Beveridge et al, Bourbonnais and Lasserre, 'Winter shipping in the Canadian Arctic: toward year-round traffic?', Guy and Lasserre, 'Commercial shipping in the Arctic: new perspectives, challenges and regulations'.

All other concepts that appear in this study were introduced by the respondents.

## Survey analysis

We processed the 99 completed questionnaires, using thematic content analysis.<sup>68</sup> We extracted indicators that would allow us to compare companies. Using RQDA,<sup>69</sup> we coded each questionnaire, identifying keywords appearing in the replies, as described by Arksey & Knight.<sup>70</sup> First, a sample of questionnaires was selected for a double-blind analytical coding in order to assess the validity of the coding process. Twenty-one surveys (around 20%) were therefore analysed by two separate coders. We then calculated the inter-coder agreement rate with a result of 0,91 of agreement between coders. This agreement rate does not account for agreement that could occur by chance between two coders.<sup>71</sup> To take into account this possibility, we calculated the inter-coder reliability coefficient, using Krippendorff's alpha method.<sup>72</sup> In our sample, 104 response elements were coded by one or both coders. We calculated an  $\alpha$  of 0,807. It is considered that inter-rater agreement should be greater than 0,8 and a coefficient should be greater than 0,7.<sup>73</sup> We were therefore able move on to the next step of our analysis and proceeded to the coding of the entire set of questionnaires.

## Results

### Interest in the Arctic

We solicited a total of 236 shipping companies in North America, Europe and Asia. 99 of them agreed to reply and participate in our study. They are distributed as seen on Figure 2:

Respondents were selected with regard to the position they hold in their company: while we favoured operations executives, we were sometimes redirected to another respondent within the company. Companies were targeted regardless of whether they were active in the Arctic as long as they were active companies. We used and updated a database of shipping companies developed for previous research.<sup>74</sup> As few companies are active in Arctic shipping, the majority of respondents do not operate in the Arctic and often do not intend



**Figure 2.** Geographical distribution of answers received

<sup>68</sup>Krippendorff, *Content analysis: an introduction to its methodology*, Miles et al, Paillé and Mucchielli.

<sup>69</sup>Huang, *RQDA R-based Qualitative Data Analysis. R package version 0.3–1*.

<sup>70</sup>Arksey and Knight.

<sup>71</sup>Cho, *Intercoder Reliability*.

<sup>72</sup>Krippendorff, 'Computing Krippendorff's Alpha-Reliability', –, 'Estimating the Reliability, Systematic Error and Random Error of Interval Data', –, 'Reliability in Content Analysis: Some Common Misconceptions and Recommendations', –, *Content analysis: an introduction to its methodology*.

<sup>73</sup>Lombard et al., 'Content Analysis in Mass Communication: Assessment and Reporting of Intercoder Reliability'.

<sup>74</sup>Lasserre et al, Lasserre and Pelletier.



**Figure 3.** Breakdown of company activity in the Arctic among respondents.

to do so. Company activity in the Arctic among respondents breaks down as indicated on Figure 3:

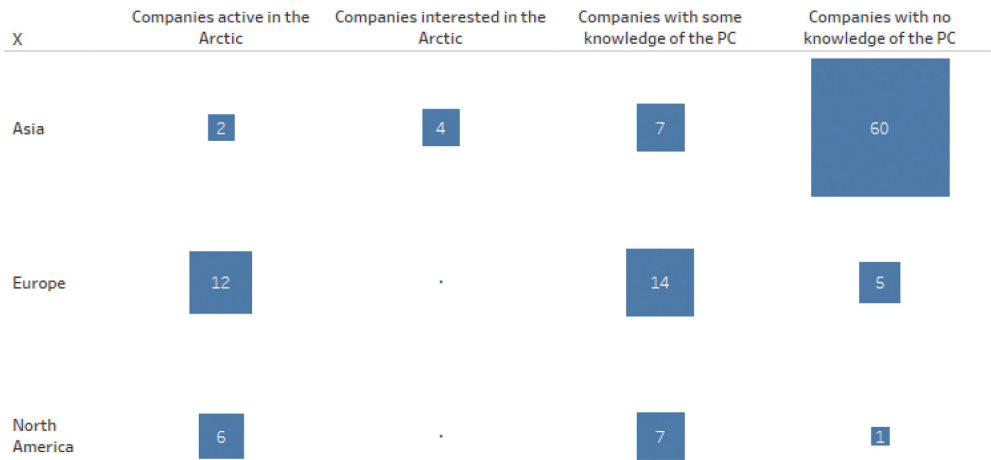
As the most detailed answers were provided by companies active in the Arctic, they form the core of the analysis.

*Knowledge of the Polar Code*

Of the 99 companies that answered the questionnaire, 28 knew of the Polar Code, to various degrees. It is worth noting that a few companies not active in the Arctic had some, albeit rather superficial, knowledge. Surprisingly, one respondent from a company active in the Arctic region had no knowledge of the Polar Code. Another respondent referred to his company’s irregular activity in the Arctic and eluded the question of whether he knew of the Polar Code.

In our sample, knowledge of the Polar Code can be summarised as shown on Figure 4:

Several Asian companies replied, but very few knew of the Polar Code. Most respondents from Asia were not interested in developing an activity in the Arctic and did not answer any questions regarding their knowledge of the Polar Code (questions beyond question 4, see appendix 1). By contrast, most European and North American companies that responded to the survey were active in the region and knew of the Polar Code. Those not active in the region simply ignored our survey.



**Figure 4.** Knowledge of the Polar Code

## Perception of the Polar code

Almost all companies active in the Arctic had some knowledge of the Polar Code and were able to answer some questions. To gain better understanding of their perception of the Polar Code, two questions centred on the advantages and challenges related to its implementation (see Annexe 1). Answers are mapped in Figure 5.

These topics were most mentioned by respondents, albeit with varying frequency as displayed below. They allow for a first picture of the perception of the Polar Code to emerge. The following figure presents the recurrence of each of the mapped topics. Figure 6a shows the number of questionnaires associated with each code, while figure 6b presents the recurrence of each code.

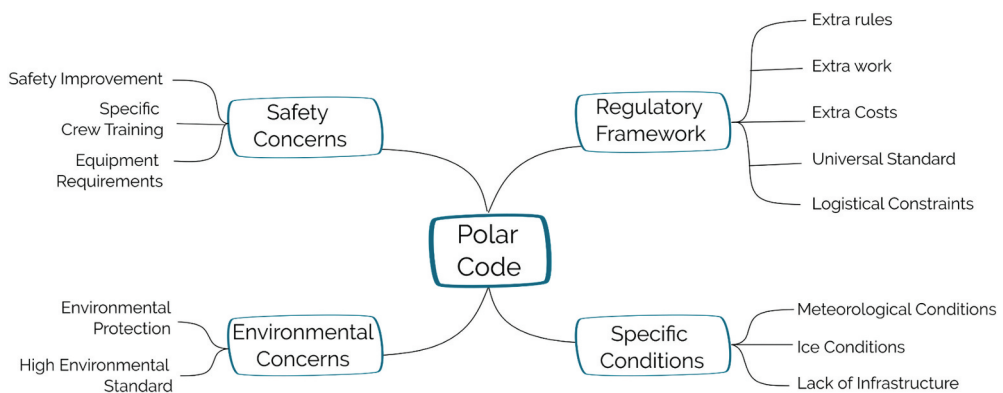


Figure 5. Features most often associated with the Polar Code.

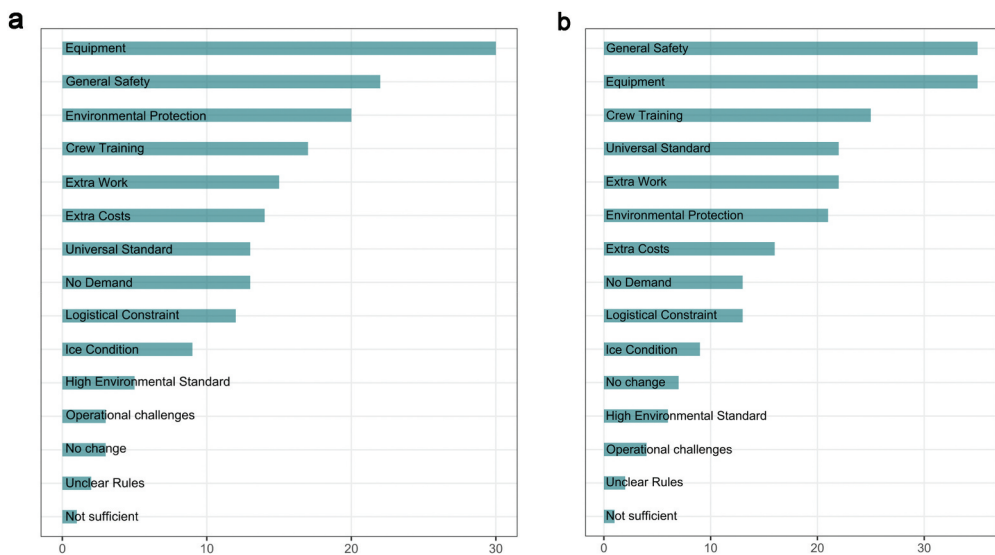


Figure 6. Number of questionnaires associated with each code (a). Recurrence of each code (b).

Fig 6a indicates the number of questionnaires in which each code appears at least once. As a code can appear several times in one questionnaire, fig 6b indicates the recurrence of each code across all questionnaires. For example, the sense that the Polar Code improves the general safety of navigating in the region was mentioned by 22 respondents (fig 6a). However, this code was usually associated with several other codes (see fig. 7 below) and therefore appears 35 times in total in the questionnaires (fig 6b).

As could be expected, given that they figure prominently in the Polar Code, safety regulations, in particular those related to equipment and crew training, tend to attract most attention. Regulations related to operation in polar waters, for their part, are far less frequently mentioned. An explanation may be that most companies with knowledge of the Polar Code were already active in the region when it came into force and had no or only minor adjustments to make. Indeed as shown in fig. 6a, a few companies mentioned

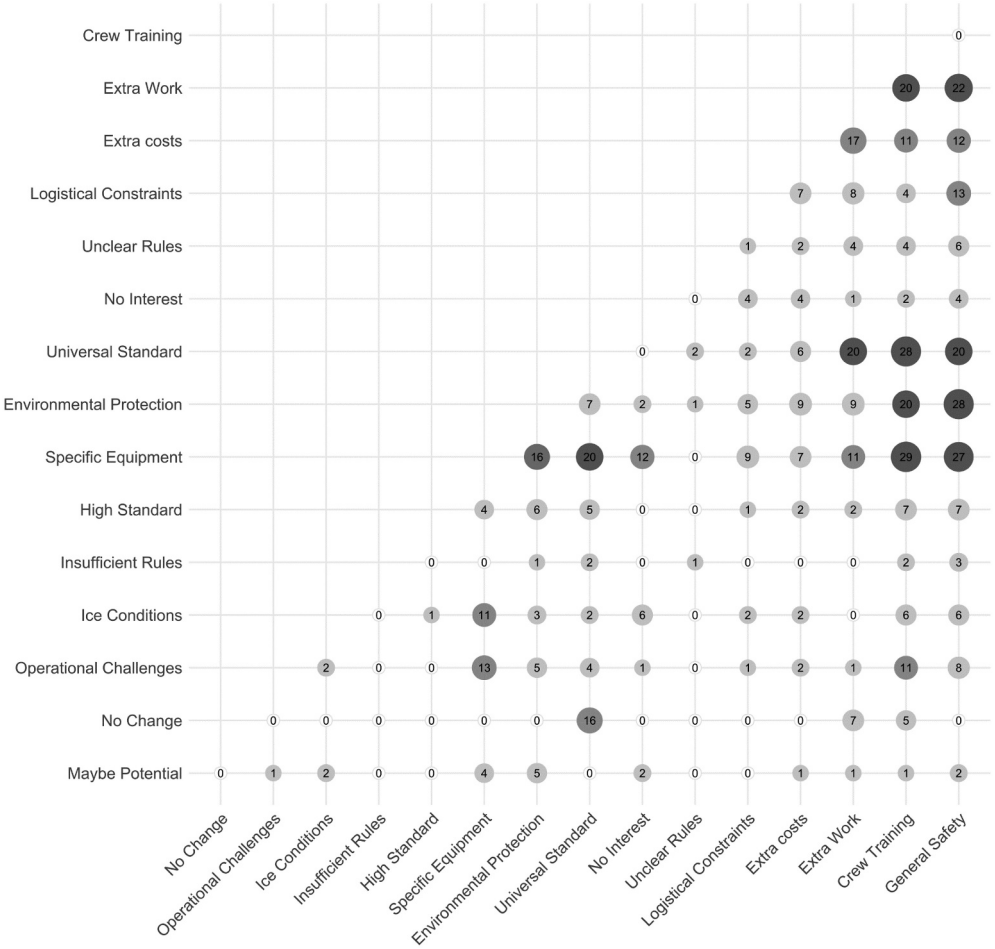


Figure 7. Codes Co-occurrences

that in practical terms, the Polar Code did not really require changes in their practice ('No change').

After this first phase, we added another layer to the analysis and examined how codes were associated with each other. To bring out the most common associations, we performed a cross-analysis of the codes, summarised in [fig. 7](#).

This figure shows how codes were associated with one another. As expected, the frequency of each code is slightly different from what appears in [fig. 6b](#), as some codes are associated with several others. Every co-occurrence is listed. For instance, the issue of environmental protection is associated 20 times with the question of crew training and 28 times with concerns about general safety. Yet, the code 'environmental protection' did not appear 48 times in the questionnaires, as it was sometimes simultaneously associated with both the training and the safety codes. The establishment of a 'universal standard' by the Polar Code is another good example. It was mentioned very often by interviewees, suggesting approval of the Polar Code's standard-setting. Respondents often provided additional details and as a cross-cutting issue it is linked to every main topic, as can be seen in [fig. 7](#). Technical aspects of the Polar Code are very often associated with one another: companies with knowledge of the Polar Code provided more answers, and with a higher level of detail, resulting in more co-occurrences. Arguably, these requirements are perceived as highly interconnected.

The following section will further explore the cross-analysis, focusing in particular on four issues that stand out, namely environmental protection, safety, operational challenges and the fact that the Polar Code provides a uniform regulatory regime.

### **Theme 1 – Environmental concerns/protection**

*Environmental protection is an important goal of the Polar Code.* It is mentioned by a vast majority of respondents. Of the 28 companies with knowledge of the Polar Code – whether they were active in the Arctic or not – 21 mentioned protection of the environment as one of the priorities of the Polar Code, if not as the foremost priority (see [fig. 6a](#)). Interestingly, for companies not operating in the Arctic but with knowledge of the Polar Code, this is predominantly the only feature mentioned:

"The main feature is to protect the sensitive Polar environment by applying strict regulations for the shipping taking place in the region".<sup>75</sup>

As expected, companies active in the Arctic and with a deeper knowledge of the Polar Code provided more detailed answers. When asked whether the Polar Code was potentially hampering the development of navigation in the region, no company clearly said so. A few companies not active in the region mention that the Polar Code is an extra barrier to market access. Most often, however, the Polar Code is referred to as a necessary step for the development of navigation and the protection of the sensitive Arctic environment:

"No, not at all. Environment requirement is the global shipping trend. When it applies to Arctic shipping, it is very understandable".<sup>76</sup>

<sup>75</sup>European Company 1, interviewed on February 14 2019.

<sup>76</sup>Asian Company 1, interviewed on May 7, 2019.



One company even indicates that the Polar Code does not go far enough in terms of environmental protection and that it should be strengthened:

“Not at all, it was absolutely protection perceived as a priority necessary. And it does not go far enough (it should have banned vessels to run on HFO in Arctic waters, for example)”.<sup>77</sup>

It is interesting to note that discussion on a ban on heavy fuel oils (HFOs) in the Arctic was underway at the IMO at the time of the interview. It has been debated for almost a decade before the Marine Environment Protection Committee of the IMO adopted in November 2020 the ‘prohibition on the use and carriage for use as fuel of heavy fuel oil by ships in Arctic waters’ starting in 2024.<sup>78</sup>

*Environmental protection perceived as a priority in Canadian Regulations.* Most respondents did not know that new Canadian regulations came into force in December 2017. Among the companies aware of the regulatory change in Canada, most bring up the issue of environmental protection. Some view the new regulations as consistent with the Polar Code:

“The Canadian Shipping Regulations incorporate the Polar Code into Canada’s domestic legislation. Therefore, both sets of rules are consistent”.<sup>79</sup>

The general perception is, however, that they are stricter than the requirements of the Polar Code:

“I think the Canadian regulations are much stricter. The Polar Code is a general basis”.<sup>80</sup>

One company that views the regulations as more stringent appears approving:

“Consistent to a certain degree but the Canadian regulation is more stringent and rightly so”.<sup>81</sup>

Interestingly, companies with no knowledge of the Canadian regulations were actually perplexed to learn they existed:

“I’m not aware that TC are in a process of issuing new legislation. Canada was actually a quite important player when the Polar Code was developed and I am a little puzzled if they are introducing national legislation for the Arctic?”<sup>82</sup>

In short, the importance of environmental protection is raised in a vast majority of replies and underlined as an important feature.

## Theme 2 – safety

The second main feature of the Polar Code related to safety of navigation in polar waters is abundantly mentioned by respondents as well. It covers two main issues: equipment and crew training.

<sup>77</sup>European company 2, Interviewed on 20 February 2018.

<sup>78</sup>Humpert, *IMO Moves Forward with Ban of Arctic HFO But Exempts Some Vessels Until 2029*, IMO Media Center, *Sub-Committee on Pollution Prevention and Response (PPR 7)*, 17–21 February 2020.

<sup>79</sup>European company 3, Interviewed on 12 February 2018.

<sup>80</sup>American company 1, Interviewed on 2 May 2019.

<sup>81</sup>European company 4, Interviewed on 11 February 2019.

<sup>82</sup>European company 5, Interviewed on 21 December 2018.

*Equipment.* As indicated above, according to the Polar Code, all ships must have on board a valid Polar Ship Certificate and the ship's Polar Water Operational Manual. Both requirements were widely mentioned by companies operating in Arctic waters:

"It provides the master on the ship with a clear picture of what the ship has been certified to and are capable of. The Code requires that the shiphull are strengthened if the ship is indented to sail in ice. There are in addition additional requirements for double bottom if the ships are within category A and B".<sup>83</sup>

"Following the regulations of the code a risk assessment for any ship intending to perform activities within the code area will make sure that the human beings onboard, the ship herself together with all technical installations may be operated in a safe manner".<sup>84</sup>

Part I-A chapters 3 to 6 of the Polar Code specify the technical requirements ships must comply with to navigate in polar waters. They cover ship structure and ice class for the ships, stability, watertight and weathertight integrity, and machinery. Respondents mention them abundantly, in more or less detail. It is interesting to note that these requirements were often mentioned as a reason not to engage in Arctic shipping:

"None of our ships are suitable for trading in arctic waters, nor are their sizes used in these areas".<sup>85</sup>

"We don't have suitable ships for that. We only have three LNG ships, between 6000-8000 dwt. Our ships are small and no ice class".<sup>86</sup>

*Crew Training.* The issue of crew training was also mentioned by most interviewees. The Polar Code requires masters, chief mates and officers in charge of navigational watch to receive appropriate basic and specific training (Part I-A, chapter 12). This appears to be well-known, both for companies active in the Arctic and with knowledge of the Polar Code and for companies not active in the region.

"Maintaining a sufficient level of expertise with well-trained crews is one of the future challenges for companies operating in this region".<sup>87</sup>

"Arctic shipping has commercial potential, but we don't have business via there, neither qualified crew for Arctic shipping".<sup>88</sup>

The requirement of specific training for crews operating in polar waters, as the requirement of specific equipment, is very often mentioned by companies not operating in the region as a reason not to engage in Arctic shipping. Companies active in the region often mentioned those requirements as important and necessary but fraught with challenges.

### Theme 3 – operational challenges

For companies not active in the Arctic, operational challenges are related to a general lack of infrastructure, as suggested by this interviewee:

<sup>83</sup>European company 5, Interviewed on 21 December 2018.

<sup>84</sup>European company 6, Interviewed on 30 January 2019

<sup>85</sup>European company 7, Interviewed on 23 February 2018.

<sup>86</sup>Asian company 2, Interviewed on 30 May 2019.

<sup>87</sup>American company 2, interviewed on 14 May 2019.

<sup>88</sup>Asian company 3, interviewed on 21 May 2019.

“Arctic shipping is not a mature shipping route, the infrastructure and emergency aid is poor, the supply and port call service poor as well”.<sup>89</sup>

These companies usually associate regulatory requirements with extra costs, which make it harder for them to enter the market.

As could be expected, companies active in the Arctic present a more granular view of those challenges. Interviewees underline several technical and operational challenges related to the implementation of the Polar Code:

“In general, the Polar Code increases the safety for the Arctic areas, which is a very positive thing. On the other hand, this makes it very tricky for a company with 160 vessels working in a spot and tramp market, to get the vessel quickly mobilized and upgraded for the trade in compliance with the Polar Code. So operational wise, we face more disadvantages ...”.<sup>90</sup>

Two main concerns stand out. First, companies often emphasise that the Polar Code requirements entail additional costs for operating in Arctic water:

“There is however a cost to get the certification, so we need the business to be there before we push the button to certify and order equipment”.<sup>91</sup>

Second, companies insist on the significant amount of extra time and work required to comply with the Polar Code:

“Very difficult and costly to implement for companies without experience in the area”.<sup>92</sup>

“There are an increased amount of documentation and calculations which has to be provided before the Polar Certificate can be issued”.<sup>93</sup>

“Our impression on this new regulation is that we have to apply the certificate now, which takes time”.<sup>94</sup>

In short, complying with the Polar Code costs money and takes time, which may be a barrier for newcomers in the Arctic market and a challenge for companies active in the region.

#### **Theme 4 – ‘universal standard’**

Although the Polar Code is associated with several challenges, it is often also portrayed as beneficial for it sets a ‘universal standard’ for navigation in the region, that is, a uniform set of norms applicable to all flags. As one respondent puts it:

“For shipowners that are already implementing processes and methods to adapt to the polar navigation and were afraid that their competitors would not, the code sets principles to be implemented by everyone”.<sup>95</sup>

This is a critical aspect to note. As the market is gradually developing and opening to new actors, most interviewees underline that such standards are critical to level the field. Several respondents expect the Polar Code to act as a barrier:

<sup>89</sup>Asian company 4, interviewed on 19 May 2019.

<sup>90</sup>European Company 8, interviewed on 5 February 2019.

<sup>91</sup>European company 9, interviewed on 6 February 2019.

<sup>92</sup>European company 3, interviewed on 12 February 2018.

<sup>93</sup>European company 5, interviewed on 21 December 2018.

<sup>94</sup>Asian company 5, interviewed on 5 April 2019.

<sup>95</sup>European company 2, interviewed on 20 February 2018.

“Also, the code stands as a “barrier to entry” for low standard operations companies”.<sup>96</sup>

“Will not hampering navigation but will make it very difficult for outsiders to get into the market”.<sup>97</sup>

Interestingly, one respondent praised the non-political nature of the Polar Code, noting that regulating activities in the Arctic can become highly politicised:

“However clarifies the rules across the whole Arctic and gives another, non-political signal about rules to abide by in the Canadian Arctic, especially as newcomers come by without experience”.<sup>98</sup>

The advantage of a universal set of rules is a recurrent mention and conveys the need for a level playing field for an emerging market, which develops in a complex environment.

## Discussion

The survey provides a number of valuable insights in shipping companies’ perceptions of the new regulatory environment of Arctic shipping brought about by the Polar Code. A brief overview of the key findings will follow.

### *A limited interest in the Arctic market*

In line with literature on the issue,<sup>99</sup> our research confirms a limited interest in developing activities in the Arctic. Main reasons appear to be the costs and logistical difficulties associated with developing activities in the region. The gap between the perception of companies active in the Arctic and of those not active is noteworthy. The former often mention that the Polar Code prompts extra costs and extra work, but they also indicate that it does not require fundamental changes in their established practices. Fig. 7 shows an important co-occurrence of these issues. For companies not active in the region, however, extra costs are considered an additional barrier to enter the market. This tends to confirm suggestions made by some authors that high operating costs limit the access to the Arctic market.<sup>100</sup> As shown in fig. 7, for respondents with no interest in the Arctic market, these additional requirements are often the reason.

### *A highly challenging market*

Another main conclusion is that the Arctic market is perceived as a challenging market for companies, whether they are active in the region or not. Destination

<sup>96</sup>American company 2, interviewed on 14 May 2019.

<sup>97</sup>European company 3, interviewed on 12 February 2018.

<sup>98</sup>American company 1, interviewed on 2 May 2019.

<sup>99</sup>Beveridge et al, Dawson, Lasserre, ‘Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector’, –, “Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector” [Transport. Res. Part A Pol. Pract. 66 (2014) 144–161]: A rejoinder’, Leppälä et al.

<sup>100</sup>Lasserre, ‘Simulations of shipping along Arctic routes: comparison, analysis and economic perspectives’, Sarrazboles et al.

traffic, especially for resource transportation,<sup>101</sup> dominates the relatively closed market. It is often referred to as a niche or particularly specific market, which is highly competitive and difficult to operate in. The fact that the Polar Code sets uniform standards seems to meet with approval. Most respondents insist that the Arctic shipping market is highly challenging and not for amateur ship-owners and that rules need to be strict to ensure safety of navigation and environmental protection. Companies seem to consider such standards an advantage when they are already active in the Arctic. They reinforce the highly specialised nature of the market and therefore limit competition and promise profitable investments. Respondents not active in the region, for their part, see these standards as an extra barrier to enter the market. Given these findings, it would not be surprising to observe only moderate development of Arctic shipping in the short or medium term, as suggested in the literature.<sup>102</sup>

### ***A strong emphasis on safety and environmental protection***

Strong emphasis placed by respondents on ensuring safety confirms the need suggested in the literature for uniform and specific shipping regulations applicable to all polar waters.<sup>103</sup> Many respondents highlight operational challenges associated with navigation in these waters, climate change that would seem to facilitate operations in Arctic waters notwithstanding. The strategic importance of a strong set of rules to ensure safety of navigation and environmental protection is repeatedly underlined. Interestingly, [fig. 7](#) shows that safety is often associated with environmental concerns. It is also worth recalling that one respondent considered the Polar Code requirements not strict enough and in need of strengthening and suggested to ban heavy fuel oils from the region.

### ***Scant knowledge of canadian regulations reflecting poor attractiveness of the northwest passage***

Respondents were mostly unaware of the new Canadian regulations on Arctic shipping, with the exception of Canadian companies and a few foreign companies. Most respondents felt Canadian regulations were stricter than the Polar Code, some approving, one considering they would be an improvement to and consistent with the Polar Code. Rules perceived as stricter than those of the Polar Code could raise the issue of their acceptability, especially to foreign companies. It is, however, likely that they will prove unproblematic in practice. Compared to the Northern Sea Route, the Northwest Passage and Canadian Arctic waters indeed have very limited attractiveness, as reflected in company surveys<sup>104</sup> and traffic statistics.<sup>105</sup>

<sup>101</sup>Beveridge et al, Doyon et al., 'Perceptions et stratégies de l'industrie maritime de vrac relativement à l'ouverture des passages arctiques', Lasserre, *Arctic Shipping: A Contrasted Expansion of a Largely Destinal Market*.

<sup>102</sup>Bourbonnais and Lasserre, Lasserre, *Arctic Shipping: A Contrasted Expansion of a Largely Destinal Market*, Eguiluz et al., 'A quantitative assessment of Arctic shipping in 2010–2014'.

<sup>103</sup>Fedi, Fedi et al.

<sup>104</sup>Lasserre et al.

<sup>105</sup>Bartenstein, *Les pouvoirs du Canada de protéger le milieu marin dans l'archipel arctique*, Lasserre, 'La navigation dans l'Arctique 2019: l'épreuve de la réalité', Lasserre and Faury.

## Conclusion

The survey on the perception of the Polar Code and the new regulation adopted in its wake by Canada calls attention to the divide within the shipping industry, with companies active or considering development of services in the Arctic on the one side and shipping companies with no interest in the region on the other side. Among the latter, the majority have little awareness of the content of the Polar Code and consider it a barrier to entry into the niche market. For companies already active or planning to become so and aware of shipping conditions in the Arctic, requirements imposed by the Polar Code appear perfectly warranted and are not questioned. By contrast, few shipping companies are aware of Canada's new shipping regulations applicable to its Arctic waters. Some companies question the regulations' compatibility with the objective of uniform shipping rules in the Arctic, while others support them, considering that they contribute to improving safety by providing stricter rules.

This analysis also indirectly confirms that interest in Arctic shipping remains limited, especially as far as the Canadian Arctic is concerned. Surveyed shipping companies not operating in the Arctic show little interest in the region. They consider Arctic shipping a niche market with limited development possibilities in the short and medium term. Although there is a marked difference between the more developed Russian and the far less developed North-American route, it appears that companies predominantly perceive the general Arctic market as not yet ripe.

While ice-free summers may become a reality in a relatively near future,<sup>106</sup> there is no climate model predicting ice-free winters. Future ice conditions are therefore expected to be very different, but no less hazardous for ships sailing in the Arctic. As a consequence, it is likely that perceptions of the Polar Code will remain similar. Further research may, however, be warranted to investigate how the Polar Code is perceived in light of changing ice conditions.

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## Bibliography

- Allianz, *Safety and Shipping Review*. Munich, 2015. <https://www.agcs.allianz.com/content/dam/onemarketing/agcs/agcs/reports/AGCS-Safety-Shipping-Review-2015.pdf>.
- Arctic Council, *Arctic Marine Shipping Assessment 2009 Report*. Tromsø, 2009. [https://www.pame.is/images/03\\_Projects/AMSA/AMSA\\_2009\\_report/AMSA\\_2009\\_Report\\_2nd\\_print.pdf](https://www.pame.is/images/03_Projects/AMSA/AMSA_2009_report/AMSA_2009_Report_2nd_print.pdf).
- Arctic Monitoring and Assessment Programme (AMAP), *Snow, Water, Ice and Permafrost in the Arctic (SWIPA) 2017*. Oslo, Norway, 2017. <https://www.amap.no/documents/doc/snow-water-ice-and-permafrost-in-the-arctic-swipa-2017/1610>.
- Arksey, H., and P.T. Knight. *Interviewing for Social Scientists*. London: Sage, 1999.

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<sup>106</sup>AMAP, *Snow, Water, Ice and Permafrost in the Arctic (SWIPA) 2017*.



- Bai, J., "The IMO Polar Code: The Emerging Rules of Arctic Shipping Governance," *The International Journal of Marine and Coastal Law* 30, no. 4 (2015): 674–99. doi:[10.1163/15718085-12341376](https://doi.org/10.1163/15718085-12341376).
- Bartenstein, K. "Les pouvoirs du Canada de protéger le milieu marin dans l'archipel arctique." In *Passages et mers arctiques. Géopolitique d'une région en mutation*, ed. F. Lasserre. Québec: Presses de l'Université du Québec, 2010. 269–290.
- Bartenstein, K., "The "Arctic Exception" in the Law of the Sea Convention: A Contribution to Safer Navigation in the Northwest Passage?," *Ocean Development & International Law* 42, no. 1–2 (2011): 22–52. doi:[10.1080/00908320.2011.542104](https://doi.org/10.1080/00908320.2011.542104).
- Bartenstein, K., "Between the Polar Code and Article 234: The Balance in Canada's Arctic Shipping Safety and Pollution Prevention Regulations," *Ocean Development & International Law* 50, no. 4 (2019): 335–62. doi:[10.1080/00908320.2019.1617932](https://doi.org/10.1080/00908320.2019.1617932).
- Bartenstein, K., and A. Chircop. "Chapter 18: Polar Shipping Law." In *Research Handbook on Polar Law*, ed. K.N. Scott and D.L. VanderZwaag. Cheltenham: Edward Elgar Publishing, 2020. 371–390.
- Bartenstein, K., and S. Lalonde. "Shipping in the Canadian and Russian Arctic: Domestic Legal Responses to the Polar Code." In *Shipping in the Arctic: Climate Change, Commercial Traffic and Port Development*, ed. F. Lasserre and O. Faury. New-York: Routledge, 2019. 137–156.
- Baxter, J., and J. Eyles, "Evaluating Qualitative Research in Social Geography: Establishing 'Rigour' in Interview Analysis," *Transactions of the Institute of British Geographers* 22, no. 4 (1997): 505–25. doi:[10.1111/j.0020-2754.1997.00505.x](https://doi.org/10.1111/j.0020-2754.1997.00505.x).
- Beveridge, L., M. Fournier, F. Lasserre, L. Huang, and P.-L. Têtu, "Interest of Asian Shipping Companies in Navigating the Arctic," *Polar Science* 10, no. 3 (2016): 404–14. doi:[10.1016/j.polar.2016.04.004](https://doi.org/10.1016/j.polar.2016.04.004).
- Bognar, D. "Russia and the Polar Marine Environment: The Negotiation of the Environmental Protection Measures of the Mandatory Polar Code." *Review of European, Comparative & International Environmental Law* 27, no. 1 (2018): 35–44. doi:[10.1111/reel.12233](https://doi.org/10.1111/reel.12233).
- Borgerson, S. "Arctic Meltdown: The Economic and Security Implications of Global Warming." *Foreign Affairs* 87, no. 2 (2008): 63–77.
- Borgerson, S. "The Coming Arctic Boom: As the Ice Melts, the Region Heats Up." *Foreign Affairs* 92, no. 4 (2013): 76–89.
- Bourbonnais, P., and F. Lasserre, "Winter Shipping in the Canadian Arctic: Toward Year-round Traffic?," *Polar Geography* 38, no. 1 (2015): 70–88. doi:[10.1080/1088937X.2015.1006298](https://doi.org/10.1080/1088937X.2015.1006298).
- Brigham, L.W. "An International Polar Navigation Code for the Twenty-first Century." *Polar Record* 33, no. 187 (1997): 283–84. doi:[10.1017/S0032247400025377](https://doi.org/10.1017/S0032247400025377).
- Brigham, L.W. "The Emerging International Polar Navigation Code: Bi-polar Relevance?" In *Protecting the Polar Marine Environment: Law and Policy for Pollution Prevention*, ed. D. Vidas. Cambridge: Cambridge University Press, 2000. 244–262.
- Brigham, L.W. "The Changing Maritime Arctic and New Marine Operations." *Governance of Arctic Shipping Balancing Rights and Interests of Arctic States and User States* Chap. 1, ed., R. Beckman, T. Henriksen, K. Dalaker Kraabel, E.J. Molenaar, and A. Roach. Leiden, Nederland: Brill Nijhoff, 2017. 3–23.
- Browning, P., "What Does the Polar Code Mean for Arctic Ship Monitoring?," Exactcare 2015, <http://blog.exactearth.com/blog/polar-code-for-arctic-ship-monitoring>.
- Chircop, A. "Sustainable Arctic Shipping: Are Current International Rules for Polar Shipping Sufficient?" *The Journal of Ocean Technology* 11(3), (2016). 39–51.
- Chircop, A., and M. Czarski, "Polar Code Implementation in the Arctic Five: Has Harmonisation of National Legislation Recommended by AMSA Been Achieved?," *The Polar Journal* 10, no. 2 (2020): 303–21. (accessed 2020/07/02). [10.1080/2154896X.2020.1799614](https://doi.org/10.1080/2154896X.2020.1799614)
- Chircop, A., P. Pamel, and M. Czarski. Canada's Implementation of the Polar Code. *Journal Of International Maritime Law* no. 24(6) (2018): 428–50.
- Cho, Y.I. "Intercoder Reliability". *Encyclopedia of Survey Research Methods*. Thousand Oaks, California: Sage Publishing, 2008. 345.
- Dalaklis, D., E. Baxevani, and P. Siousiouras, "The Future of Arctic Shipping Business and the Positive Influence of the Polar Code," (paper presented at the International Association of Maritime Economists 2016 Conference, Hamburg, Germany, 2016).

- Dawson, J. "Arctic Shipping: Future Prospects and Ocean Governance." In *The Future of Ocean Governance and Capacity Development*, ed. B. Nijhoff. Halifax: International Ocean Institute, 2018. 484–489.
- De Vaus, D.A. *Surveys in Social Research*. 6th ed ed. London: Routledge, 2013.
- Denzin, N.K. *The Research Act: A Theoretical Introduction to Sociological Methods*. New Brunswick [N.J.]: AldineTransaction, 2009.
- Doyon, J.-F., F. Lasserre, P. Pic, P.-L. Têtu, M. Fournier, L. Huang, and L. Beveridge. "Perceptions et stratégies de l'industrie maritime de vrac relativement à l'ouverture des passages arctiques." *Géotransports* 8 (2017): 5–22.
- Eguíluz, V.M., J. Fernández-Gracia, X. Irigoien, and C.M. Duarte, "A Quantitative Assessment of Arctic Shipping in 2010–2014," *Nature* 6, no. 1 (2016): 30682. doi:[10.1038/srep30682](https://doi.org/10.1038/srep30682).
- Fedi, L. "The Polar Code (R)evolution? Arctic Shipping Law: From Atomised Legislations to Integrated Regulatory Framework." *Arctic Shipping, Commercial Traffic and Port Development* Chap. 7, ed., F. Lasserre and O. Faury. London: Routledge, 2019. 117–136.
- Fedi, L., O. Faury, and D. Gritsenko. "The Impact of the Polar Code on Risk Mitigation in Arctic Waters: A "Toolbox" for Underwriters?" *Maritime Policy & Management* 45, no. 4 (2018): 478–94. doi:[10.1080/03088839.2018.1443227](https://doi.org/10.1080/03088839.2018.1443227).
- Fraser, D. "A Change in the Ice Regime: Polar Code Implementation in Canada." In *Governance of Arctic Shipping*, ed. A. Chircop, F. Goerlandt, C. Aporta, and R. Pelot. Cham: Springer, 2020. 285–300.
- Fu, S., D. Zhang, J. Montewka, X. Yan, and E. Zio. "Towards a Probabilistic Model for Predicting Ship Besetting in Ice in Arctic Waters." *Reliability Engineering & System Safety* 155 (2016): 124–36. doi:[10.1016/j.res.2016.06.010](https://doi.org/10.1016/j.res.2016.06.010).
- Furuichi, M., and N. Otsuka, "Examining Quick Delivery at an Affordable Cost by the NSR/SCR-combined Shipping in the Age of Mega-ships," *Maritime Policy & Management: The Flagship Journal of International Shipping and Port Research* 45, no. 8 (2018): 1057–77. doi:[10.1080/03088839.2018.1473656](https://doi.org/10.1080/03088839.2018.1473656).
- Gao, T., and V. Erokhin, "China-Russia Collaboration in Arctic Shipping and Maritime Engineering," *The Polar Journal* 10, no. 2 (2020): 353–74. (accessed 2020/07/02). [10.1080/2154896X.2020.1799612](https://doi.org/10.1080/2154896X.2020.1799612)
- Ghosh, S., and C. Rubly. "The Emergence of Arctic Shipping: Issues, Threats, Costs, and Risk-mitigating Strategies of the Polar Code." *Australian Journal of Maritime & Ocean Affairs* 7, no. 3 (2015): 171–82. doi:[10.1080/18366503.2015.1093695](https://doi.org/10.1080/18366503.2015.1093695).
- Guy, E., and F. Lasserre, "Commercial Shipping in the Arctic: New Perspectives, Challenges and Regulations," *Polar Record* 52, no. 3 (2016): 294–304. doi:[10.1017/S0032247415001011](https://doi.org/10.1017/S0032247415001011).
- Hastings, S.L. "Triangulation." In *Encyclopedia of Research Design*, ed. N.J. Salkind. Thousand Oaks: SAGE Publications, 2012. 1538–1540.
- Hay, I. *Qualitative Research Methods in Human Geography*. Fourth edition ed ed. Don Mills, Ontario: Oxford University Press, 2016.
- Henriksen, T., "The Polar Code: Ships in Cold water–Arctic Issues Examined," In *CMI Yearbook*, 2014, 332–44. K.G. Jebsen Centre for the Law of the Sea, Faculty of Law, University of Tromsø.
- Howard, R. *The Arctic Gold Rush the New Race for Tomorrow's Natural Resources*. London: Continuum, 2009.
- Huang, R., "RQDA R-based Qualitative Data Analysis. R Package Version 0.3-1" (2018).
- Humpert, M. *IMO Moves Forward with Ban of Arctic HFO but Exempts Some Vessels until 2029*. High North News. February 24 2020. <https://www.highnorthnews.com/en/imo-moves-forward-ban-arctic-hfo-exempts-some-vessels-until-2029>
- IMO, "International Code of Safety for Ships Operating in Polar Waters (Polar Code)," *Resolution MSC.385(94)*, IMO (London: 2017).
- IMO Media Center, "Sub-Committee on Pollution Prevention and Response (PPR 7), 17-21 February 2020," 2020, <http://www.imo.org/en/MediaCentre/MeetingSummaries/PPR/Pages/PPR-7th-Session.aspx>.
- Jensen, Ø., "Arctic Shipping Guidelines: Towards a Legal Regime for Navigation Safety and Environmental Protection?," *Polar Record* 44, no. 2 (2008): 107–14. doi:[10.1017/S0032247407007127](https://doi.org/10.1017/S0032247407007127).

- Khon, V., I. Mokhov, M. Latif, V. Semenov, and W. Park, "Perspectives of Northern Sea Route and Northwest Passage in the Twenty-first Century," *Climatic Change* 100, no. 3–4 (2010): 757–68. doi:[10.1007/s10584-009-9683-2](https://doi.org/10.1007/s10584-009-9683-2).
- Kikkert, P. "Promoting National Interests and Fostering Cooperation: Canada and the Development of a Polar Code." *Journal of Maritime Law and Commerce* 43, no. 3 (2012): 319–34.
- Kirchner, S. "Beyond the Polar Code: Enhancing Seafarer Safety along the Northern Sea Route." *Journal of the Siberian Federal University* 3, no. 11 (2018): 365–73.
- Kobzeva, M., "Strategic Partnership Setting for Sino-Russian Cooperation in Arctic Shipping," *The Polar Journal* 10, no. 2 (2020): 334–52. (accessed 2020/07/02). [10.1080/2154896X.2020.1810956](https://doi.org/10.1080/2154896X.2020.1810956)
- Krippendorff, K., "Estimating the Reliability, Systematic Error and Random Error of Interval Data," *Educational and Psychological Measurement* 30, no. 1 (1970): 61–70. (accessed 1970/04/01) [10.1177/001316447003000105](https://doi.org/10.1177/001316447003000105)
- Krippendorff, K., "Reliability in Content Analysis: Some Common Misconceptions and Recommendations," *Human Communication Research* 30, no. 3 (2006): 411–33. doi:[10.1111/j.1468-2958.2004.tb00738.x](https://doi.org/10.1111/j.1468-2958.2004.tb00738.x).
- Krippendorff, K. "Computing Krippendorff's Alpha-Reliability." *University of Pennsylvania Departmental Papers (ASC)* (2011). p. 12.
- Krippendorff, K. *Content Analysis: An Introduction to Its Methodology*. Third edition. ed ed. Los Angeles: Sage, 2013.
- Kum, S., and B. Sahin. "A Root Cause Analysis for Arctic Marine Accidents from 1993 to 2011." *Safety Science* 74 (2015): 206–20. doi:[10.1016/j.ssci.2014.12.010](https://doi.org/10.1016/j.ssci.2014.12.010).
- Lajeunesse, A. "A New Mediterranean: Arctic Shipping Prospects for the 21st Century." *Journal of Maritime Law and Commerce* 43, no. 4 (2012): 521–37.
- Lalonde, S., and F. Lasserre. "Droit de la mer et souveraineté sur les passages arctiques." In *Passages et mers arctiques. Géopolitique d'une région en mutation*, ed. F. Lasserre. Québec: Presses de l'Université du Québec, 2010. 245–270.
- Lam, J.S.L., and J.A. Lassa. "Risk Assessment Framework for Exposure of Cargo and Ports to Natural Hazards and Climate Extremes." *Maritime Policy & Management* 44, no. 1 (2017): 1–15. doi:[10.1080/03088839.2016.1245877](https://doi.org/10.1080/03088839.2016.1245877).
- Lasserre, F., "Case Studies of Shipping along Arctic Routes. Analysis and Profitability Perspectives for the Container Sector," *Transportation Research Part A* 66, no. 1 (2014): 144–61. doi:[10.1016/j.tr.2014.05.005](https://doi.org/10.1016/j.tr.2014.05.005).
- Lasserre, F., "Simulations of Shipping along Arctic Routes: Comparison, Analysis and Economic Perspectives," *Polar Record* 51, no. 3 (2015): 239–59. doi:[10.1017/S0032247413000958](https://doi.org/10.1017/S0032247413000958).
- Lasserre, F. "Arctic Shipping: A Contrasted Expansion of A Largely Destinalional Market." In *The Global Arctic Handbook*, ed. M. Finger and L. Heininen. Cham: Springer International Publishing, 2018. 83–100.
- Lasserre, F. "La navigation dans l'Arctique 2019: L'épreuve de la réalité." *L'Année Arctique* 2019 (2019): 18–25.
- Lasserre, F. "Navigation Arctique: Renforcement Du Trafic De Destination." *L'Année Arctique* (2020). 23–33.
- Lasserre, F. "Case Studies of Shipping along Arctic Routes. Analysis and Profitability Perspectives for the Container Sector" [Transport. Res. Part A Pol. Pract. 66 (2014) 144–161]: A Rejoinder." *Transportation Research Part A* 94, no. 2016 703–04. doi: [10.1016/j.tr.2016.09.005](https://doi.org/10.1016/j.tr.2016.09.005).
- Lasserre, F., L. Beveridge, M. Fournier, P.-L. Têtu, and L. Huang. "Polar Seaways? Maritime Transport in the Arctic: An Analysis of Shipowners' Intentions II". *Journal of Transport Geography* 57, 2016. 105–14. [10.1016/j.jtrangeo.2016.10.004](https://doi.org/10.1016/j.jtrangeo.2016.10.004). (accessed 2016/12/01/).
- Lasserre, F., and O. Faury. *Arctic Shipping: Climate Change, Commercial Traffic and Port Development*. London: Routledge, 2019.
- Lasserre, F., and S. Pelletier, "Polar Super Seaways? Maritime Transport in the Arctic: An Analysis of Shipowners' Intentions," *Journal of Transport Geography* 19, no. 6 (2011): 1465–73. (accessed 2011/11/01/). [10.1016/j.jtrangeo.2011.08.006](https://doi.org/10.1016/j.jtrangeo.2011.08.006)

- Leppälä, L., S. Honkala, G. Ferrara, M. Kirkko-Jaakkola, H. Kuusniemi, and H. Miettinen-Bellevergue, "Challenges in Arctic Navigation: The User Perspective," (paper presented at the 2019 European Navigation Conference (ENC), 2019).
- Les principaux enjeux et impacts du Code polaire OMI*. HAL, 2016. <https://ideas.repec.org/p/hal/journal/hal-02065947.html>.
- Lloyd's, Chatham House, *Arctic Opening: Opportunity and Risk in the High North*. London, 2012. <https://www.chathamhouse.org/sites/default/files/publications/0412arctic.pdf>.
- Lombard, M., J. Snyder-Duch, and C.C. Bracken, "Content Analysis in Mass Communication: Assessment and Reporting of Inter-coder Reliability," *Human Communication Research* 28, no. 4 (2002): 587–604. doi:10.1111/j.1468-2958.2002.tb00826.x.
- Loughnane, D., B. Judson, and J. Reid. "Arctic Tanker Risk Analysis Project." *Maritime Policy and Management* 22, no. 1 (1995): 3–12. doi:10.1080/03088839500000028.
- McDowell, L. "Interviewing: Fear and Liking in the Field." In *The SAGE Handbook of Qualitative Geography*, ed. D. DeLyser, S. Herbert, S. Aitken, M. Crang, and L. McDowell. London: SAGE Publications, Inc., 2010. 156–171.
- Meho, L.I., "E-mail Interviewing in Qualitative Research: A Methodological Discussion," *Journal of the American Society for Information Science and Technology* 57, no. 10 (2006): 1284–95. doi:10.1002/asi.20416.
- Miles, M.B., A.M. Huberman, and J. Saldaña. *Qualitative Data Analysis: A Methods Sourcebook*. Third edition ed. Thousand Oaks, California: SAGE Publications, Inc, 2014. <http://ariane.ulaval.ca/cgi-bin/recherche.cgi?qu=a2510992>
- O'Leary, C. "The New Ice Age: The Dawn of Arctic Shipping and Canada's Fight for Sovereignty over the Northwest Passage." *University of Miami Inter-American Law Review* 46, no. 1 (2014): 117.
- Paillé, P., and A. Mucchielli. *L'analyse Qualitative En Sciences Humaines Et Sociales*. Paris: Armand Colin, 2016. <https://www.cairn.info/analyse-qualitative-en-sciences-humaines-et-social-9782200614706.htm>.
- Parsons, J.R., "Marine Insurance and the Polar Code," (paper presented at the Global perspectives in MET: Towards Sustainable, Green and Integrated Maritime Transport, 2017).
- Sarrabezoles, A., F. Lasserre, and Z. Hagouagn'rin, "Arctic Shipping Insurance: Towards a Harmonisation of Practices and Costs?," *Polar Record* 52, no. 4 (2016): 393–98. doi:10.1017/S0032247414000552.
- Scassola, A. "An International Polar Code of Navigation: Consequences and Opportunities for the Arctic." *The Yearbook of Polar Law Online* 5, no. 1 (2013): 271–97. doi:10.1163/22116427-91000126.
- Snider, D., "A Mandatory Polar Code – How Does It Affect Shipping?" Canadian Sailings 2017, <https://canadiansailings.ca/a-mandatory-polar-code-how-does-it-affect-shipping/>
- Stoddard, M.A., L. Etienne, M. Fournier, R. Pelot, and L. Beveridge. "Making Sense of Arctic Maritime Traffic Using the Polar Operational Limits Assessment Risk Indexing System (POLARIS)." *IOP Conference Series: Earth and Environmental Science* 34, 2016. 10.1088/1755-1315/34/1/012034. (accessed 2016/04)
- Sun, Z., and R. Beckman. "The Development of the Polar Code and Challenges to Its Implementation." In *In Global Commons and the Law of the Sea*. Brill Nijhoff, 2018. 303–325.
- Tikka, K., K. Riska, and S. Liu. "Tanker Design Considerations for Safety and Environmental Protection of Arctic Waters: Learning from past Experience." *WMU Journal of Maritime Affairs* 7, no. 1 (2008): 189–204. doi:10.1007/BF03195131.
- Todorov, A., "Coping with Deficiencies in the Polar Code: A Russian Perspective," *The Polar Journal* 10, no. 2 (2020): 322–33. (accessed 2020/07/02) 10.1080/2154896X.2020.1799615
- Transport Canada, "New Arctic Shipping Safety and Pollution Prevention Regulations," (Ottawa: 2018).
- Vylegzhanin, A., I. Bunik, E. Torkunova, and E. Kienko, "Navigation in the Northern Sea Route: Interaction of Russian and International Applicable Law," *The Polar Journal* 10, no. 2 (2020): 285–302. (accessed 2020/07/02) 10.1080/2154896X.2020.1844404
- Wanerman, R.O. "Freezing Out Noncompliant Ships: Why the Arctic Council Must Enforce the Polar Code." *Case Western Reserve Journal of International Law* 47, no. 1 (2015): 429.