

Arctic shipping and China

Governance structure and future developments

Hjalti Þór Hreinsson

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Hjalti Þór Hreinsson

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Advisor
Rachael Lorna Johnstone

Faculty of Law
School of Humanities and Social Sciences
University of Akureyri
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Faculty of Law
School of Humanities and Social Sciences
University of Akureyri
Sólborg, Norðurslóð 2
600 Akureyri

Telephone: 460 8000

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Abstract

The goal of this thesis is to study China's shipping ambitions in the Arctic and the pertinent governing instruments. Arctic shipping poses significant challenges for Arctic governance with increased access to its oceans for shipping companies. Arctic transit is driven by demanding world markets in the West and the rising economic powers of the East, looking for the most cost-efficient routes. Rapid ice melt leads to better access for vessels, but other obstacles await those interested in Arctic shipping as the shortest route might not be the optimum choice. The Arctic shipping routes; the Northwest Passage; the Northern Sea Route; and the Central Arctic Ocean Route, are all at different phases when it comes to access for ships and governance prowess. The main governing bodies of Arctic shipping; UNCLOS; the International Maritime Organization; and Russia's and Canada's coastal state governance, must strike a balance between environmental protection and a feasible route for shipping companies worldwide. This is especially relevant to China's advancing economy and its need to diversify current shipping lanes. China has heightened its interest in the Arctic and now looks for economic opportunities in the North. This thesis brings together three elements of Arctic shipping: its prospect and feasibility, and China's interest and Arctic governance, with speculations whether the Arctic Ocean is a feasible transit route for China.

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Acronyms

ASPPR - Arctic Shipping Pollution Prevention Regulations
AWPPA - Arctic Waters Pollution Prevention Act
CLCS - Commission on the Limits of the Continental Shelf
CNARC - China Nordic Arctic Research Centre
CNOOC - China National Offshore Oil Corporation
COLREGs - Convention on the International Regulations for Preventing Collisions at Sea
COSCO - China Ocean Shipping Group
DNV - Det Norske Veritas (Norwegian company)
dwt – deadweight tonnage
EEZ - Exclusive economic zone
GDP - Gross domestic product
GESAMP - The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
Gtoe - gigatons of oil equivalent
ICJ - International Court of Justice
ILC - The International Law Commission
IMO – International Maritime Organization
IPCC - Intergovernmental Panel on Climate Change (IPCC)
ITF - International Transport Workers Federation
ITLOS - International Tribunal for the Law of the Sea
MARPOL - International Convention for the Prevention of Pollution from Ships
nm – Nautical mile
OWW - Open water vessels
PC - Polar Class
PRIC – Polar Research Institute of China
PSSA - Particularly Sensitive Sea Areas
SOA - State Oceanic Administration
SOLAS - International Convention for the Safety of Life at Sea
STCW - International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
TEU - Twenty-foot equivalent unit (shipping containers)
ULCS - Ultra Large Container Ships
UNCLOS - United Nations Convention on Law of the Sea.
WWF - World Wide Fund for Nature

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Introduction

Most of the global warming observed over the last 50 years is attributed to human activities. The increase in carbon dioxide levels has led to changes in the world climate with multiple effects, including decrease of the Arctic sea ice. It is projected that the ice will continue to shrink during the 21st century.¹ This has led to an old dream coming closer to reality, the possibility of a shorter shipping route between Europe and Asia. It could have significant effects on the world economy as 90% of all international trade is carried on oceans.

In recent years the Arctic sea ice has continued to retreat with the all-time low year being 2012, passing the 2007 record.² Increased media attention given to the Arctic and its potential, periodically trigger news stories generalizing the vast potential of Arctic shipping. Most of them focus primarily on the shortened distance but the spotlight scarcely falls on the field of law and regulatory framework. The writer of this thesis attended a Polar Law program and became aware of how much more there is to Arctic shipping than merely shorter distances.

This observation led to further scrutiny of the media tendencies to headline stories on the distance but neglect deeper research journalism. From personal experience working in the media, knowing how stories are framed and the lack of more meaningful narration it became clear that most headlines were facsimile. Research papers often show the same results, and general public discussions of the topic briefly touch other issues. And people tend to jitter when they hear the words “China” and “Arctic” in the same sentence.

This disclosure led to a series of questions. How much research has been done? What was its focus? Has any research focused on the legal framework? Who had been conducting these researches and what has been

¹ Climate Change 2014: Impacts, Adaptation, and Vulnerability. (2014). A Special Report of Working Group II of the IPCC – Summary for Policymakers.

² Vizcarra, N. (2013). Arctic sea ice reaches lowest extent for 2013. National Snow and Ice Data Center.

the conclusion? How realistic is the Arctic as a future shipping route? In what scenario is it economically viable? To what extent will nature shape the future of Arctic shipping? How realistic is the scenario of regular transits between China and Europe through the Arctic? What are the drivers of China's shipping interest in the Arctic? Is China's interest in the Arctic shipping routes legit? What is China shipping, and where to? How is its trade relationship in Europe? Will that relationships strengthen and lead to increased opportunities for China to use the Arctic shipping routes? Or is it just to show intent as a world power? Is China's interest in the Arctic strongly tied to shipping, or are there other alternative motives? Who else than China would use the shipping routes? Is there much interest in Arctic shipping in general, or are the speculations only a vision of unrealistic alternatives to the shipping industry? How does governance come into play? How is the landscape scenario for shipping overall? Does it relate especially to China? Is China hindered by Arctic governance?

Although each of these questions could be explored much further, this thesis focuses on China and Arctic shipping as a transit route with general cargo, for example containers or hydrocarbons. The term "Arctic shipping" in this thesis is based on this approach. Tourism and cruise ships were not considered as they are specific trips, for example with specialized ships sailing to the North Pole. That kind of traffic will however continue to add to increased shipping activities, as do other means of shipping introduced in the thesis.

China's interest in Arctic shipping is of particular interest. After working with Chinese scientists and officials, witnessing strong devotion to the Arctic and its shipping potential, it is intriguing to explore the issue and develop into a thesis. A visit to China's research station in Ny Alesund, Svalbard, and exploring China's icebreaker, The Snow Dragon, further augmented the interest. As the world's largest energy consumer, China is indeed interested in Arctic exploration – demonstrated by making Iceland the first stop in Chinese Prime Minister Wen Jiabao's 2012 European tour. China does not have an official Arctic policy, which makes analyzing its ambitions more challenging, but vast shipping opportunities and energy resources make the Arctic a lucrative territory.

The most comprehensive international agreement on the world's oceans is the United Nations Convention on the Law of the Sea (UNCLOS)

from 1982, applying to ocean activities worldwide including in the Arctic Ocean. It is curious to speculate whether the current setup of ocean governance is strong enough to regulate future Arctic shipping, especially in the case of non-Arctic states. UNCLOS supports the International Maritime Organization (IMO), referring to it as a “competent international organization” on numerous occasions in its 1982 Conventions, creating a strong collaboration.

This thesis will attempt to come to a conclusion on the research question of how China views the potentials of Arctic shipping and how it relates to the regulatory framework in place.

Much speculation on Arctic shipping has emerged, but research has been lacking. The research has stemmed from different origins, often focusing on general topics but failing to take into account all aspects such as the class of the ship or realistic destinations for transport to and from Asia. Shipping companies also tend to not tend to partake in any research which has been publicly released. Existing research, like the aforementioned media coverage, tends to focus on the shortening of distances but neglects the numerous other aspects that have to be kept in mind. A person without special knowledge of the topic might assume that Arctic shipping routes are opening up very soon and that it is just as any other shipping route. That idea is quite understandable since broad public discussions are few and far between.

This thesis brings together the many aspects needed to estimate how the Arctic shipping routes are seen, with China as the primary example as it seems most interested in utilizing the route and has mechanism to support it. Existing literature tends to focus on one aspect and few thorough assignments and estimates have been conducted with China in mind. As a leading world economy and one of the biggest transport nations, it is a key player in Arctic shipping.

Combining China’s drives for alternative transportation routes for its imports and exports, its need for resource diversification, the regulatory framework and governance in the Arctic as well as future shipping scenarios, this thesis is of importance to ocean governance, Arctic governance, all Arctic states, China, other non-Arctic states interested in shipping, and the global shipping community.

Chapter overview

The thesis is split into four main chapters. The topics are Arctic Shipping, China and Arctic Shipping, Shipping Governance, and it ends with Conclusions and discussions.

The first chapter is *Arctic shipping: Prospects and Threats*. It starts with an overview of the global shipping industry, how it works and what it demands from its shipping routes. It is essential to recognize the needs of the shipping industry to shed light on how it would thrive in the Arctic. It highlights how trade is expected to increase and looks at the potential of three chokepoints of the industry of significance to China and Arctic shipping; the Malacca Strait, the Suez Canal and the Panama Canal. It briefly discusses alternatives to the three routes, but the real alternative and highlight of the chapter are the Arctic shipping routes; the Northwest Passage, the Northern Sea Route, and the Central Arctic Ocean Route.

Each of the three routes are introduced and defined before analyzing the challenges of Arctic shipping. The chapter introduces recent changes in climate and what climate models are projecting for the future. Arctic shipping is closely related to the Arctic sea ice extent and therefore an essential part of the chapter as it would not prosper if it weren't for the Arctic ice melt. It is demonstrated in the Northwest Passage where ice conditions are still not feasible for transits.

The Northern Sea Route is given the most attention in the chapter. The reason is that it is most relevant for Arctic shipping in the near future as ice conditions and regulatory framework are in place for shipping activities. It is also the most relevant route in present times for China. The chapter shows how shipping has grown in the Route and highlights the role Russia hopes it will play, but also shows what problems it faces and how it deals with them.

The Central Ocean Route is also discussed. As the shortest route across the Ocean, and the one outside the Canadian and Russian territories, it could be the best option for future shipping activities. It is seldom discussed in present literature.

Threats to the Arctic environment are also reviewed as many are concerned that increased shipping activities could affect the environment. Arctic pollutants are introduced and pollution from ships analyzed.

Finally, the chapter discusses a survey on the future of Arctic shipping for shipping companies, a case study on the compatibility of the Arctic in 2030 and 2050 and finally a study on the constraints and lack of research for Arctic shipping. The survey is highly relevant and clearly shows the interest in shipping for the main users, the ship-owners. They are the drivers behind Arctic shipping as they control what routes to take to deliver their cargo. Ship-owners must be interested in the Arctic routes for them to gain recognition and be utilized.

The first case study was selected as it makes assumptions to estimate the future Asia-Europe Arctic transit shipping activity in 2030 and 2050. It was a detailed case study which demonstrates the prospects of future transits between Asia and Europe, closely linked to the topic of the thesis.

The final case study was selected to highlight how many unknowns there are concerning Arctic shipping. The study analyzed the impacts of climate change on Arctic transportation and examined with complex climate models the accessibility of the Arctic shipping routes.

The second chapter is *China and Arctic Shipping: Needs and ambitions*. It recognizes China as the primary driver for Arctic shipping. The reasons are manifold, including the significance of China for world trade. China's increased attention to the Arctic is also briefly introduced and how economical prosperity for China is the main reason for its interests in Arctic shipping.

The question if China needs Arctic shipping is also asked, discussed and answered. The chapter shows the main drivers for China's interests and how Chinese shipping companies view the opportunities. The interest of the Chinese commercial sector is highlighted with a case study on the interest of Chinese companies to develop active service along the Arctic waterways. As a primary driver for Arctic shipping, the Chinese shipping companies form the backbone of Arctic shipping in some ways. If Chinese shipping companies were not interested in the route it would significantly hamper the prospects many see for the Routes, especially Russia, which hopes to increase its economic prosperity by developing a strong shipping route.

Finally, China's energy security is introduced and explained how it relates to Arctic shipping. One reason is that China wants to diversify its energy imports for energy sources, mainly coming from the Middle East and Africa. China sees the Arctic as a potential new source for energy imports and has increased its cooperation on Arctic energy matters, for example in Russia and Iceland. If China would make large-scale investments in Arctic energy projects, it could increase China's shipping in the Arctic to fulfill a growing energy demand.

China is also concerned about the Malacca Strait because of political and security reasons. As shipping is expected to increase in the future, the Malacca Strait would need to allow for even more usage, which China fears. China would therefore be interested in utilizing the Arctic as an alternative to the Malacca Strait.

The third chapter is *Governance of Arctic shipping: Balance between feasible routes and a strong regulatory framework*. It highlights the most relevant governance tools for shipping activities in the Arctic.

The chapter starts by introducing the United Nations Convention on Law of the Sea (UNCLOS), which is the most comprehensive legal instrument for the law of the sea, therefore including the Arctic Ocean. It examines the most relevant chapters of UNCLOS for the Arctic and the disagreements over classification of the Northwest Passage and the Northern Sea Route.

UNCLOS allows coastal states to adopt special regulatory frameworks and put constraints on shipping activities. As both Canada and Russia have utilized this option of UNCLOS, the chapter highlights these two most relevant countries for Arctic shipping and how they have adapted to increasing shipping interests. The two countries have adopted different sets of regulations, Canada focuses on environmental protection and looks to limit shipping as much as it can, whilst Russia hopes to open up its route and has established a special administration to govern shipping. Russia's rules are still justified by an Article in UNCLOS which allows for stricter regulations based on environmental protection. The newly established Northern Sea Route Administration is introduced and the regulatory framework it has implanted is highlighted.

Closely linked to UNCLOS is the International Maritime Organization (IMO). It has adopted numerous significant and specified instruments to govern shipping and the most relevant to the Arctic are discussed in the chapter. That includes the IMO's new Polar Code, which will be a new legally binding instrument for Arctic shipping. The Polar Code is anticipated and is welcomed by the shipping industry, and is the closest instrument to a comprehensive shipping convention for the Arctic as of yet. Although UNCLOS is the comprehensive shipping Convention of the Arctic, regulatory framework has been built on its regulations to respond to changes in the Arctic, showing the need for added regulations.

Governance of the Arctic environment is also introduced in the chapter. It is especially relevant for Arctic shipping as concerns grow in relation to increased activities. Environmentalists are especially concerned and demand stronger framework, whilst others would dispute such ideas.

The conclusions and recommendations chapter brings all factors together; facts, economics and prospects in the Arctic for shipping in general, China's ideas for future use, and shipping governance. The chapter also discusses if there is a need for a special treaty for Arctic shipping governance, which has been suggested.

Methodology

This research started with talks to specialists in the field of climate change and sea ice, as it is critical to Arctic shipping. A key question was if and when the Arctic would be ice-free for long periods of time or year-round. After talking to leading experts in Iceland and reading numerous reports, the consistent theme was: We don't know.

After reading numerous online scholarly articles on topics related to Arctic shipping, the law of the sea, and China's interests in the Arctic, it soon became clear that although many articles had been written on China's interests, few came to concise conclusions on what its plans were.

The approach of this thesis was to bring together the main aspects of Arctic shipping, its challenges and opportunities, China's views and aspirations for Arctic shipping, and the governance to develop a complete outlook of the future Arctic shipping scenario.

A wealth of data exists on the topic of the thesis as it is of present interest. However, a great deal of data on China's shipping interest in the Arctic is in Chinese. The research showed lack of research articles and case studies from Chinese scholars in English.

The relevance and credibility of all the sources were considered using criteria that included how current the source was, how it was aligned to the research question, and the credentials of the author. The majority of the sources used were less than five years old. Older references were of great interest and relevance, and still applicable to the topics.

The data for this thesis was first organized through a series of interviews and meetings with individuals from different sectors related to the topic, respectively. The purpose was to identify what research questions are most relevant, and identify gaps in knowledge in Iceland and at the University of Akureyri.

No meeting in the thesis is used directly as a source. However, the meetings all helped with different aspects, for example with getting ideas, discussing methods, structure and content, finding new sources and most

importantly, be inspired by meeting people with passion for the relevant field.

In 2012 the author spent time with Chinese scientists from the Polar Research Institute of China (PRIC) and was inspired by their interests in Iceland and the Arctic. Dr. Huigen Yang, the Director of PRIC, and Dr. Hongqiao Hu, Chief Scientist, were especially helpful with their extensive knowledge. Visiting the Chinese research icebreaker, The Snow Dragon, and the Chinese research station, the Yellow River station in Svalbard, also inspired the author.

In 2013 the author met with several people from the University of Akureyri to discuss ideas, including Ágúst Þór Árnason from the Polar Law Institute, and professor Guðmundur Alfredsson to discuss the topic of governance. The author also met Alyson Bailes, Adjunct Lecturer at the University of Iceland, who lived in China and has extensive knowledge on China-Arctic relation.

Gísli Viggósson, an experienced specialist at the Icelandic Maritime Administration, gave the author information and good ideas about sea ice and Arctic shipping which led to better use of sources.

Gylfi Sigússon, the president/CEO of Eimskip, was helpful with information about the shipping industry in general. He also discussed China's interest in Arctic shipping and cooperation with Cosco.

Joan Nymand Larsen gave the author good points on economics and excellent reading material related to the Arctic and even access to the forthcoming Arctic Human Development Report II, and Egill Þór Níelsson, a visiting scholar at PRIC, gave the author good points on China in the Arctic and Arctic shipping in general.

More perspectives on China were received by visiting the two embassy offices of China in Reykjavík. Zhang Zhirou, working in political affairs gave the author insight to Chinese foreign policy, and the head of the Economic and Commercial Counsellor's Office of China, Guoxiang Xie and Han Li, Third Secretary, provided excellent data and recommendations for Chinese economy and information on the shipping industry.

And the Arctic Council's working group's offices of PAME and CAFF in Akureyri both made excellent comments and recommendations for literature.

Throughout the fall of 2013 and to date the author collected various information sources from online search engines and through other means online, relevant articles on various media and e-mail were used to find and collect data. Frequent visits to the libraries in Akureyri also occurred and search on library websites. Inter-library loans for books were also utilized to gather sources.

Search engines for peer-reviewed articles were the starting point for articles online, and known sources for data were also used, such as websites of organizations and conventions.

Sources for this thesis from the Internet were written by professionals in their fields and published on reliable websites, in referred publications or on professional organization sites. News stories used in the thesis are from esteemed news agencies worldwide.

The data was analyzed in 2014. Data was collected from the sources in relevance to the research question to get to a conclusion from the research.

Librarians at the University of Akureyri Library assisted with the making of references and gave advice on the style used. Help from websites cited by the UNAK Library were exclusively used. With approval of the Faculty of Law footnotes are used to cite sources for better reading.

Literature review

The topic of the thesis cannot rely on one set of literature or documents, but must be approached from various perspectives. Many meetings prior to the actual writing helped extensively with content and sources as mentioned above.

For the shipping chapter a major contributor, both as an inspiring read and as a reliable source, was the Arctic Marine Shipping Assessment (2009). It is a comprehensive assessment, a follow up to the finding of the Arctic Climate Impact Assessment (2004) which stated that reduced sea ice was “very likely to increase marine transport and access to resources.” AMSA contributed to general information on Arctic shipping, the Northwest Passage, and the Northern Sea Route and historical aspects.

Numerous scholars have written about the Arctic shipping routes from different perspectives. Verny & Grigentin (2009) wrote on container shipping in the Northern Sea Route, Moe & Jensen (2010) provided a report on opening of new Arctic shipping routes, the North Meets North report (2006) by the Icelandic Ministry of Foreign affairs spoke on general Arctic shipping and the potential of hub-ports playing a role, (2006). Humpert & Raspotnik (2012) examined the feasibility of the Central Arctic Ocean Route with respect to the continued decline of Arctic sea ice and analyzed the economic potential of the route and its compatibility with existing trade patterns, also connecting Arctic shipping with the global shipping industry, and Lasserre & Pelletier (2011) provided an analysis of ship-owners intentions for maritime transport in the Arctic. The Arctic Risk Report by Lloyds, a leading specialist in insurance contributed to the risk analysis and management of Arctic shipping, whilst also contributing to other sources as a comprehensive report on Arctic issues.

Information from local authorities was also extensively used, for example from the Russian Northern Sea Route Administration, the Panama Canal Authority, the Suez Canal Authority, and respected reports and institutions contributed to sea ice information and climate change, including

the ACIA report, the National Snow and Ice Data Center, and the Intergovernmental Panel on Climate Change.

Many interesting articles on China are, understandably, in Chinese. Many articles in English highlight general Arctic interests but two reports from Linda Jakobsson were profound. *China Prepares for an Ice Free Arctic* (2010), providing an overview of China's scientific, commercial and security interest in the Arctic and outlining China's approach to international politics of the region, and *China's Arctic Aspirations* (2012) - providing insights into thinking among Chinese officials and researchers on China's current and future role in the Arctic.

Several articles discuss China from different aspects. They include Kopra (2013), examining China's interests in context with its overall foreign policy, Gayazova (2013) looking at China's policy steps in relation to UNCLOS and to which degree China's rights in the marine Arctic may be limited by its legislative policies in its coastal waters, Hong (2011), assessing the potential of the new Arctic shipping routes, Humpbert (2013) assessing how realistic the Arctic shipping routes are to China, Alexeeva & Lasserre (2012), reviewing China's growing economic interests, and Xing & Bertelsen (2013), discussing the role of the Arctic in light of the crucial importance of energy and transportation security for continued political stability and economic growth in China. A book on the natural resources (Tian 2007) of China, analyzing present and future challenges, also contributed to the chapter.

The chapter concludes with a case study (Huang, Lessere, Alexeeve, 2013), which looked to what extent Chinese shipping firms are interested in developing active service along the Arctic shipping routes.

The governance chapter is dominated by direct sourcing from official sources, namely UNCLOS, the IMO and its extensive information on its website and through its regulations, the United Nations, Canadian laws and regulations, and laws and regulations from the Russian Northern Sea Route Administration.

The book *International Law of the Sea* (Rothwell & Stephens, 2010) provides for regulation management and governance of the world Oceans and explained the fundamental principles of the law of the sea. It mainly reviews UNCLOS but also overviews general ocean governance. To apply governance to the Arctic, several articles contributed including (Östreng

2012; Molenaar 2009; Vanderzwaag et al 2008; Stokke 2006) as well as books (Byers 2007; Byers 2013).

This thesis therefore brings together the necessary aspects to analyze future Arctic shipping: Climate change projections, to see what access to the Arctic Ocean is likely in the near-, medium-, and long-term; interest of the shipping companies and the economic feasibility of transits through the Arctic compared to other routes; analysis the main drivers of Arctic shipping, focusing on China as the most relevant single country to utilize the route for future transport; the problems arising in the shipping industry with piracy, security, tariffs and other aspects calling for an alternative; and the regulatory framework and laws that govern Arctic shipping.

1 Arctic Shipping: Prospect and Threats

Arctic shipping has gained considerable attention in recent years. The reason is that there lies a shorter route through the Arctic on a shipping route between the East and the West, which is now slowly but surely opening up. As the polar ice melts at an unprecedented speed, an old dream could alter the shipping scenario; a shorter route from Asia to Europe or America. From early explorers this has been a vision which is now becoming a reality with increased access and better technology. But the feasibility has been questioned as more access and a shorter route does not necessarily result in a better route. Numerous aspects have to be taken to consideration before starting a transit between, for example, China and the Netherlands. Although the routes are shorter, the shipping companies must be interested in utilizing the route. If the shipping industry is not interested, there is little to gain, and the Arctic would not be a part of the global shipping network.

Arctic shipping is an alternative in the global shipping network. The existing routes are many, but three will be discussed here; the Suez Canal, the Panama Canal and the Malacca Strait. The Suez Canal has raised its tolls in recent years, and serves almost as a monopoly route for trade between Asia and Europe. An alternative route is around the Cape of Good Hope in South Africa, a much longer route, which can be difficult to navigate. The Suez Canal brings other problems to the shipping industry, including piracy. Pirates have a history of disrupting transport close to the main shipping route to the Suez Canal, for example in the Gulf of Aden. The Panama Canal is relatively small. The possibility of using the Northwest Passage to transit goods between Europe and Asia exists and here the Northwest Passage is also compared to the Panama Canal. In addition an old idea which is becoming a reality is also introduced, the forthcoming Nicaragua Canal.

Arctic shipping has many challenges and many questions are unanswered. That includes when the sea ice will have retreated enough for open water vessels or lightly strengthened ships to transit through various routes. When sea ice conditions will reach that stage, Arctic shipping will become much more feasible than at present times.

Three Arctic shipping routes are introduced, among them the Central Arctic Ocean Route. As the shortest and perhaps the most direct route across the Arctic, it could be the best route for future transits. Natural conditions are much better than in the Northern Sea Route, but it lacks necessary infrastructure and its remoteness is among problems along the Route.

The Northern Sea Route is the route which will have the most access in the 21st century. But it has numerous challenges, on top of sea ice conditions, including narrow straits and the tariffs the Russian government collects for permissions to transit. It looks increasingly likely that the future of Arctic shipping will be mostly destinational, and not trans-Arctic.

Another challenge is the environmental aspect of Arctic shipping. With fragile environment and sea ice in its waters, the prospect of an oil spill in the Arctic is horrendous. Although shipping is the most economical transportation option it creates environmental risks in the Arctic, exponential to increased activities.

1.1 Global shipping operations

Global shipping operations are dependent on three key elements: predictability – the ability to foresee changes in recent future to take important decisions, punctuality – the ability to follow a detailed timetable, and economies-of-scale – the cost advantage that arises with increased output of a product. The cargo is dominated by transportation of raw materials, tanker trade and other dry cargo, including containerized cargo. Seaborne trade accounts for 90% of world trade.³

The majority of cargo ships operate on regular schedules of transits. Profitability can only be assured with large-scale shipping based on stable and predictable year round operations. The shipping industry operates on

³ Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route.

just-in-time cargo deliveries – where the cargo is delivered immediately before it ships to minimize storage costs.⁴

The world shipping industry uses traditional, fixed routes that are carefully chosen for commercial and geographical reason. Maritime routes have changed little since the Suez and Panama canals were opened in 1869 and 1914, respectively. Global shipping routes follow economic globalization, reflecting mobility of humans and merchandise across natural and national borders.

The trend toward further globalization of trade and production has accelerated since the 1990s. The evolution of the world's commerce relies heavily on efficient, fast and secure transportation to reduce costs and minimize risks and losses. More than seven billion tons of merchandise were transported worldwide in 2007. About 80% was carried on commercial shipping lines, or 5.6 billion tons.

Shipping containers changed the transportation scenarios greatly in the 1960s as they allowed for the transformation of moving bulk goods to standardized packaging of goods. The uniformity of handling the containers has lowered transportation costs.

The maritime routes linking the planet's principal industrial center, Asia, to the powerful consumers market of Europe and N-America are crucial. The Europe-Asia axis is handling a volume of around 30 million twenty-foot equivalent units (TEU) per year.

Shipping companies want to maximize their gains, and try to balance the gains obtained at sea by employing large vessels against the additional port fees incurred by such a strategy. Larger ships call for larger ports. Companies are also investing in faster ships that pollute less.⁵

China has responded rapidly to demand, efficiently developing its ports while principal European ports are facing congestions on their access routes, for example Le Havre in France and Hamburg in Germany. The port of Rotterdam in Holland is expanding its capacity and others are following the trend.⁶

Both the Suez Canal and the Panama Canal are approaching their

⁴ Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route.

⁵ Verny, J., & Grigentin, C. (2009). Container shipping on the Northern Sea Route.

⁶ Verny, J., & Grigentin, C. (2009). Container shipping on the Northern Sea Route.

carrying capacity, despite recent and current expansions. World trade is expected to grow by three quarters by 2025 and the world cargo fleet is projected to grow from 2008 to 2018, from 77.500 vessels to 100.000 above 500 dwt.⁷ The increase in ships results in more traffic congestion and increased risk of accidental collisions.⁸

This thesis focuses on Arctic shipping and China and therefore the routes between Asia and Europe, mainly the Malacca Strait and the Suez Canal, as well as the Panama Canal, are discussed. They are a part of the strategic chokepoints identified on the trading route between Asia and Europe and alternative routes must therefore be considered in response to the scenarios where the Arctic could be one solution.⁹

The Suez Canal



Figure 1-1 The Suez Canal. The map also shows the locations of the Strait of Hormuz and the Strait of Bab el-Mandab, mentioned in this thesis. It shows where ships need to transit taking the Suez Canal route, through the Red Sea.¹⁰

⁷ dwt is a common measure of how much weight a ship can safely carry.

⁸ Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route.

⁹ Verny, J., & Grigentin, C. (2009). Container shipping on the Northern Sea Route.

¹⁰ Authors own work. Information retrieved from Google Maps.

Attempts to connect the Red Sea and the Mediterranean were made into reality with the opening of the Suez Canal, seen in figure 1-1, in 1869. The Canal is an artificial waterway connecting the Mediterranean Sea and the Red sea, and therefore Europe and Asia. Most of the Canal is limited to a single lane of traffic but transits are allowed in bypass zones. The current maximum dwt of ships is 240.000.¹¹ In comparison, the latest line of mega tankers can carry up to 400.000 dwt.¹²

According the Suez Canal Authority, feasibility studies are being conducted in the effort to increase the capacity of the Suez Canal and reduce transit time.¹³ Making ships larger will not compensate for the limited capacity of the Suez Canal as it will diminish the number of ships in each convoy, which means longer waiting times and less frequent services. With shipping companies optimizing for the Suez Canal to save time, having to wait longer for service in the canal could cause problems for the Asia-Europe shipping lane.¹⁴

Traffic through the canal increased annually up till 2008, when it started dwindling from its peak year of 21,450 vessels.¹⁵ The shipping industry has suffered since the world economic slowdown, with excess capacity, falling prices, and slowing demand.¹⁶

The Suez Canal Authority raised its tolls three times in the last three years. The Egyptian economy earns around \$5 billion USD a year in tolls. The Suez Canal Authority stated in 2013 after raising the tolls by 5%, that the price hike was not too steep for shipping companies to avoid the canal, as has been suggested by Peter Hinchliffe, the Secretary General of the International Chamber of Shipping. A standard container ship bringing consumer goods on that route pays about \$1 million USD in tolls for a return trip through the canal, representing about a quarter of costs for such a voyage.¹⁷

Tolls were further raised in 2014 for the third straight year, this time

¹¹ The Suez Canal Authority. (n.d.). About Suez Canal.

¹² DNV. (2010). Shipping across the Arctic Ocean.

¹³ The Suez Canal Authority. (n.d.). Suez Canal Future Plans.

¹⁴ Verny, J., & Grigentin, C. (2009). Container shipping on the Northern Sea Route.

¹⁵ The Suez Canal Authority. (n.d.). Yearly Statistics.

¹⁶ North Atlantic Treaty Organization. (2014). Counter-piracy operations.

¹⁷ Black, D. (2013). Suez Canal raises tolls by up to 5 per cent sparking chorus of complaints. The National.

by 2.6%.¹⁸ In addition to the fee rise, political unrest has spurred companies to seriously consider re-routing around the Cape of Good Hope in South Africa.¹⁹

The cost of transporting a container between two fixed ports in 2007 was on average three times higher for routes from Asia to Europe than the inverse. But several large new container ships in the Asia-Europe network allowed for the coefficient to drop to around two in late 2008. The market price of westbound containers has grown in recent years due to an imbalance in the traffic between Asia and Europe, more containers are being sent west than east. About two TEUs leave Asia for every TEU going to Europe. This means higher transportation costs as sending two containers to Europe includes sending one empty container back to Asia.²⁰

Frequently raised tolls, political unrest and lack of security are all threatening the Suez Canal, and could lead to rise in interest of the Arctic as an option for shipping.

The threat of pirates

Attention has been raised to the vulnerability of the Canal to the effects of war or instability in the region. The increasing threat of terrorist attacks in recent years has fuelled worries that an attack on a ship in the Suez Canal could close it for a shorter or longer period. The Canal was closed to shipping for two years during the Israel-Egypt war in 1973, leading to substantial rises in shipping costs and oil prices. This demonstrated how hazardous it could be to rely on the Suez Canal alone for the transport of goods between east and west.²¹

Two other straits have been considered as strategic chokepoints in trade between Asia and Europe.²² First is the Strait of Hormuz, seen on

¹⁸ Gupte, E. (2014). Suez Canal Tolls to rise by 2-2,6% for oil tankers starting May. Platts.

¹⁹ Saul, J. & Alsharif, A. (2013). Egypt unrest raises re-routing risk after Suez toll rise. Reuters.

²⁰ Verny, J., & Grigentin, C. (2009). Container shipping on the Northern Sea Route.

²¹ Ministry of Foreign Affairs. (2005). North Meets North navigation and the future of the Arctic.

²² Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route.

figure 1.1, lying between Iran and Oman. It is a vital shipping route for the colossal oil and gas production in the Middle East. Pirate attacks in the Strait are rare, but in March 2014 a merchant ship was attacked and shot at, showing that attacks can occur. Men armed with machine guns shot at a ship but the crew used hoses to repel the attackers, and none was hurt.²³ The Strait of Hormuz is “by far the world's most important chokepoint with an oil flow of about 17 million barrels per day in 2011,” in relation to oil transit.²⁴

The Strait of Bab el-Mandab, also seen on figure 1.1, is located between Yemen, Djibouti, and Eritrea, and connects the Mediterranean and Europe and the Indian Ocean and Asia through the Suez Canal. It is only 18 miles wide at its narrowest point and has two 2-mile-wide channels for inbound and outbound shipments. Security is a concern in the area after frequent attacks by Somali pirates.²⁵

The International Maritime Organization (IMO) has responded to piracy threats and identifies the area from the Suez Canal to the Strait of Hormuz as a “high risk area.” The IMO issued guidance for best management practices for protection against Somalia based piracy in 2011. The guidelines include recommendations that ships should not travel alone, and should use an Internationally Recommended Transit Corridor (IRTC) and travel in convoys or group transits. Ships are also instructed to use visible and physical protection measures, such as razor wire, water or foam to prevent attackers for boarding a ship. Ships are recommended to use maximum speed and keep the vessel manoeuvring.²⁶

²³ Fineren. D. (2014). Merchant ship shot at in Strait of Hormuz Sunday-NATO. *Reuters*.

²⁴ U.S Energy Information Administration. (2012). World Oil Transit Chokepoints.

²⁵ U.S Energy Information Administration. (2012). World Oil Transit Chokepoints.

²⁶ International Maritime Organization. (2011). Piracy and armed robbery against ships in waters off the coast of Somalia.

The Panama Canal



Figure 1-2 The Panama Canal in Panama. It shows where ships can transit between the Pacific Ocean and the Caribbean Sea. One possible route of the Nicaragua Canal is also drawn on the map.²⁷

The Panama Canal was built by the United States at the beginning of the 20th century to connect the eastern part of the Pacific Ocean with the Atlantic. It was opened in 1914 and immediately became an important shipping route. A substantial quantity of goods also passes through the canal on their way to and from East Asia.

The Panama Canal was owned and operated by the United States until the year 2000 when it was given to the Panama government. It is 84 km long but shortened the route from the North Atlantic to the North Pacific by as much as 9,000 nautical miles.²⁸

The canal is currently handling more vessel traffic than had been envisioned. To improve capacity, alterations have been made and developments are ongoing through the Panama Canal Expansion Project. It is intended to double the capacity by creating a new lane of traffic and allowing

²⁷ Authors own work. Information retrieved from Google Maps.

²⁸ Ministry of Foreign Affairs. (2005). North Meets North - navigation and the future of the Arctic.

both more and larger ships to transit. The Panama Canal Authority expects the expansion project to be completed in 2015.

The objectives are to achieve long-term sustainability for the Panamanian society, to maintain the Canal's competitiveness, to meet the growing demand of bigger ships and to make the Canal more productive, safe and efficient. The project will increase the limits of TEU significantly. After completion, the Canal can allow ships with up to 13.000 TEUs to pass, compared to 5.000 before.²⁹

Critics of the expansions have pointed out that: "The amount of cargo that passes through the Panama Canal is determined by the supply and demand of the route, not by the size of the ships carrying the cargo."³⁰

Most Asian exports to America go through the ports of Los Angeles and Long Beach in California, which are very congested. Using the canal to shift cargoes to the east coast eases that burden when moving cargo the United States, however transport through the US leaving from the west coast on roads can be faster than sailing through the canal, depending on the cargo and its final destination.³¹

The forthcoming Nicaragua Canal

Ideas for new routes and new modes of transport are in development. A Chinese company, Hong Kong Nicaragua Canal Development Investment Company, plans to invest \$40 billion USD in constructing a rival shipping route to Panama through Nicaragua. Figure 1.2 shows a proposed route. The group believes that by 2030, the volume of world trade will have grown by 240% from 2014. The Nicaragua Canal could save 4000km on the route Shanghai - Baltimore compared to the Suez Canal, and savings from \$500.000 to \$1.000.000 USD for a round trip. "The Nicaragua Canal would be able to accommodate the largest ships and would be the shortest passage for containerships between Asia and the U.S. East Coast," proclaims the project's website.³²

²⁹ Panama Canal Authority. (2006). Proposal for the Expansion of the Panama Canal.

³⁰ Vaquez, I. (2005). Analysis: Expanding the Panama Canal. United Press International Inc.

³¹ Salin, D., L. (2010). Impact of Panama Canal expansion on the U.S. intermodal system.

³² HKND Group. (2014). Trends in Global Shipping Trade Demand A New Canal.

The idea of such a Canal is nothing new. The Spanish conquistadors, Napoleon III, the US industrialist Cornelius Vanderbilt, the United States, and the United Kingdom all had plans for a Nicaragua canal by the mid 1800s. The Panama Canal then opened in 1914. Engineering challenges, costs, and later the Panama Canal, saw all such plans failing before the ideas even left the drawing tables.³³

The project is said to begin in 2014. The route would be 170 miles from the Pacific Ocean to the Caribbean Sea and would take at least five years to complete. The mega canal would be one of the biggest investments in Central America ever. The project would also include an oil pipeline, a railroad and two airports. It would traverse the enormous Lake Nicaragua – the biggest freshwater lake in Central America, with various environmental concerns raised.

“I take all responsibility for any environmental damage. I have told my employees that if we make a mistake on this front, we will be dishonored in the history textbooks of Nicaragua,” Wang Jing, the billionaire who funds the project released a statement with the president of Nicaragua in 2014, saying, “the Nicaraguan government and HKND Group are pleased to confirm that canal construction work will begin as planned in December 2014.” He also insisted that the project would be completed in 2019.³⁴

But that is not the only competition the Panama Canal faces from China, who is looking into constructing a 220 km railway between Colombia's Pacific and Caribbean coasts to rival the canal, although no agreements have been reached yet.³⁵

³³ Meyer, A. & Huete-Pérez, J.A. (2014). Conservation: Nicaragua Canal could wreak environmental ruin. *Nature*.

³⁴ Titcomb, J. (2014). £24bn rival to Panama Canal to break ground this year. *The Telegraph*.

³⁵ Branigan, T. (2011). China goes on the rails to rival Panama Canal. *The Guardian*.

The Malacca Strait



Figure 1-3 The Malacca Strait, between Indonesia and Malaysia. One of the worlds busiest sea lanes, with ships transiting between the Indian Ocean and Asia. Shanghai, the largest city in China, is also marked on the map.³⁶

The Strait of Malacca is a narrow strait between Indonesia and Malaysia, connecting the Indian Ocean to the South China Sea and the Pacific Ocean, therefore connecting the Middle East to the growing Asian markets. It is one of the busiest ocean highways in the world and crucial to the world economy as one third of the world trade passes through the strait. It is the shortest route for ships to transit between East Asia and Europe and a crucial chokepoint of world oil trade as exports from Africa and the oil-rich Middle East are transported through it.

As a vital seaway to the world economy, its security is crucial. As piracy and other problems emerge, shipping companies and governments are

³⁶ Authors own work. Information retrieved from Google Maps.

concerned about the safety of the seaway. China is especially concerned as discussed in chapter 2.5, and the concerns are one of the drivers for China to be so interested in Arctic shipping.³⁷

Over 60.000 ships pass through the Strait of Malacca every year,³⁸ in comparison to 13.600 in the Panama Canal in 2013³⁹ and 17.200 in 2013 in the Suez Canal.⁴⁰

The average width of the Strait is only 11-200nm, the narrowest point being 1.7miles wide and at certain parts the navigable area is less than 30m deep. At one particular point the IMO recommendation for maximum draught for passing of ships is 19.8 meters.⁴¹

Any disruption or blockage in the Malacca strait, either by terrorist groups or by nation states, would have severe consequences for the transportation system and therefore the world economy. Nearly half of the world's fleet would be required to reroute. Although other routes are available, they are longer and would cost more. Security of the ships and crews are also a concern in the case of terrorism or piracy.⁴²

Piracy has been a major problem in the Malacca Strait and it is still not free of its threats and attempts. Before the littoral states fought together against piracy the total actual or attempted attacks by pirates on ships in the strait were high. They peaked in 2000 with over 100 actual or attempted attacks, around 80 in 2001, 40 in 2002, almost 60 in 2003 and then dropping significantly to around 20 in 2005. The attacks were for numerous occasions, from hijacking and robbery to kidnaps for ransom.⁴³

The rampant piracy and possible links to terrorism saw a new low for the Malacca Strait in 2005, when the Joint War Committee, the London-based insurance giant added the Malacca Strait to its *Hull, War, Strikes, Terrorism and Related Perils Listed Areas*, which gave the area the same risks—and insurance premiums—as operating in a war zone.

³⁷ Zubir, M. (2004). The strategic value of the Strait of Malacca.

³⁸ Ibrahim, H.M. & Khalid, N. (2007). Growing shipping traffic in the Strait of Malacca: Some Reflections on the environmental impact.

³⁹ Panama Canal Authority (2013). Panama Canal Traffic - Fiscal years 2011 through 2013.

⁴⁰ The Suez Canal Authority. (n.d.). Yearly Statistics.

⁴¹ Zubir, M. (2004). The strategic value of the Strait of Malacca.

⁴² Zubir, M. (2004). The strategic value of the Strait of Malacca.

⁴³ Bateman, S., Raymond, C. & Ho, J. (2006). Safety and Security in the Malacca and Singapore Straits.

Conflicts between the littoral states on border uses were put aside as the world's superpowers became concerned, and threatened to patrol the Strait with its navies. The littoral states began information sharing and conducted joint patrols of the area. Indonesia got donors to assist with updates of its naval patrol vessels and financing a joint information center in the Strait.

Cooperative agreements, at a high-level political and working-level logistical, were accelerated and extensive coordinated air and sea patrol launched. The cooperation saw immediate effects as piracy dropped significantly since pirates could no longer jump from one countries' jurisdiction to the next, leaving the pursuing naval vessel behind as they could before.⁴⁴

Although the number of attacks has dropped substantially due to the increased and aggressive patrols, ships are advised to continue maintaining strict anti-piracy watches when transiting the straits. Currently, there are no indications as to how long these patrols will continue or reduce.⁴⁵

Alternatives for trade between Asia and Europe

The world commercial trade has many routes, by sea, land or air. Looking at the Asia-Europe trade relationship, as China trades most of its commodities to Europe through the Suez Canal and is most relevant for this thesis, alternatives have been discussed and used, although shipping remains the best option.

One alternative is to use rail transport through Russia. Investments have been made by Russia in the train networks, notably the Trans-Siberian and Trans-Aralian Railways. The transit time from Shanghai to Hamburg is 18–20 days by train compared to 28–30 days through the Suez Canal. In 2007 only 1% of the total container flux between Asia and Europe used the rail system. However, Russia needs to improve the train systems' infrastructure if it is to gain more attraction. It has been suggested that Russia could achieve that by doubling the number of tracks, improving the networks signals and

⁴⁴ Whaley, F. (2009). Fighting Piracy in the Malacca Strait.

⁴⁵ International Chamber of Commerce. (n.d.). Piracy & Armed Robbery Prone Areas and Warnings.

electrical supply, increasing security, facilitating border crossing, improving automated container traffic and adapting to European rail standards.

Another option is utilizing two modes of transport, by sea and by air. It typically includes maritime traffic to the Persian Gulf and a large cargo plane landing at a major airport in Europe. It is more rapid than sea transit, but more expensive, yet not as much as air transport. By using this method, the cost of one TEU unit has been calculated to be three times as expensive by air than by the sea-air transit. But as this option is more expensive than maritime transit it is mostly viable for products with high added value.

And then there is the option of Arctic shipping, discussed in other parts of the chapter. It has been calculated that the Northern Sea Route and the Trans-Siberian Railway appear to be roughly equivalent second-tier alternatives to the Suez Canal.⁴⁶

1.2 The future of Arctic shipping

The three key elements the global shipping operations are dependent on: predictability, punctuality and economy-of-scale, are all limited in Arctic shipping, causing uncertainties on its future aspirations. As the Arctic cannot fulfill these three elements, it has not yet developed as a global shipping route.⁴⁷

But since the beginning of ocean sailing, mariners have used the Arctic Ocean and the adjacent seas. History shows development from indigenous communities using the sea routes for transport and hunting, to expeditions and explorations and in more recent times to increased use with emerging economic activities.

Indigenous communities were the first Arctic explorers and are the founders of the region. Most of their activities are undocumented but their marine use was for hunting and search for supplies and settlement areas.

⁴⁶ Verny, J., & Grigentin, C. (2009). Container shipping on the Northern Sea Route.

⁴⁷ Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route. Arctic Yearbook.

The first non-indigenous Arctic explorer was the Greek navigator Pytheas. In 325 B.C he sailed northward and is thought to have reached Iceland, and possibly Greenland. Pytheas was an astronomer, geographer and a navigator but it was much later that Icelanders settled their country and Greenland was colonized. The Vikings of Scandinavia colonized Iceland in 850 A.D. but Eric the Red discovered Greenland in 981.⁴⁸

There are three general shipping routes when transit in the Arctic Ocean is discussed. They are the Northwest Passage, connecting the Atlantic and Pacific Oceans, the Northern Sea Route, connecting Europe and the Pacific and finally the Central Arctic Shipping Route, which lies around the North Pole, connecting the Pacific Ocean and the North Atlantic Ocean.

The general topics of shipping include numerous types of ships, including tankers, bulk carriers, offshore supply vessels, passenger ships, tug/barge combinations, fishing vessels, ferries, research vessels and government and commercial icebreakers.⁴⁹ Maritime transport interacts and competes with other modes of transport, such as pipelines, railways and river transports but it has the advantage of big volume transits.⁵⁰

Modes of Arctic transport are four; destinational transport, intra-Arctic transport, trans-Arctic transport or navigation and cabotage. This thesis focuses on transit shipping in the Arctic, or trans-Arctic transport as defined below.

Destinational transport is when a ship sails to the Arctic, performs an activity and sails back south. This includes for example a large cruise ship sailing from southern ports to the west coast of Greenland, LNG tankers and oil tankers sailing from Murmansk in Russia and northern Norway to deliver goods to world markets, and research icebreakers conducting surveys and research in the middle of the Arctic Ocean.

Intra-Arctic transport is a voyage or marine activity that stays within the general Arctic region, linking Arctic states. This includes for example a voyage between Hudson Bay in Canada and Murmansk in Russia and an Icelandic fishing vessel in the Greenlandic Ocean.

⁴⁸ Larsen, J.N. (Ed.). (2004). Arctic Human Development Report. Akureyri: Stefansson Arctic Institute

⁴⁹ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

⁵⁰ EU Arctic Information Center. (2013). Changes in Arctic Maritime Transport.

Trans-Arctic transport or navigation are voyages taken across the Arctic Ocean from the Pacific to the Atlantic Ocean or vice versa. This includes an oil tanker sailing from Europe to Asia through the Bering Strait. This thesis uses this definition to describe Arctic shipping, generally called transit.

Cabotage is the trade or transport in coastal waters between ports, within an Arctic state. This includes the year-round traffic between ports in Russia where marine transport is more feasible than land transport.⁵¹

Challenges and the unknown

The primary drive for Arctic shipping - a term here used to describe transit shipment of materials or goods through the Arctic, from the Atlantic Ocean to the Pacific Ocean or vice versa - is reduced costs due to numerous factors. Other factors are important as well, but with the climatic changes both challenges and opportunities arise.

Although bottlenecks in other routes have formed, for example in the Suez Canal and the Malacca Strait, there is no burning need as of yet to utilize the Arctic other than reducing costs. And for regular Arctic shipping with huge investments to become a reality, it must be economically viable.

Generally shipping companies want as much volume on one vessel as possible to lower costs. The Arctic sea routes are not open to the big carriers and economic viability can be questioned when only smaller ships can pass. The shipping routes through the Arctic today are all through coastal states' territories and often follow the shallow continental shelf and narrow straits. This limits shipping - but with reduced sea ice, more deep-water routes are projected to open and therefore open the possibility of larger ships, reducing costs for shipping companies.

As sea-ice seriously hampers shipping, specialized ships are needed for all transportation through the Arctic. Ships must be specifically strengthened to cope with ice laid waters or be escorted by an icebreaker for navigation in the Arctic. Both factors are expensive. And other modes of transport are competing with Arctic shipping, mainly the Suez Canal but also rail and pipeline transportation.

⁵¹ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

Arctic conditions are often unpredictable as sea-ice conditions change, weather can alter quickly and navigational problems arise with the lack of mapping and hydrographical services. These conditions are not feasible for shipping companies who need to rely on their cargo being transported safely and at the right time to its destination. Other means of transport today are most often more reliable than Arctic shipping.

Some of the time-hampering aspects of Arctic shipping are weather and sea-ice conditions, regulatory approvals and waiting time for convoys or icebreakers, relatively slow speed of ice-breaking transport, challenge of full utilization of tonnage capacity in both directions and the need to prepare vessels for Arctic conditions through winterization.

Sea ice conditions

Climate change has changed the shipping scenario for Arctic navigation. Climate change is advancing more rapidly in the Arctic than everywhere else on Earth, thinning the ice and forcing it to recede. In September 2007 the ice was at its record low when an unprecedented ice melt occurred. The difference between the coverage was a staggering 1.5 million square kilometers in only two years, as 2005 was the previous record low. In 2007, both the Northwest Passage and the Northern Sea Route were completely ice-free, temporarily.⁵²

But 2012 saw the record broken again. The 2012 extent was measured at 3.6 million square kilometers and the years between 2007 and 2012 saw the sixth lowest extents of Arctic sea-ice on record. Since 2006, the ice extent has not been above six million sq. kilometers. The data reaches back to 1979.⁵³

It is debated if, and in that case when, the Arctic would experience a complete late season melt-out of sea ice. One study says 2020.⁵⁴ Satellite images from 2011 taken by the European Space Agency show that the multi-

⁵² Byers, M. (2013). *International Law and the Arctic*. Chapter 5.

⁵³ Byers, M. (2013). *International Law and the Arctic*. Chapter 5.

⁵⁴ Overland, J. E., & Wang, M. (2013). When will the summer Arctic be nearly sea ice free?

year ice was already gone from much of the Arctic Ocean and elsewhere it was thinning rapidly. This has resulted in an upturn in Arctic shipping.⁵⁵

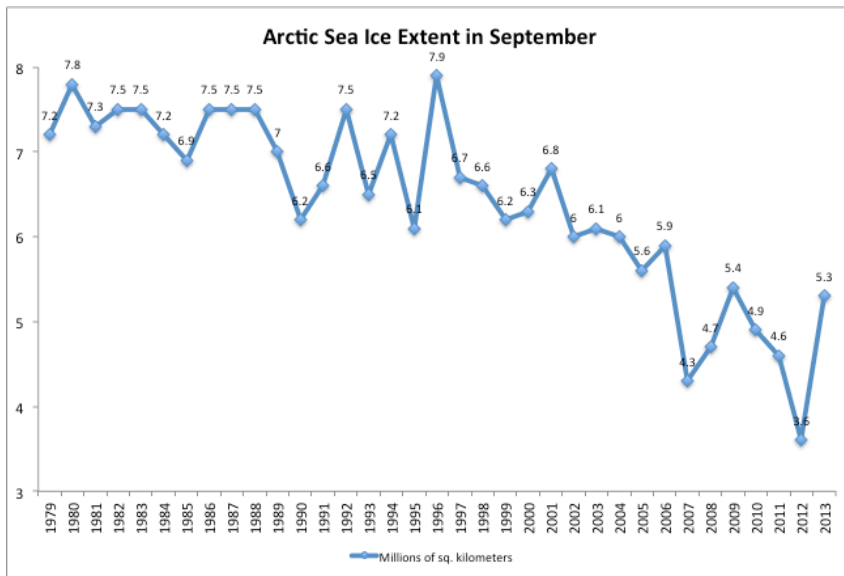


Figure 1-4 Arctic sea ice extent in September, 1979-2013. Numbers are in millions of sq. kilometers. The figure shows how the ice has retreated since satellite measurements of sea ice extent measurements began.⁵⁶

Due to changeable sea ice conditions, the Arctic-shipping season is relatively short. The best time for shipping is in the late summer and the short window of feasible transits make the routes less attractive for ships operating on fixed scheduled routes, such as much of the container shipping market, since it would have to change logistics twice a year. This makes for an unattractive business condition. On the other hand, the melting sea ice has spurred interest in Arctic shipping again.

The shipping season in the second decade of the 21st century is almost exclusively restricted to the summer and early fall, but is projected to lengthen. The navigational season is often defined as the number of days per year in which there are navigable conditions, generally meaning less than 50% sea ice concentration. The Northern Sea Route has been projected to be

⁵⁵ Byers, M. (2013). International Law and the Arctic. Chapter 5.

⁵⁶ Authors own work. Data retrieved from the National Snow and Ice Data Center website: http://nsidc.org/data/seaice_index/archives.html

accessible for 90-100 days by 2080 but with vessels with icebreaking capacity this number would be increased to 150 days in 2080 in seas with up to 75% sea ice concentration.⁵⁷

Although distances for Arctic shipping are often shorter compared to the Suez Canal, the speed of Arctic shipping is still limited due to sea ice. Timesaving is projected to increase when the ice retreats.

That said, sailing shorter distances will save fuel but then again breaking ice requires extra energy and the same can be said about moving a heavy ship that has been ice-reinforced that is not fit for plying open waters. Fuel consumption can be reduced, but then at the cost of time.

But even if the sea ice will retreat and conditions improve in favour of shipping in the Arctic, much variation is expected from year to year and also within the same season. This unpredictability is a concern for shipping companies as the length of the shipping season can vary between years. Shipping companies would be forced to use ice-strengthened vessels year-round with icebreaker assistance needed for most of the year. All adds to costs of shipping from A to B.

Ships for Arctic conditions

Not just any vessel can transit the Arctic and the cost of the ice-classed vessels to navigate in the Arctic can be enormous. They can also be more expensive to operate, as they might only be available for operation for parts of the year. Fuel consumption in ice-infested waters is higher than elsewhere and therefore utilizing ice-classed vessels in non-iced waters is unfeasible.⁵⁸

The IMO has developed requirements, guidelines and recommendations for polar ice-covered waters since 1990. They relate to maritime safety and prevention of pollution and include the non-mandatory instrument Guidelines for ships operating in Arctic ice-covered waters from 2002. At the end of 2009 new Guidelines for ships operating in Polar waters, addressing Antarctica in addition to the Arctic, were released.

The Guidelines address the additional demands the polar environment have, including navigation, communications, life-saving

⁵⁷ ACIA, Impacts of a Warming Arctic: Arctic Climate Impact Assessment (2004).

⁵⁸ Stephenson, S. R., Smith, L. C., Brigham, L. W., & Agnew, J. A. (2013). Projected 21st-century changes to Arctic marine access.

appliances, machinery, environmental protection and damage control. This emphasizes the need to ensure that all ship systems are capable of functioning effectively under anticipated operating conditions and provide adequate levels of safety in emergency situations. The Guidelines also address the human aspect, as polar conditions require specific attention to training and operation for the ship crew.⁵⁹ The Guidelines are only intended for commercial vessels. They do not address warships, naval auxiliary, or other vessels operated by a State and used for government service.⁶⁰

The Guidelines address numerous topics. All Polar Class ships, as defined below, are to be “designed, constructed and maintained in compliance with applicable national standards of the Administration or the appropriate requirements of a recognized organization which provide an equivalent level of safety for its intended service.”⁶¹ The same article also states that special attention should be drawn to the need of winterization aspects. It is recommended that all ships should carry at least one qualified Ice Navigator.⁶²

However, the IMO is developing a new instrument, the Polar Code, which will cover the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the Arctic and Antarctic waters. It will be a legally binding instrument to be released in 2014 and implemented in 2016.⁶³ The Polar Code is addressed separately in chapter 3.3.

Although shipping technology has evolved, further technology advances could be necessary to accommodate more Arctic maritime transport.⁶⁴ Interesting developments have emerged, for example the Aker Arctic DAS ships, enabling vessels to proceed ahead in thinner ice and astern in heavier ice, using 40% less fuel than traditional technologies.⁶⁵

⁵⁹ IMO (2010). Guidelines for ships operating in Polar waters.

⁶⁰ IMO (2010). Guidelines for ships operating in Polar waters. (Article 1.2.9).

⁶¹ IMO (2010). Guidelines for ships operating in Polar waters. (Article 1.2.1).

⁶² IMO (2010). Guidelines for ships operating in Polar waters. (Article Article 1.2.1).

⁶³ IMO. (n.d.). Shipping in polar waters.

⁶⁴ Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁶⁵ Niini, M. (2013). Ice is Their Passion. *High Tech Finland*.

Classification of Polar ships

The International Maritime Organization, IMO, published the aforementioned Guidelines for Ships Operating in Polar Waters in 2009, as well as recommendations for equipment, operational guidelines including crew training, and environmental protection and damage control. They also take account of the Unified Requirements for Polar Ships of IACS (2007), which address aspects of construction for ships of Polar Class. The guidelines are intended to be applicable to new ships with a keel-laying date on or after January 1, 2011.⁶⁶

The Guidelines state that only ships with Polar Class designation, based on IACS Unified Requirements for Polar Class Ships, or a comparable alternative standard of ice-strengthening appropriate to the anticipated ice conditions, should operate in polar ice-covered waters.⁶⁷

The International Association of Classification Societies, IACS, is a non-governmental organization in consultative status with the IMO. The notations are intended to guide owners, designers and administrations in selecting an appropriate Polar Class (PC) to match the requirements for a given ship with its intended voyage or service. It is the responsibility of the ship-owner to select an appropriate Polar Class when navigating to polar waters.⁶⁸

⁶⁶ DNV. (2010). Shipping across the Arctic Ocean.

⁶⁷ IMO. (2010). Guidelines for ships operating in Polar waters. Introduction.

⁶⁸ IMO. (n.d.). Shipping in polar waters.

Table 1-1 IACS requirements for ships in Polar waters.⁶⁹

Polar Class	Specifications
PC 1	Year-round operation in all ice-covered waters.
PC 2	Year-round operation in moderate multi-year ice conditions.
PC 3	Year-round operation in second-year ice which may include multi-year ice inclusions.
PC 4	Year-round operation in thick first-year ice which may include old ice inclusions.
PC 5	Year-round operation in medium first-year ice which may include old ice inclusions.
PC 6	Summer/autumn operation in medium first-year ice which may include old ice inclusions.
PC 7	Summer/autumn operation in thin first-year ice which may include old ice inclusions

Safety aspects

Ships operating in the Arctic face numerous risks unique to the area. In addition to the sea-ice, the Arctic is exposed with poor weather conditions, the relative lack of good charts, communications systems, and other navigational aid problems for mariners. The Arctic is remote and infrastructure often far away from shipping lanes. The remoteness would make rescue or cleanup operations difficult and costly. Cold temperatures may reduce the effectiveness of ship components, including machinery and emergency equipment. Therefore, winterizations – to prepare for such conditions, is recommended in the Guidelines for ships operating in polar waters. Sea ice can impose additional loads on a ship's hull and its propulsion system.⁷⁰

Therefore, improvements are needed on numerous safety issues for Arctic shipping to be viable for shipping companies. Charting and monitoring are lacking and control of ship movements needs attention. Radio and satellite communications and emergency response, including search and rescue, are currently not satisfactory. Observational networks and forecasts for weather, icing, waves and sea ice are insufficient and need to be

⁶⁹ IMO. (2010). Guidelines for ships operating in Polar waters. p.11.

⁷⁰ IMO (2014). Publications.

improved. Standards for Escape, Evacuation and Rescue (EER) will need to be changed in order to be appropriate for the Arctic.⁷¹

The *Barents 2020 Project* from 2010 listed some of the shortcomings of current standards. It included: "...evacuation to the ice, safe havens, reduced survival time, limited possibilities for using helicopters and aircraft, need for icebreaker assistance to reach muster points in the ice, and search being hampered by darkness during part of the sailing season."⁷²

Reducing risk is key for safe shipping in the Arctic and solutions have emerged, including the development and use of decision support systems. Guidance onboard to the shipping master, as Russia demands for approval to navigate through the Northern Sea Route, is an option to avoid excessive hull stress and collision, and grounding has recently been developed. Coastal authorities could also reduce risk by using Automatic Identification Systems (AIS) for ship traffic monitoring.⁷³

1.3 Navigating the Arctic

Three main shipping routes emerge when the term Arctic shipping is used. They are all defined here but each route: the Northwest Passage, the Northern Sea Route and the Central Arctic Ocean Route, are a broad term for numerous shipping lanes through the Arctic.

⁷¹ DNV. (2010). Shipping across the Arctic Ocean.

⁷² DNV. (2010). Shipping across the Arctic Ocean. p.18.

⁷³ DNV. (2010). Shipping across the Arctic Ocean.

Northwest Passage



Figure 1-5 *The Northwest Passage. The line is general and other similar routes can be taken to navigate the route. The Lancaster Sound and Beaufort Sea are also marked on the map.*⁷⁴

The Northwest Passage is the joint name of various routes connecting the Atlantic and Pacific Oceans along the Northern coast of North America, spanning the Canadian Archipelago. It is approximately the size of Greenland, comprising of about 36,000 islands, making it one of the most complex geographies on Earth. The area is sparsely populated. There are five recognized transit routes through the Canadian Arctic, making up the Northwest Passage.⁷⁵

The widest and deepest route runs from Lancaster Sound through Barrow Strait and onwards to the Beaufort Sea. The most prospects all lie to the Beaufort Sea, as it has the thinnest ice.⁷⁶

The distance savings saved by using the route instead of the Panama Canal are not as impressive as with the Northern Sea Route, but still substantial. The stretch from London to Tokyo is for example 16,000km

⁷⁴ Map by Arctic Portal. *Amended by author.*

⁷⁵ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

⁷⁶ Byers, M. (2009). Who Owns The Arctic?

through the Northwest Passage compared to 23.000km through the Panama Canal.⁷⁷

The area that now comprises the Canadian Archipelago was explored by Inuits thousands of years ago. However, no documentation reveals what they discovered. The majority of exploration has been conducted the past 500 years, mainly by European explorers.⁷⁸

The first documentation of the possibility of a Northwest Passage was in the 1490s when the thought of a more direct route to India and China was sought. Europeans had to sail around Cape of Good Hope in South Africa to reach India. Many attempts were made but all were unsuccessful. Among explorers to seek the Northwest Passage were John Cabot, Martin Frobisher, John Davis, Henry Hudson and Luke Foxe. Most of the attempts were made via Hudson Bay in Canada. In 1779 the first attempt to transit the Northwest Passage from the west was made by John Cook. In 1977, *Arktika* was the first surface vessel to reach the North Pole.⁷⁹

The Canadian Royal Army started regular explorations in the 1800s and in 1845 Europeans had explored the whole archipelago. Part of the reason it was comprehensively explored was the disappearance of the ships *Erebus* and *Terror*, owned by Sir John Franklin, and efforts to discover their remains.

It was Roald Amundsen of Norway who was the first navigator to transit the Northwest Passage. He did so in 1906 on the vessel *Gjoa*. It took three winters to complete the voyage, which started in 1903. He had help from local Inuit for survival in harsh conditions. Henry Larsen was the captain of the second ship to transit the passage, and the first one to go through from the east to the west, and he was also the first to make a return journey in one season. He did so in 1944 on a journey lasting 86 days.

When the previously mentioned trips were made, sense of adventure and security were the primary reasons for navigation in the passage. But in 1969 the focus had shifted on economical drivers and 30 transit passages were made from 1969 to 1980. A new major oil field was found in Prudhoe Bay, Alaska in 1968 that called for better transportation. Most were Canadian vessels in hydrocarbon explorations.

⁷⁷ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

⁷⁸ Mease, A. (n.d.). Explorers as Northern Exploration.

⁷⁹ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

The first commercial transit passage was the SS Manhattan in 1969. It took the effort of four shipyards, three major oil companies and an international team of marine experts to consider the technical and financial side of a commercial transit through the Northwest Passage. The SS Manhattan was converted from a normal merchant vessel to having icebreaking capabilities.

The costs were much higher than anticipated but after testing the vessel made the 4400nm journey in 1969. The vessel had assistance from two icebreakers in this important journey that taught Canada a great deal about the passage, most importantly that it was technically and economically feasible to use non-escorted large icebreaking merchant ships for the routes explored, and therefore most likely for the Northern Sea Route.⁸⁰

Current situation in the Passage

The Northwest Passage traffic is limited to few activities. It has been predicted to be the last area of the Arctic where the multiyear ice will disappear and shipping through it will remain risky, even in the summer season. Ice models predict that ice conditions will remain too heavy for any commercial shipping for some time.⁸¹

Despite these predictions, a large freighter vessel completed a voyage through the Northwest Passage for the first time in September of 2013. It left Vancouver early in September and reached Finland a month later, delivering coal. It was estimated that it save one week of sailing time using the route instead of the Panama Canal, saving around \$80.000 USD worth of fuel. The route was around 1000nm shorter. The route was been called a “high-risk - high-gain strategy,” and increased the amount of cargo per transit of 25%.⁸²

Some Canadian government scientist have warned that although the Northwest Passage is following the Arctic trend of thinner ice and smaller extents, it could become worse for shipping. “The longer thaw season of a warmer climate will promote a longer period of weakness in the pack, resulting in more rapid drift of Arctic Ocean multi-year ice through the Arctic

⁸⁰ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

⁸¹ Norwegian Mapping Authority. (2011). Marine traffic in the Arctic.

⁸² McGarrity, J. & Gloystein, H. (2013). Big freighter traverses Northwest Passage for 1st time. *Reuters*.

Archipelago and into the Northwest Passage. This will tend to maintain, or even increase, the hazard of shipping in the Northwest Passage as long as there is a supply of ice from the Arctic Ocean.”⁸³

But the Passage has been predicted to be ice-free for parts of the year and that ships will indeed utilize the route. The fjords are deep and many of them wide resulting in feasible natural conditions for large ships, pending on ice cover.

But for the near term uncertainties await, including the ones of weather, ice-movements, availability of search and rescue and higher insurance premiums. But less solvent and less reputable companies have been predicted to take a risk with the Passage.⁸⁴

Increased commercial activities in the Canadian Arctic will also lead to more shipping. Mining has developed in Nunavut and on Baffin Island. The prospect of a big port in Nunavut to serve the mining industry has been discussed but not planned but companies like Royal Dutch Shell have looked to the route for transporting oil and gas.⁸⁵

Case study: The Northwest Passage compared to the Panama Canal⁸⁶

A study at the University of Alberta, Canada, simulated shipping between Yokohama in Japan to St. Johns in Newfoundland and New York in USA, comparing the Panama Canal to the Northwest Passage. The aim was to see if the sea ice thinning could make the Arctic a viable option for container ships. A model calculation of ice volume was applied using historical records.

The study showed that the average speed had surprisingly little variations between seasons on the Northwest Passage. A ship using the Passage could make 38% more trips per year and 13% more on the same trip to New York, by using the Northwest Passage rather than the Panama Canal, resulting in more revenue for the Arctic route, but at the same time, the ship through the Arctic would be more expensive and the running costs higher. For example, it was calculated that the ships would require 130.8 tons of fuel

⁸³ Byers, M. (2009). Who Owns The Arctic? p.39.

⁸⁴ Byers, M. (2009). Who Owns The Arctic? p.40.

⁸⁵ Byers, M. (2009). Who Owns The Arctic? p.41-42.

⁸⁶ Somanathan, S., Flynn, P., & Szymanski, J. (2009). The Northwest Passage: A simulation.

every day on average compared to 82.6 on the Panama route, due to the power needed to break through ice.

The study finally calculated the required freight rate for a 9% return on capital between the routes, showing a slight more return on the Arctic route. However, the difference was only \$13 USD per TEU.

The study discussed that the difference is not compelling due to the uncertainty and risk associated with the Northwest Passage. However, the thinning and shrinking of the Arctic ice is continuing and it would reduce costs with average ship speed increasing, resulting in more round trips per year and the fuel consumption would decrease with less power needed to break the ice. Less ice could also mean that less expensive ships could transit the route.⁸⁷

The Northern Sea Route



Figure 1-6 The Northern Sea Route. The line is general and other similar routes can be taken to navigate the route.⁸⁸

⁸⁷ Somanathan, S., Flynn, P., & Szymanski, J. (2009). The Northwest Passage: A simulation.

⁸⁸ Map by Arctic Portal.

The search for a shorter transit route between Europe and Asia spanned more than five centuries, beginning in the 15th century with Dutch, Russian and English sailors. Their task was to find a route that would take them from the Atlantic via the unknown North where goods in China, Southeast Asia and India awaited. The navigation around Cape of Good Hope in South Africa was long and difficult.

The Northeast Passage, more commonly known as the Northern Sea Route, was the answer. Discovery in 1648 revealed that there was indeed no land connection between Asia and North America, only the Bering Strait, named after Vitus Bering who crossed it in 1728. But it was not until the Swede Baron Adolf Erik Nordenskjöld traversed the Northeast Passage in 1878-1879 that the first complete crossing took place.

Two recognized expeditions achieved transit of a substantial part of the Route; Fridtjof Nansen in *Fram* in 1893-1896, and Baron Eduard Toll in 1900-1903. Roald Amundsen made the fourth transit through the route and was therefore the first to transit both the eastern and western passages. In 1934 the first one season transit was made, in an icebreaker owned by the Soviet Union.

The Passage has been used commercially since the First World War. In the years 1917-1932 the Passage was utilized for community re-supply, in addition to exploitation by indigenous people. It was also used to export timber. From 1932-1953 the Soviet Union decided to develop, equip and keep the route in good order, adding security measures and employing more ships to the route. It was an important route in the Second World War. From 1953 the goal was to facilitate an improved route, open from summer to autumn and around 1970 year-round navigation was the target.

In 1991 it was finally opened for non-Russian ships, only few months after the Soviet Union was dissolved after the end of the Cold war.⁸⁹

During the Soviet era, the route never achieved a status as a significant transit route between the Pacific and the Atlantic. Transit traffic reached its maximum cargo volume in 1993 with 30 voyages in multi-purpose ships carrying 208.600 tons. In the 1990s transits were rare, occasional and low key.⁹⁰

⁸⁹ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

⁹⁰ Humpert, M. (2011). Part 1: The Future of the Northern Sea Route – A “Golden Waterway” or a Niche Trade Route.

Current situation on the Route

After numerous climatic reports and numbers on sea-ice extent retreat interest amplified and in recent years transits across the Northern Sea Routes have significantly increased. In 2010 the Danish 40.000 ton bulk carrier MV Nordic Barents became the first non-Russian bulk carrier to transit the route and a Japanese bulk carrier, double in size, followed in 2010, carrying iron ore from Murmansk in Russia to Xingang in China. The first supertanker used the route in 2011 with the 160.000-ton Suezmax-class Vladimir Tihkonov.⁹¹

The year 2011 saw 41 ships transition with 15 carrying liquids, 15 ballast cargo, 5 in bulk, 4 had fish and 2 general cargo. Most of the ships sailed under the Russian flag, or 26. China had no ship flying its flag in 2011 but the ships sailed under 10 different flags. The majority sailed from the west to the east, 30 ships.

The year 2012 saw a slight increase in numbers with 46 ships. A total of 26 carried liquids. Again Russia dominated, but now with 18 vessels, Finland had six and Norway five. China was a newcomer, with two vessels, one of them the icebreaker research vessel Xuelong (Snow Dragon), bound for Iceland as discussed later. Ships with eight different flags utilized the route and more sailed from west to east, 25. The year 2013 had a total of 71 ships transiting. The majority was from Russia, 46 ships.⁹²

Shipping companies are likely to look profitable individual transport projects rather than regulatory shipping in near-term Arctic shipping plans. An example of special projects is the usage of the Northern Sea Route by German company Beluga Shipping which gained attention. The company sent two cargo ships from South Korea through the Bering Strait and the Northern Sea Route to Ob Bay in Russia with 44 heavy lift modules for a power plant. They were escorted by two icebreakers for parts of the trip but did not encounter serious ice conditions. The journey was made in late August when sea ice conditions were favourable.

Such voyages, with heavy, high value cargo that is not time-sensitive, are seen as a good alternative to other global shipping routes. The company said it saved around \$600.000 USD per ship. The fees it paid were

⁹¹ Humpert, M. (2011). Part 1: The Future of the Northern Sea Route – A “Golden Waterway” or a Niche Trade Route.

⁹² Northern Sea Route Information Office. (n.d.). NSR Transit Statistics

not disclosed but the official tariff at the time calculated to around \$1.2-1.5 million USD.⁹³

Although container-shipping aspirations are not very bright for the near future, Russia claims that hydrocarbon projects will require substantial shipping activity both at the construction phase and to transport products. Commercial transits on the Northern Sea Route have not started. There is potential and ideas from various stakeholders for utilization, including China as discussed in chapter 2. But concise plans from shipping companies have not been developed or implemented as of yet.⁹⁴

Reliable figures for actual costs savings for the Northern Sea Route are limited. The number of vessels utilizing it is still relatively small and further research is needed. Cost savings are closely linked with savings in fuel costs which operators can achieve in two ways. One is shorter distances and therefore shorter navigational time, also resulting in more return trips in a time period with increased revenue and potentially greater profits.

The other is slow sailing to reduce fuel usage, resulting in perhaps the same time for transits on the Northern Sea Route vs. the Suez Canal, but with much less fuel used. A ship going from Murmansk to Yokohama can reduce its speed by 40% and still arrive in Japan at the same time as a ship sailing at full speed traveling through the Suez Canal. This is especially an option for transportation of low-value materials where time of arrival is not crucial.⁹⁵

Ships operating in the Northern Sea Route have serious size restrictions as the Russian coastline is shallow in many areas and straits are narrow as well. Maximum draft of ships is 12.5m due to the shallow waters and the maximum beam is 30m as the ships cannot be wider than the icebreakers that sometimes are called upon for assistance. That restricts ships in the route to about 50,000dwt, which is much smaller than ships operating in the Suez Canal⁹⁶ who can have as much as 240,000dwt.⁹⁷

⁹³ Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁹⁴ Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁹⁵ Humpert, M. (2011, September 21). Part 1: The Future of the Northern Sea Route – A “Golden Waterway” or a Niche Trade Route.

⁹⁶ Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁹⁷ The Suez Canal Authority. (n.d.). Canal characteristics.

The infrastructure challenge

Russia governs navigation in the shipping route through its EEZ, the Northern Sea Route. See chapter 3 for details on governance. Russia has been facing reduced income from transport fees and has a very limited budget allocation, resulting in deteriorated infrastructure for shipping along the route. There has been no modernization of ports along the route, apart from Dudinka, since 1990.

The lack of infrastructure has been widely criticized, both the lack of modern icebreakers and the lack of instruments for navigation, communication and bases for search and rescue services. “Because of this [poor infrastructure] the investment attractiveness of the country’s largest resource base is low,” said Russia’s Security Council’s secretary Nikolay Patrushev in 2011.

Russia’s icebreaker capabilities are also facing problems. Although Russia has the largest fleet of icebreakers in the world, it is aging fast. Russia has six icebreakers with only one of them built in Russian times, but the other five in Soviet times before 1990. Only one of the current icebreakers will remain in operation after 2017.⁹⁸ However, Russia has introduced plans for six new icebreakers to be built, three of them nuclear powered, and a new main base for emergency units will be refurbished with the addition of a series of new search and rescue vessels.⁹⁹

Furthermore, ten search and rescue centers will be opened in the near future, three big and seven smaller. The first one was opened in August 2013. Their main objective will be to prevent and react on emergency situations and accidents. Murmansk will open its center late in 2014, to be equipped with modern rescue equipment including different vehicles, off-road vehicles, snowmobiles, vessels and hovercrafts. It will have a 24-hour schedule and 83 employees specializing in search and rescue operations on mountains, on sea and land.¹⁰⁰

There is an acute need for upgrading and excavation of deeper ports if transit shipping is to take off in earnest. Other facilities are needed as well, including ones for waste disposal. The collections of oil spills are also in low

⁹⁸ Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁹⁹ Pettersen, T. (2011). More traffic along the Northern Sea Route. *Barents Observer*.

¹⁰⁰ Murmansk search and rescue center in the pipeline (2014). *Barents Observer*.

quality or lacking completely. Navigational systems and hydrographical support are in a critical condition.¹⁰¹

The Russian government says that 41 ports are open for foreign vessels along the Northern Sea Route, and that additional ports are being regulated for visits by foreigners on board foreign cargo ships. But it has been pointed out that presently over half of these ports are out of operation. Of those open, few ports have essential facilities, such as adequate water depth, berths and mechanizations needed for increased shipping.¹⁰² The Northern Sea Route Information Office lists 17 ports on its website along the Route.¹⁰³

These problems influence shipping, as it is less feasible for companies to take on the transit with non-adequate infrastructure. It also results in higher costs as insurance costs for shipping companies are inflated with the low-quality infrastructure, meaning higher costs for the overall commercial calculations.

There has been a growing recognition that infrastructure must be improved before more regular transits can start, but the financial issues have not been solved. Financing the infrastructure from state companies, private, and international investors are possible, but the profitability highly uncertain and time horizon very long.

Despite the recognized urgency by Russia and the declarations of improvements, lack of infrastructure is a problem that constraints Arctic shipping,¹⁰⁴ although Russia is showing intent by responding to problems with proposed actions. But despite the plans, several other problems remain unsolved including marine communication systems, said to be only adequate for parts of the Northern Sea Route, especially when further away from land.¹⁰⁵

The future of containerized shipping lies in the new giants of the sea, Ultra Large Container Ships (ULCS), capable of carrying more than 18.000 TEUs. Today's common standard is 6.000-8.000 TEUs. Over 100 ULCS will

¹⁰¹ Jensen, Ø., & Moe, A. (2010). Opening of New Arctic Shipping Routes.

¹⁰² Östreng, W. (2012). Shipping and Resources in the Arctic Ocean: A Hemispheric Perspective.

¹⁰³ Northern Sea Route Information Office. Arctic ports.

¹⁰⁴ Jensen, Ø., & Moe, A. (2010). Opening of New Arctic Shipping Routes.

¹⁰⁵ Östreng, W. (2012). Shipping and Resources in the Arctic Ocean: A Hemispheric Perspective.

be in service by 2016. The next generation after that could carry over 25,000 TEUs. The median vessel size has grown since 2001 on the global container ship fleet on the Asia-Europe route. None of the new mega tankers could venture in the Arctic.¹⁰⁶

The present vessels capable of transiting the Arctic Ocean can carry 2500-4500 TEU's due to beam and draft restrictions. The largest tanker to transit the Northern Sea Route in 2013 was 85,000 dwt. The new Suez Canal will carry 240,000 dwt. The beam is limited to 30 meters along the Northern Sea Route as Russia's mandatory icebreaker escorts are limited to 30-meter beam for non-ice classed vessels. The draft is further limited in parts of the route, for example to 12 meters in the Laptev Strait, and around 50,000 dwt.¹⁰⁷

The Central Arctic Ocean Route



Figure 1-7 The Central Arctic Ocean Route. The line is general and other similar routes can be taken to navigate the route.¹⁰⁸

¹⁰⁶ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

¹⁰⁷ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

¹⁰⁸ Map by Arctic Portal.

The Central Arctic Shipping Route, sometimes named the North Pole Route or the Transpolar Sea Route, is rarely mentioned when Arctic shipping is discussed. For example the Arctic Marine Shipping Assessment (2009) does not recognize it alongside the Northwest Passage or the Northern Sea Route as it is neither mentioned on a map showing the Arctic shipping routes or in a specific chapter like the other two routes.¹⁰⁹ Yet it seems as the most promising route for the future if the sea-ice retreats.

The Central Route is the most direct route across the Arctic Ocean but commercial interests have focused most on the Northern Sea Route. The length of the Central Route is approximately 2100nm, making it the shortest of the three routes. It means that navigation would not have to go through straits and along coastlines but closer to the North Pole and thus avoid any domestic State regulations. Just as for the other two shipping routes, there is no actual straight route as such, but the term Central Route is used for any route that goes over the high seas.¹¹⁰

Regulations for shipping in the high Seas and specific guidelines already provide a regulatory framework for the region. But it is not clear if they are sufficient for governance of the Central Route.¹¹¹ Governance is discussed in chapter 3.

No commercial ship has ever conducted a voyage across the Central Arctic Ocean. Two icebreakers were the first to traverse in the summer of 2004; Louis S. St-Laurent of Canada and the Polar Sea of the United States. Only seven trans-Arctic voyages had been completed by 2012, all by icebreakers and all in summertime, either nuclear or diesel powered.

The Soviet nuclear icebreaker *Arktika* became the first surface ship to reach the North Pole in 1977, departing from Murmansk and returning two weeks later after 3852nm sailed with the average speed of 11.5 knots. This triggered numerous other voyages to the North Pole, both Russian and international voyages. Around 80 voyages have been made to the North Pole, around 85% by Russian/Soviet icebreakers. Most were entertainment for tourists, around 60 voyages but others for scientific purposes.

¹⁰⁹ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

¹¹⁰ Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route.

¹¹¹ Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea.

But as in other regions of the Arctic as discussed later in the chapter, major constraints are in place for the Central Route to become a regular transit route. Apart from sea ice, one of the most obvious constraints is the remoteness and therefore lack of governmental or commercial salvage response to support shipping. Lack of communications and routinely produced ice information products at navigation scale are also a problem. No coastal state serves the high seas for weather information.¹¹²

Current situation on the Route

Present traffic in the high seas is very limited as it has been. There is little data on past traffic but there are no findings of historical accidents in the Arctic Ocean High Seas. In 2012 a total of 18 ships were in the Arctic High Seas. They spent only a total of 6.360 operating hours in total there. Most were surveillance and research vessel, only a handful of passenger vessels were in the area, presumably tourist operations on the North Pole. The traffic started in June, peaked in September and ended in the middle of October. Few studies make assessments on the ice cover and future traffic and the future traffic is largely uncertain.¹¹³

In 2012, the Chinese research icebreaker Xue Long (Snow Dragon) failed to transit the Central Arctic Shipping Route because the ice conditions were too severe.¹¹⁴

The role of transshipment ports

The increase in Arctic shipping has led to the thoughts of transshipment hubs in or near the Arctic Ocean shipping lanes.¹¹⁵ Transshipment is the act of shipping goods to an intermediate destination prior to reaching their ultimate end-use. Transshipment is a common practice with logistic benefits.¹¹⁶

¹¹² Östreng, W. (2012). Shipping and Resources in the Arctic Ocean: A Hemispheric Perspective.

¹¹³ Eide, M.S. (2014). Specially Designated Arctic High Seas Marine Areas.

¹¹⁴ Jónsdóttir, I. (n.d.). Xue Long entered the sea – Ice zone of the Arctic Ocean. Chinare5.com.

¹¹⁵ Ministry of Foreign Affairs. (2005). North Meets North - navigation and the future of the Arctic.

¹¹⁶ Informed Trade. (2007). What is Transshipment?

Transshipment ports, or hub-ports, facilitate the majority of global trade to smaller regional hubs. As cargo arrives in transshipment-ports, other modes of transportation take over and send the cargo to its final destination. This includes offloading to other often smaller ships, to roads via trucks, to rails via trains, or oil through pipelines.

There are five major global hub ports: Hong Kong (an administrative region of China), Singapore (country in South-East Asia), Shanghai (the largest city in China), Rotterdam (the Netherlands) and Long Beach (Los Angeles, USA). In terms of tonnage, Singapore is the busiest port in the world. It is connected to over 600 ports in 120 countries handling over 140.000 vessels annually. It is strategically very well located, near the Strait of Malacca. It transships around a fifth of the world's shipping containers and half of the world's annual supply of crude oil. The port of Rotterdam has an extensive short-sea shipping network and is also strategically located in Europe. Over 200 million consumers are located within 500 miles of Rotterdam.¹¹⁷

But a crucial aspect when it comes to transshipment ports is that the shipping companies themselves have the final word in deciding whether or not a new transshipment port will become a part of their network. The large companies generally operate their own shipping terminals. There are examples of huge investments in the development of such ports which have not established themselves in the international transport network.¹¹⁸

Shipping companies select transshipment ports on numerous attributes, including the shipping companies port cost, the geographical location, physical and technical infrastructure and port management and administration.¹¹⁹

Major transshipment hubs are generally tied with the major global shipping routes, for example the port of Rotterdam is well located for ships with merchandise from the Middle East and Asia to distribute to other European countries. The Arctic has no such port, and among strategic

¹¹⁷ Jackson, E.R. (2011). Hub Ports.

¹¹⁸ Ministry of Foreign Affairs. (2005). North Meets North - navigation and the future of the Arctic.

¹¹⁹ Asgari, N., Farahani, R. Z., & Goh, M. (2013). Network design approach for hub ports-shipping companies competition and cooperation.

locations Iceland¹²⁰ has been mentioned for the west side and the Aleutian Islands south of the Bering Strait for the east side. Murmansk in Russia is already a major oil terminal.

The location of a hub-port in the Arctic is crucial and many considerations need to be made. The port would need good infrastructure to build around, international airports, enough space, educated inhabitants and the support of local government. Geography, natural conditions and services all have to work together for a good location of any transshipment port.¹²¹

Although Iceland has progressed in the development of a new port envisioned for Arctic services, it is not necessarily intended to serve transshipments, at least not in the near term. Initial thoughts are to establish a port to serve the exploration of oil north off Iceland, support oil exploration off Greenland, become a base for search and rescue, and in general be a major port for large ships. The German company Bremenports is conducting research at Finnaþjórður in the northeast of Iceland with the support of the local government, with the intent of developing plans for such a hub in the near future.¹²²

1.4 The Environmental effect

Air pollution and climate impacts from shipping are not limited to the Arctic. Any efforts to address global emissions will benefit the area but the increased shipping activities will lead to more risks of pollution. The main concerns regarding the increased activities are accidental spills of oils and chemicals. Oil spills from shipping accidents occur regularly worldwide but presently there are few ways to recover spilled oil from ice-covered waters.¹²³

¹²⁰ Ministry of Foreign Affairs. (2005). North Meets North - navigation and the future of the Arctic.

¹²¹ Russia: Gazprom and Rosmorport to Design Trans-Shipments Terminal at Novy Port. (2013) World Maritime News.

¹²² Bremenport. (2013). Iceland intends to build a new port on the Arctic Ocean and wishes to cooperate with the planning experts at Bremenports [Press release].

¹²³ DNV. (2010). Shipping across the Arctic Ocean.

As oil disperses and degraded very slowly at cold temperatures, it is a primary concern and the worst oil spill in history occurred in Arctic waters. The Exxon Valdez accident took place in, although relatively warm and ice-free waters, south of Alaska.¹²⁴ The accident saw 11 million gallons of crude oil dumped in the ocean with effects still felt 25 years later.¹²⁵

Increased traffic will also result in increased emissions with potential consequences for climate, as well as local pollution, such as increased acidification and enhanced surface ozone formation. Air pollution and climate impacts from shipping are though not limited to the Arctic that will also gain from efforts to reduce global emissions.¹²⁶

Marine pollutants

The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), was established in 1969 and regularly issues reports that have estimated the volume of pollutants entering the marine environment. It is generally thought to give the most authorities assessments of the sources and types of marine pollution.¹²⁷

In 1990 GESAMP estimated the contributions of pollutants from human activities that entered the marine environment. It concluded that 44% came from land-based discharges, 33% was atmospheric sources, vessel-source pollution was 12%, dumping 10% and offshore production of oil and gas was 1%. GESAMP has not updated these estimates. It is thought that dumping would today be significantly less than the numbers from 1990 as well as operational pollution.¹²⁸

A much greater volume of oil enters the marine environment from discharges of normal operation vessels, such as from oil in bilge and ballast water, and oil that is released when operators clean the tanks of oil tankers.¹²⁹

A 2007 study from GESAMP showed that operational discharges

¹²⁴ Byers, M. (2009). Who Owns The Arctic?

¹²⁵ Robards, M. (2014). Exxon Valdez: what lessons have we learned from the 1989 oil spill disaster? *The Guardian*.

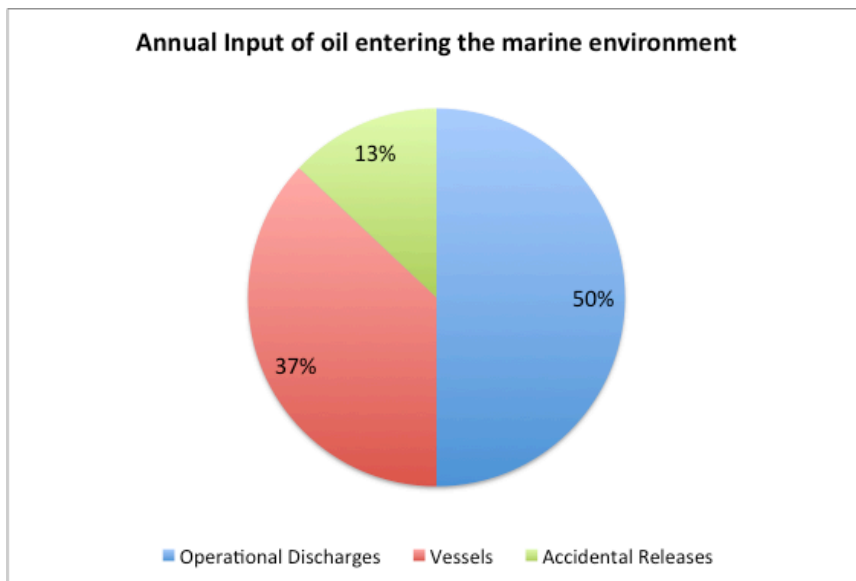
¹²⁶ DNV. (2010). Shipping across the Arctic Ocean.

¹²⁷ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

¹²⁸ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

¹²⁹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

counted for half of the annual input of oil entering the marine environment as figure 1-8 shows. Out of 1,245,200 metric tons, 457,000 came from vessels, 163,200 from accidents and the rest from operational discharges. Offshore oil and gas are estimated to release around 17,000 tons annually. Large spillages remain and coastal facilities such as refineries release more significant amount of oil into the marine environment at around 115,000 tons annually. Oil leaks from natural processes is close to the half of the annual oil release in oceans, around 600,000 tons.



*Figure 1-8 Sources of oil entering the marine environment.*¹³⁰

Nuclear pollution in the oceans is thought to cause relatively minor pollution of the marine environment and often have localized impacts. Artificial radionuclides, released from power plants and processing facilities, are not as a pressing concern as other pollutants from land based sources.

Discharges of sewage is a growing problem and fertilizers and nitrous oxides from burning fossil fuels are the main drivers of the eutrophication, an excess of nutrients, which can have adverse effects on the marine environment.

¹³⁰ Rothwell, D.R. & Stephens, T. (2010). The International Law of the Sea.

Land based pollution also includes garbage where plastics has the worst effects on the marine environment. Another pollutant gaining attention is noise. Shipping, oil and gas exploration, dredging, fishing and military operations all cause noise which generate acoustic pollutions that can travel considerable distances, and cause damage to marine wildlife, for example by disrupting natural behaviour of cetaceans, which rely on sound to navigate and communicate.

Ocean acidification is also driven by atmospheric pollution which accounts for a growing proportion of marine pollution. Sulphur and nitrogen oxides are emitted from industries and transportation, causing acid rain that has adverse effects on land and on the ocean, which absorbs one third of the carbon dioxide produced by human activities. Ocean acidification is one of the most serious threats to the health of the marine environment, alongside climate change which causes rising sea levels and warmer water temperatures, affecting ocean circulation and generating ocean dead zones.¹³¹

Ship pollutants

Marine environmental pollution from ships is always desirable to prevent but the harsh reality is that it is not possible. Pollution incidents and oil spills are notoriously difficult to contain and can cause long lasting and in some cases permanent damage to the environment.

Normal operations of vessels pollute the marine environment and in addition collisions and groundings add to the polluting. The shipping industry has grown immensely for the last 60 years in line with increasing world trade and there are now over 50.000 merchant vessels, carrying up to 90% of global trade by weight. But in line with increasing traffic, improvements have been made on international rules and standards, addressing everything from construction and operation to safety at sea and pollution. Cleaning methods have been improved and have eliminated older problems when seawater was washed through tanks and engines and then pumped back out to the sea.¹³²

Shipping is statistically the least environmentally damaging mode of transport when the productive value is taken into consideration. Compared to

¹³¹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

¹³² Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

land-based industry, shipping is a minor contributor to marine pollution from human activities.¹³³

Shipping poses threats to the environment from six major sources; routine discharges of oily bilge and ballast water from marine shipping; dumping of non-biodegradable solid waste into the ocean; accidental spills of oil, toxics or other cargo or fuel; air emissions from the vessels' power supplies; port and inland channel construction and management; and ecological harm due to the introduction of exotic species transported on vessels.¹³⁴

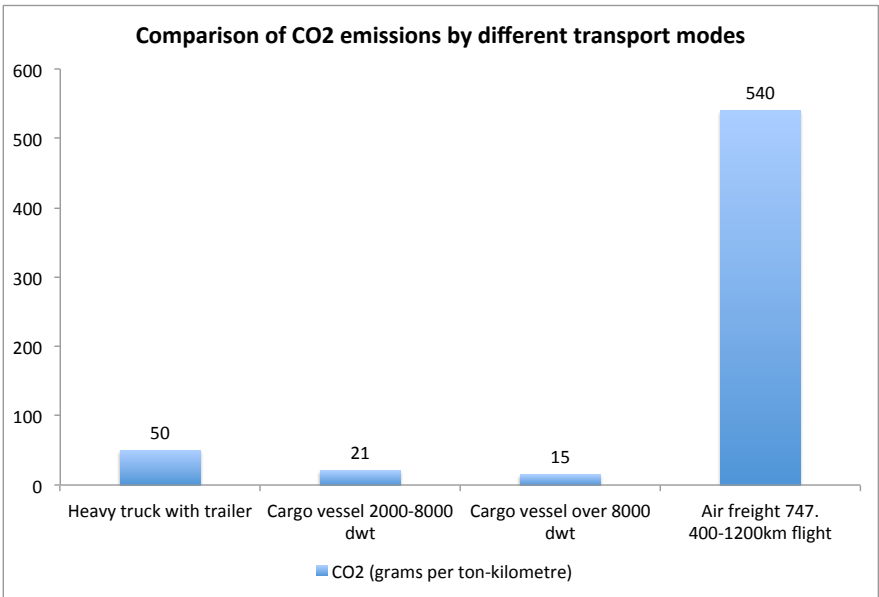


Figure 1-9 Comparison of CO2 emissions by modes of transport. The numbers are CO2 in grams per ton-kilometer travelled.¹³⁵

¹³³ IMO. Marine Environment.

¹³⁴ Hecht, J. (1997). The Environmental effects of freight.

¹³⁵ Authors work. Derived from United Nations Environment Programmes report *Green economy in a Blue World*.

Environmental threats from Arctic shipping

Arctic marine shipping poses a serious threat to natural ecosystems. The reasons are manifold, including the release of substances through emissions to air or water, accidental releases of oil or hazardous cargo, disturbances to wildlife through noise, collisions or the invasive of alien species. Management of the Arctic shipping is therefore crucial as the Arctic marine environment is especially vulnerable to potential impacts from marine activity. As discussed above, maritime activities are predicted to increase, resulting in increased threats for the environment as well as the risk of potential environmental harm.¹³⁶

Numerous topics are threatening the Arctic environment through shipping. Accidental discharge of oil or toxic chemicals is considered as one of the most serious threats to the Arctic ecosystems. If oil would be released in the Arctic environment, it could create long-term impacts as well as immediate consequences.

Responding to oil spills in the Arctic would be a major challenge due to numerous factors, including the behaviour of oil in ice-laid waters, the range of weather, the daylight for half the year, sea ice and natural hazardous shipping conditions, and the lack of infrastructure.

Regular discharges to the Arctic waters from normal shipping operations could cause severe harm but are strictly regulated. Ships produce a range of substances, including oil ballast water, oily water from washing tanks, garbage, sewage and other contaminated sources.¹³⁷

The impact of ship-source pollution can intensify in semi-enclosed seas like the Arctic Ocean. The geography of the Arctic imposes hydrological limitations, therefore trapping the wastes in the Arctic marine environment for decades. In addition, the water is further preserving the waste due to cold temperatures.¹³⁸

The Arctic environment is in general highly sensitive to damage. Its ecosystems are relatively simple in structure and the growing seasons are short. Both factors limit the resilience of the natural environment.

¹³⁶ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

¹³⁷ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report.

¹³⁸ VanderZwaag, D. et al. (2008). Governance of Arctic marine shipping.

Environmental recovery is also harder to achieve. Damage to the environment is predicted to have long-term impacts, although the vulnerability of each ecosystem varies.¹³⁹

Search and Rescue operations

A crucial aspect of Arctic shipping, and a great concern, are search and rescue operations in the case of emergencies. As described above, several aspects make conditions for search and rescue difficult, including remoteness, lack of infrastructure, darkness and severe weather. The prospect of an oil spill in the middle of the Arctic Ocean or grounding outside of Franz Josef's Land is worrying.

The IMO adopted the SAR Conference in 1979, aimed at developing an international search and rescue plan, so that “no matter where an accident occurs, the rescue of persons in distress at sea will be coordinated by a SAR organization and, when necessary, by co-operation between neighbouring SAR organizations.”¹⁴⁰

The obligation to assist vessels in distress is addressed in the International Convention for the Safety of Life at Sea (SOLAS)¹⁴¹ and in Article 98 of the United Nations Convention on law of the sea (UNCLOS), which states that “every coastal State shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service regarding safety on and over the sea and, where circumstances so require, by way of mutual regional arrangements cooperate with neighbouring States for this purpose.”¹⁴²

But before the SAR Convention was adopted there was no international system covering search and rescue operations, although well-established organizations to provide assistance were in place in many areas.¹⁴³ The Convention requires state to “ensure that necessary arrangements are made for the provisions of adequate search and rescue

¹³⁹ Emmerson, C. (2012). Arctic Opening: Opportunity and Risk in the High North.

¹⁴⁰ IMO. (n.d.). SAR Convention.

¹⁴¹ IMO. (n.d.). SAR Convention.

¹⁴² UNCLOS (Article 98 - 2).

¹⁴³ IMO. (n.d.). SAR Convention.

services for persons in distress at sea round their coasts.”¹⁴⁴ Parties should also, whenever necessary, so-ordinate search and rescue operations with neighbouring states.¹⁴⁵

The IMO divided the world’s oceans into 13 search and rescue areas, where the countries concerned in each area had responsibilities for operations. The provisional search and rescue plans for all the oceans were finalized in 1998.

However, the Convention imposed considerable obligation on parties, such as setting up shore installations, and few parties ratified it including many of the world’s coastal states. It was generally accepted that the SAR Convention was flawed and it needed amendments. The 1998 amendments were several, and further amendments were made in 2004.

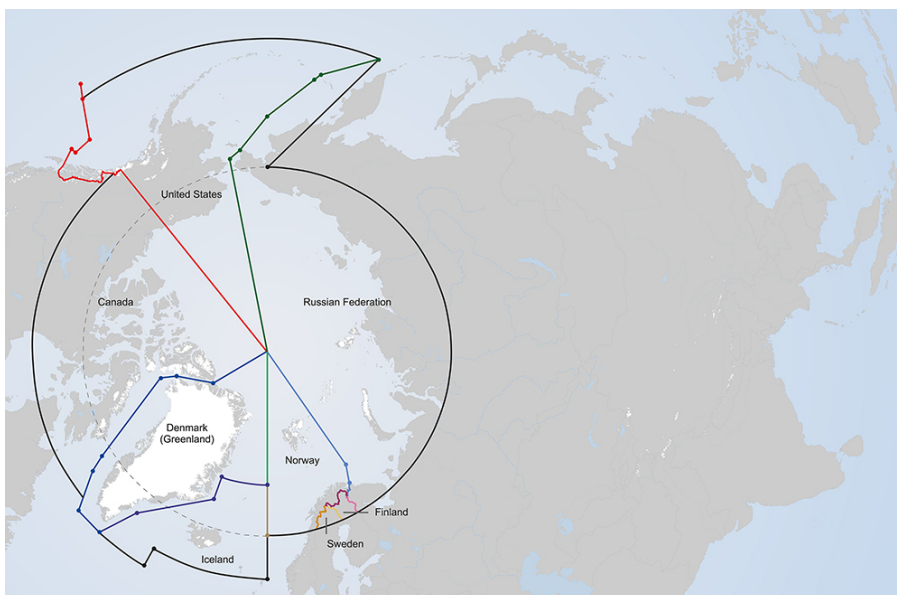
As of 28th of February 2014, a total of 108 countries had signed and ratified the convention, including China, and the eight Arctic states.¹⁴⁶

¹⁴⁴ UN International Convention on maritime search and rescue. (1979) (Article 2.1.1).

¹⁴⁵ UN International Convention on maritime search and rescue. (1979) (Article 3.1.1).

¹⁴⁶ IMO. (2014). Status of conventions. [Excel Worksheet].

Search and rescue in the Arctic



*Figure 1-10 The search and rescue regions in the Arctic as delimited in the SAR Agreement.*¹⁴⁷

In addition to the SAR Convention by the IMO, the eight Arctic states signed the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, the SAR Agreement, in Nuuk, Greenland in 2011. It was the first legally binding instrument negotiated under the auspices of the Arctic Council and the first legally binding agreement on any topic ever negotiated among all the eight Arctic states.¹⁴⁸

IMO's SAR Convention is used as a basis for conducting search and rescue operations according to the SAR Agreement.¹⁴⁹ Each party is required to “promote the establishment, operation and maintenance of an adequate and effective search and rescue capability within its area,”¹⁵⁰ all of which are defined in the agreement. Specific requirements are also established for

¹⁴⁷ Map from Arctic Portal.

¹⁴⁸ Arctic Council. (2011, June 22). Search and Rescue in the Arctic.

¹⁴⁹ SAR Agreement. Article 7.

¹⁵⁰ Arctic Council. (2011). Senior Arctic Officials (SAO) Report to Ministers. (Article 3.3).

“competent authorities” performing search and rescue operations.¹⁵¹

Under the Agreement, search and rescue regions relevant to this Agreement were delimited with coordinates, as seen on figure 1.10. But the ability to adequately cover these areas, in particular in the case of increased activities, is uncertain. Availability of information about the SAR services differs between countries. As infrastructure is lacking, the abilities of the eight Arctic states has been put in doubt, although installations of SAR facilities have been projected to increase.

Communication above 70°-72° N is greatly diminished as the magnetic and solar phenomena, interferon and geostationary all affect electronic communications. This causes problems for navigation and search and rescue operations. Arctic specific satellite communications systems by the European and Canadian space agencies could improve communication but are still under development. Related is the lack of satellites to monitor weather, which can change quickly and be quite severe in the Arctic. Weather stations are also relatively sparse. Temperature changes can vary greatly between days and even within days, causing challenges to many, including shipbuilders and infrastructure development.¹⁵²

Reducing risk with insurance

Shipping companies in the Arctic must take on numerous risks. They need to develop risk management strategies carefully, but also transfer some risk to a third party through insurance. Some companies specialize in insurance cover in extreme conditions, including the Arctic.¹⁵³

The maritime insurance industry can play a critical role in Arctic shipping, as they reduce the risk companies take. If no insurance would be available, or if they insurance fees are exceptionally high, the economic viability of Arctic shipping is seriously altered. In case of such scenarios, a domino effect would come into effect, as it would have broad implications

¹⁵¹ Arctic Council. (2011). Senior Arctic Officials (SAO) Report to Ministers.

¹⁵² Emmerson, C. (2012). Arctic Opening: Opportunity and Risk in the High North. Lloyd's.

¹⁵³ Emmerson, C. (2012). Arctic Opening: Opportunity and Risk in the High North. Lloyd's.

for numerous other industry sectors reliant on maritime logistics. Key issues of concern when considering the Arctic is remoteness, lack of rescue and salvage facilities, if the vessel to be insured is sufficiently ice-classed for expected conditions and whether it will receive icebreaker support.

The relatively small number of vessel voyages per year currently limits Arctic specific insurance but insurers are currently helping to improve the safety and raise awareness of the Arctic shipping routes, by providing information and encouraging effective risk-mitigation measures and safer vessels.¹⁵⁴

As insurance companies are hesitant to insure ships in the harsh Arctic conditions, they welcome the forthcoming Polar Code, discussed in chapter 3.

1.5 Case studies for the future of Arctic shipping

Modelling the future maritime use of the Arctic differs between studies. The scenarios are different with shipping potential defined in various ways, including with technically accessible area (Stephenson et al. 2011), transit time (Liu and Kronbak 2010; Stephenson et al. 2011), fuel consumption (Peters et al. 2011), navigation season length (ACIA 2004) and economic viability (Somanathan et al 2007; Liu and Kronbak 2010).¹⁵⁵

Here three studies are introduced, first a survey that sought answers to what ship-owners think of the potential opening of the Arctic sea routes and the second a case study with new approach to the possibilities of Arctic shipping, which combined projections of accessible areas with navigation season length and temporal variability to simulate marine access for both ice conditions and the vessel type. The third is a figure from a study assuming two different climate change scenarios and two vessel classes, to assess future changes in peak season (September) Arctic shipping potential.

¹⁵⁴ Emmerson, C. (2012). Arctic Opening: Opportunity and Risk in the High North. Lloyd's.

¹⁵⁵ Stephenson, S. R., Smith, L. C., Brigham, L. W., & Agnew, J. A. (2013). Projected 21st-century changes to Arctic marine access.

Survey: Arctic shipping will be overwhelmingly destinational, not trans-Arctic

Many articles and speculations on Arctic shipping conclude that a shorter Arctic route will automatically result in a heavy increase of traffic across the Arctic. As discussed before, there are numerous factors needed to take into consideration when shipping companies look to the Arctic as a possible trading route. Few companies seem to have put too much time into thinking about the Arctic as a viable option for transportation and the uncertainties that arise are the primary reason. Companies need to have a strong schedule to keep for it to make a profit.

Several credible studies have been conducted to determine the potential cost advantages of the Arctic passages with different results. One such states that Arctic transit could enable shipping firms to save \$3.5 million USD per transit (Borgerson, 2008). Another study is not as optimistic and concludes that transits across the Northern Sea Route can be profitable but only with optimal conditions (Guy, 2006). A 2010 study suggests that transits along the Northern Sea Route can be profitable if fuel prices reach \$900 USD per ton (DNV, 2010), and one finds that transit costs are much higher than through the Suez Canal (Verny and Grigentin, 2009). These examples show that depending on the study, one can read different kinds of results and depending on how they are conducted, very different answers can be sought to the question if Arctic shipping is economically viable.

A study from 2011 by Det Norske Veritas (DNV), a Norwegian classification society with history going back to 1864, while describing itself as a provider of services for managing risk,¹⁵⁶ states that theoretical advantages remain highly uncertain given the investments and special equipment required in addition to costs of insurance and variable transit times. The study sought answers to what ship-owners think of the potential opening of the Arctic sea routes.

A total of 98 answers were received but of these, only 17 agreed that their company was contemplating developing operations in the Arctic. Their reasons for little interest varied, but included that the container industry is not interested at all in Arctic shipping with constraints and risks too great. The companies do not believe in the potential savings in transit time and costs

¹⁵⁶ DNV. (2010). Shipping across the Arctic Ocean.

emphasized strongly in the media, mainly because of higher capital and insurance costs or the fact that transit time is not much different from other routes because of the reduced speed.

The conclusion of the study shows a totally different and much more restrained picture of Arctic shipping than previous ones, although shipping activities are increasing.

"To sum up, Arctic Passages will not become the new Panama of the 21st century. This empirical evidence from the survey of shipping firms and the analysis of traffic data is in line with traffic scenarios set up by the Arctic Council in its study Arctic Marine Shipping Assessment 2009 Report: "Arctic voyages will be overwhelmingly destinational, not trans-Arctic.""¹⁵⁷

Case study: Projected 21st-century changes to Arctic marine access¹⁵⁸

Climate models have predicted continued Arctic sea ice reductions and summer conditions by the mid-21st century could see nearly ice-free areas. A study from 2013 took a new approach to the possibilities of Arctic shipping. It combined the projections of the accessible areas, navigation season length and temporal variability to simulate marine access for both ice conditions and the vessel type.

Projections were made for three climatic scenarios in three different time periods, the early (2011–2030), mid- (2046–2065), and late- (2080–2099) 21st century, for the three routes; the Northwest Passage, the Northern Sea Route and the Central Arctic Ocean route, for three different types of vessels; Polar Class 3, Polar Class 6, and open-water vessels (OW), with high-medium and no icebreaking capabilities. They are defined further earlier in this thesis. Two seasons were used, the summer season (July–October) and the winter season (December–March).

The study looked both at access to three marine areas, defined according to the Arctic IMO Boundary Guidelines intended to delineate area

¹⁵⁷ Lasserre, F., & Pelletier, S. (2011). Polar super seaways? Maritime transport in the Arctic: an analysis of shipowners' intentions.

¹⁵⁸ Stephenson, S. R., Smith, L. C., Brigham, L. W., & Agnew, J. A. (2013). Projected 21st-century changes to Arctic marine access.

with potentially hazardous ice conditions necessitating ice-strengthened ships. The overall study area was further divided to the EEZ's of five Arctic Coastal states; Canada, Greenland/Denmark, Norway, Russia and USA.

The study projects robust, widespread increases in Arctic marine access during the summer (July-October) for a range of vessel classes in the IMO Boundary area. Polar Class 3 vessels will gain at least 90% access by late century and up to 98%, and Polar Class 6 from 82% in mid-century up to 95%.

Table 1-2 Accessibility for three different classes of ships, Polar Class 3 (PC3), Polar Class 6 (PC6) and open water vessels (OWV), in a modelled Arctic scenario for three different time periods and different times of year, summer season between July & October (s) and winter between December & March (w). The table includes a baseline for accessibility in the 20th century. The numbers are the worst-case scenarios for each season and the best-case scenario under the different climate models.

Time period	Accessibility (PC3)	Accessibility (PC6)	Accessibility (OWV)
1980-1999	54%	36%	23%
2011-2030	75% (w) – 87% (s)	45% (w) – 71% (s)	29% - 31% (s)
2046-2065	89% - 94% year round	58% (w) – 91% (s)	41% - 62% (s)
2080-2098	93% - 99% year round	68% (w) – 98% (s)	76% - 97% (s)

The Northern Sea Route is the most accessible route throughout the 21st century under all scenarios. By mid-century, PC3 and PC6 may access the entire route nearly all summer, and open water vessels for three months. The Northwest Passage and the Central Arctic Ocean route are less accessible, especially for the weaker vessels until the latter half of the century. By late century, the Central Route is projected to become a viable option for polar-classed vessels, suggesting that routing decisions may increasingly be made to maximize distance savings rather than ice avoidance

in the long term. It is thought to be a summertime possibility. In the near future, marine access will be mainly confined to the summer season.

The Northwest Passage will see early century navigation severely shorter in the Canadian Arctic Archipelago than anywhere else in the Northwest Passage for Polar Class 3 ships. Navigation season in the Lancaster Sound was on average 105-120 days but only 15 days or less in the high Arctic. It was projected to increase to up to 20-37 days by mid-century and 15-38 days in late century. The surprising finding of less time in late century could result from the import of heavy ice from the central Arctic Ocean because of the melt. Polar Class 6 vessels will have very short periods in the early century but up to 45 days in late century. Open water vessels only have around 10 days in early century but up to 50 in late century. These short periods of navigation for open water vessels represent a strong limitation to use of the Northwest Passage for trans Arctic voyages.

The Northern Sea Route is the most accessible route and Polar Class 3 vessels are projected to be able to transit throughout the summer for the whole century. The central portion around the Kara Sea and Vilkitsky Strait, will have more ice and the winter season is shorter. Polar Class 6 vessels see long periods of summer use, up to 120 days, but it is highly variable between locations, down to 45 days in some areas. Open water vessels are similar to Polar Class 6 ships, they can enjoy good access in the summer time, up to 120 days, but it is highly variable between seasons and areas, down to 35 days.

The Central Arctic Ocean Route season for all ships is highly variable. Even for Polar Class 3 it is brief, up to 80 days in some areas but down to 25 days in others. Overall summer season grow by 24-30 days by mid-century and 24-31 days by late century. Polar Class 6 ships only enjoy sporadically seasons but it grows to up to 46 days in mid-century and 64 days in late century. Open water vessels are not able to transit in early century, but could see a season of up to 30 days in mid-century and 74 in late-century.

The results therefore suggest highly increased access under all climate scenarios. Ice capable ships will be necessary for Arctic navigation in the near term at least. Their importance could diminish as time passes and ice retreats. PC3 vessels are able to navigate relatively freely in all forcing scenarios with relatively minor seasonal fluctuation, while weaker vessels,

especially the open water vessels, are comparatively more subject to difference in climate forcing and the intra-annual timing of ice retreat.

The study concludes that although the access is more, numerous challenges continue to restrain Arctic navigation. One key finding is that voyages in the near term are likely to be unreliable due to highly variable seasons in much of the region.

The main conclusions is that Arctic marine access depends strongly upon capital investment and infrastructure in addition to sea ice presence, and is therefore a unifying interdisciplinary concept determined by both the physical environment and human socioeconomic systems.¹⁵⁹

¹⁵⁹ Stephenson, S. R., Smith, L. C., Brigham, L. W., & Agnew, J. A. (2013). Projected 21st-century changes to Arctic marine access.

Figure: Assessment of future changes in the peak Arctic shipping season¹⁶⁰

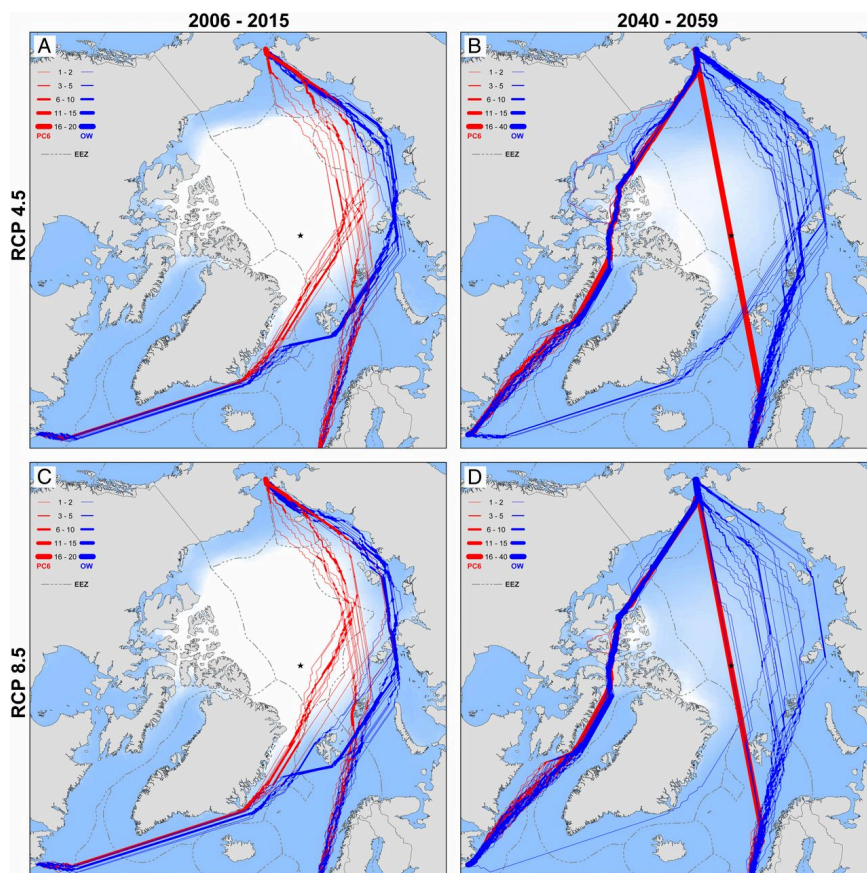


Figure 1-11 Assessment of future changes in the peak Arctic shipping season. The red lines indicate the fastest available transit routes for Polar Class 6 ships, whilst the blue lines represent the fastest lanes for open water ships. The picture on the left shows the years 2006-2015 and the pictures on the right the period 2040-2059. The pictures above show the climate scenario 4.5, medium low ice melt, and the pictures below the climate scenario 8.5, high ice melt.

A study from 2013 analyzes seven climate model projections of sea ice properties and assumed two different climate change scenarios based on the

¹⁶⁰ Smith, L. C., & Stephenson, S. R. (2013). New Trans-Arctic shipping routes navigable by midcentury.

projections. The result was a study published, but a figure presented was of special importance, showing clearly the potential between scenarios and seasons. The study sought to assess future changes in peak season, which is in September for Arctic shipping potential. Two vessel classes were compared, Polar Class 6 defined to have medium ice strengthening, and open water vessels, with no strengthening.

The study chose two timeframes, 2006-2015 representing present times, and a future scenario of 2040-2059. Optimal navigation routes were determined for the Intergovernmental Panel on Climate Change (IPCC) representative concentration pathway (RCP). The routes are for RCP 4.5 - medium-low and RCP 8.5 – high climate forcing scenarios.

The red lines indicate the fastest available transit routes for Polar Class 6 ships, whilst the blue lines represent the fastest lanes for open water ships. Where overlap occurs, line weights indicate the number of successful transits using the same navigation route. Dashed lines indicate national 200-nm EEZ boundaries; white backdrops indicate period-average sea ice concentrations in 2006–2015 (A and C) and 2040–2059 (B and D).¹⁶¹

1.6 Conclusions

There is definite potential for all the Arctic shipping routes; the Northwest Passage, the Northern Sea Route and the Central Arctic Ocean Route. They are all at different stages of development, both in regards to environmental conditions, infrastructure and governance. But the first step to become a serious option for transits is the interest, which could be described at current times as little, but growing. Curiosity is present, but real concrete interest seems to be lacking, at least for transits through the Arctic.

The lack of interest is demonstrated in this chapter, for example with a study by DNV which asked what ship-owners think of the potential opening of the Arctic sea routes. Only 17 out of 98 shipping companies participating in the study showed any interest in the Arctic and the main conclusion was

¹⁶¹ Smith, L. C., & Stephenson, S. R. (2013). New Trans-Arctic shipping routes navigable by midcentury.

that Arctic shipping would remain overwhelmingly destinational, and not trans-Arctic.

The need for Arctic shipping at present times is very little for the world shipping industry. Three main chokepoints were identified in this chapter to discuss the Arctic as an alternative to the problems arising in them. The Suez Canal has been improved on numerous occasions to respond to the demands of the shipping industry. It has also raised its toll significantly, leading to unrest in the industry threatening to leave the canal.¹⁶² However, to transit between Asia and Europe and go around the Cape of Good Hope seems unfeasible although it has the benefit of avoiding the tariffs in Suez, and the danger of piracy. Areas near by have been infested with pirates and although the problem has diminished in recent years, piracy is still a threat on the Suez Canal route especially when leaving the Red Sea to navigate to the Arabian Sea, in the Gulf of Aden.

The Malacca Strait has problems as well. As one of the most frequently used shipping lane it is vital to the economy, especially to China as demonstrated in chapter 2.5. It is narrow and with the potential increase in shipping, the problems might grow. Any disruption, by terrorists or natural disasters, would have severe consequences for the world transportation system.

The Panama Canal is being humbled by the prospect of a mega project in Nicaragua that would see a Chinese business tycoon investing in a shipping canal through the country. The Panama Canal is still relatively small, although it is being improved.

The near-term use of the Northern Sea Route for transits will be occasional summer transports with cargo that often has high value, is heavy duty and with no need to be delivered on a specific time. The German company Beluga Shipping demonstrated this option and showed the potential of such transits, however the transit was from deep within the Russian Arctic but reportedly saved the company over \$1 million USD compared to the Suez Canal route.¹⁶³

Regular transits with containers are still speculations, and ones for the long term. Shipping companies need to be interested, as they are the ones

¹⁶² Reuters <http://www.reuters.com/article/2013/03/20/egypt-suez-shipping-idUSL6N0C6DFZ20130320>

¹⁶³ Moe and Jensen

who control where their ships go. They are responsible for gaining as much money as they can for their owners. Shipping companies need three key elements for sustainable management: predictability, punctuality and economies-of-scale, all of which are lacking in the Arctic. Predictability cannot be sustained as charting is lacking, weather and ice conditions can change suddenly. Time hampering activities are sometimes needed, such as waiting for icebreaker assistance. Punctuality is lacking for the same reasons as above, shipping companies cannot establish a detailed timetable for their ships to follow when conditions are unpredictable. And economy-of-scale cannot be reached, at least not in the near future, as the natural conditions induce shallow straits, resulting in only small vessels being able to transit.

Another reason only small ships can pass is that the ones needing icebreaker assistance cannot be wider than the icebreaker itself. And if a shipping company would want to build a ship big enough to carry huge amounts of cargo, but still being able to transit through ice, the cost would be enormous. It is unknown if shipping companies would risk such investments when there are so many questions unanswered about the prospects of Arctic shipping, especially since shipping companies are building bigger ships to save money per each transport.

The Chinese vessel Yong Sheng transited the Arctic in 2013. It was a test run by Chinese company Cosco. It was carrying mere 17.000 tons,¹⁶⁴ and by calculations that one TEU is 24 tons,¹⁶⁵ it was carrying around 700 TEUs. The transit was successful but the amount of cargo is dwarfed by the amount of cargo the bigger ships transport today, up to 18.000 TEUs,¹⁶⁶ although that number is just for the latest giants of the sea.

With the increase in technology in shipbuilding, the near future will see use of ships carrying over 25.000 TEU's,¹⁶⁷ the shipping industry will want to use its biggest ships for transportation, calling for use of the Central Arctic Ocean Route. As ships pay tariffs to Russia per ton, it would become increasingly expensive to navigate big ships on the route, in addition to natural conditions being unfeasible.

¹⁶⁴ Northern Sea Route Information Office. (n.d.). NSR Transit Statistics.

¹⁶⁵ Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe. p.440.

¹⁶⁶ Andersen, O. (2012). The race among the world's biggest ships begins. *Shippingwatch*.

¹⁶⁷ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

Arctic shipping will not be feasible in any of the Arctic routes until the ice has retreated more. It is predicted to continue to decrease and therefore Arctic shipping is a waiting game at present time. Shipping companies are waiting for conditions to get better, both natural conditions, and the infrastructure. Shipping companies want to reduce risk, and their insurance companies as well. That is a hindrance to the Central Arctic Route where the ice will be the last to retreat and it is furthest away from infrastructure and search and rescue operations for emergencies.

Russia is actively trying to add to its infrastructure in the Northern Sea Route, but it needs transits to pay for them. The more transits, the more tariff Russia can collect. Therefore, Russia is put in a difficult position; it must take risks in adding to the infrastructure, which is very expensive, before the shipping activities increase. Russia can however not be assured that it will be compensated by means of tariffs if and when shipping activities grow. Some might be waiting for the Central Arctic Route to open to avoid the Russian tariffs.

Arctic shipping is still a relatively unknown activity. Although research has been conducted, very few have looked at the economic feasibility of transits with climatic conditions in mind. More research has to be conducted before more shipping companies will increase their interest.

When looking at the feasibility, one has to take into account where the ships are going. Japan would seem in a good position to utilize the Arctic, for example for energy transport between Murmansk and Yokohama. However, transits between Shenzhen, the second biggest port in China, and Rotterdam, would only save 15% of the distance,¹⁶⁸ but the risks for the ships would be multiplied. Adding lack of predictability to that equation and only small ships being able to transit, the feasibility is questionable.

As nature will help in determining the scope of Arctic shipping, the world changes. One study suggests that open water vessels with no ice strengthening as the majority of all vessels today, will see an up to 97% accessible area of the Arctic Ocean in the summertime near the end of the 21st century. Although they can enjoy good access in the summertime, up to

¹⁶⁸ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

120 days, it is highly variable between seasons and suggested it could go down to 35 days in the Northern Sea Route close to the 22nd century.¹⁶⁹

In this case scenario, shipping companies could use their regular ships for transits for some days of the year, up to 120 days in the summer and some days in winter. But then the question of how big the ships in question would be rises again.

Another factor is time and technology. As there are unknowns for the extent and scope of sea ice throughout the century, how will the world change? How will the world economy change? How will governance evolve? How will the energy sector look like, would it call for access to deep lying Arctic resources with increased shipping activities? How will transportation change? Will there be alternative solutions for transportation in 70 years?

Environmental concerns grow in the Arctic with increased activities. Although ships pollute less than other means of transport, the danger of accidents will threaten the fragile Arctic biodiversity. Numerous concerns arise when ships traverse the Arctic compared to regular world shipping lanes, including seasonal darkness, sea ice, narrow straights and remoteness, causing search and rescue operations to become harder. There is also less experience and knowledge of cleanups where sea ice is present than in regular waters.

Iceland seems to be one of few countries looking to the use of a transshipment hub for future use of the Arctic shipping routes. However, China has shown interest in such a port, which will be predominantly used for other activities than to support transits through the Arctic if built. Nonetheless, Iceland would be in a good position if regular shipping across the Central Ocean Route would become a reality. But that does not seem to be feasible in the near or medium term. Even after that, the viability of a container hub-port in Iceland for shipping part time of the year can be questioned. And the feasibility of the Central Route will have to be assessed as it lacks necessary infrastructure for ships in addition to weather and ice reports.

More research on Arctic shipping is needed and it is quite normal that interest in Arctic shipping is lacking at present times. With so many problems and unknowns related to Arctic shipping when many are enjoying regular

¹⁶⁹ Stephenson, S. R., Smith, L. C., Brigham, L. W., & Agnew, J. A. (2013). Projected 21st-century changes to Arctic marine access.

transits on their sea-lanes, why spend time and money looking into and developing something you do not know what will look like in 10 years?

But as next chapter shows, there might be need to utilize the Arctic shipping routes for different reasons. If one country and one industry would be capable and interested in Arctic shipping, it would be China. It could be the biggest player for Arctic shipping and could alter the transport scenario. China showed its intent and capability with the Yong Sheng in 2013, and it might just be the beginning for the emerging superpower in the east.

2 China and Arctic shipping: Needs and ambitions

China has been conducting research in the Arctic for decades. It has shaped its Arctic agenda in recent years by structuring governmental organizations, increasing attention to the region. China has adopted a cautious approach to Arctic affairs and officially claims its interest are for the necessity of doing research on the climatic changes occurring in the region as they affect China, including extreme weather patterns.¹⁷⁰

Recently China's shipping industry has been in a decline and real concrete interest from shipping companies to utilize the Arctic seems small. The current interest is recent although Chinese officials and researchers have been aware of the potential in Arctic shipping.¹⁷¹ But as an economic power willing to signal its strength and influence worldwide, China has increased its attention to shipping through the Arctic. The first Chinese merchant vessel navigated through the Northern Sea Route in 2013, saving two weeks of its travel time compared to the Suez Canal.¹⁷²

China, along with the European Union, is the most important non-Arctic actor and will be instrumental to the development of future Arctic shipping. China is the world's largest exporter of manufactured goods having surpassed the EU and USA in 2011 and the second-largest importer of globally shipped goods.¹⁷³

"Whoever has control over the Arctic route will control the new passage of world economics and international strategies,"¹⁷⁴ said Li Zhenfu at Dalian Maritime University, referring to the Arctic shipping routes and the Arctic resources.¹⁷⁵

¹⁷⁰ Alexeeva, O., & Lasserre, F. (2012). China and the Arctic.

¹⁷¹ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

¹⁷² Jakobson, L. (2010). China prepares for an ice-free Arctic.

¹⁷³ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

¹⁷⁴ Jakobson, L. (2010). China prepares for an ice-free Arctic.

¹⁷⁵ Jakobson, L. (2010). China prepares for an ice-free Arctic.

Reports and studies differ on when the Arctic routes will be feasible for ships, but no climate model projects an ice-free Arctic in winter by 2100. Marine access has been said to be determined upon capital investment and infrastructure in addition to sea ice presence, and is therefore a unifying interdisciplinary concept determined by the physical environment and human socioeconomic systems.¹⁷⁶

However, Huigen Yang, the director of the Polar Research Institute of China, has said that China is convinced that the Central Arctic route across the North Pole will be open 4 months every year for strengthened ships of the type already being operated in the Kara Sea as soon as 2020.¹⁷⁷ Yang has also said that 5-15% of China's international trade could use an Arctic shipping route by 2020, worth 300-900 billion USD.¹⁷⁸

Shipping distances between China to Europe comparing the Arctic with the Suez Canal depend greatly on the origin of the port and its destination. A journey from Shanghai, the largest port in China, to Rotterdam is 3.200nm shorter through the Arctic, around 28%. However if departing from Shenzhen, China's second biggest port and the one growing the fastest, the difference is cut to 1.600nm or 15%. The majority of China's fastest growing ports are in the southern provinces of China.¹⁷⁹

China does not have an official Arctic policy and therefore it can be challenging to identify China's official position to certain topics. This chapter looks at the main drivers behind China's interest in Arctic shipping and concludes with a case study which asked if Chinese companies were in fact interested in Arctic shipping.

¹⁷⁶ Stephenson, S. R., Smith, L. C., Brigham, L. W., & Agnew, J. A. (2013). Projected 21st-century changes to Arctic marine access.

¹⁷⁷ Skarphéðinsson, Ö. (2013). The Arctic as a Global Challenge – Issues and Solutions [Key note speech].

¹⁷⁸ Kopra, S. (2013). China's Arctic Interests.

¹⁷⁹ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

2.1 China's trade partners

China's economy has gone through rapid change since it reformed in 1979, opening up to foreign trade and investment and implementing free market reforms. The result is staggering and China has been growing rapidly ever since. With real annual gross domestic product (GDP) growth averaging nearly 10% through 2012, China has emerged as a major global power. It is currently the world's second-largest economy, largest merchandise exporter, second-largest merchandise importer, second-largest destination of foreign direct investment (FDI), the largest manufacturer and the largest holder of foreign exchange reserves.¹⁸⁰

China is currently the second-largest economy after the United States, and some analysts predict that it could become the largest within the next five years or so. On a per capita basis (a common measurement of a nation's standard of living), however, China is significantly less developed than the United States.¹⁸¹

The United Nations statistical division estimates that in 2012, the value of China's exports increased by 7.9% and its imports by 4.3%. A total of 24 major partners accounted for 80% of China's exports in 2012. The main products were machinery; transport equipment manufactured articles and manufactured goods. Most of China's imports are machinery, transport equipment and mineral fuels.¹⁸²

A study by the Polar Research Institute of China concludes that the Arctic will indeed play a major role for the country's future trade networks. It indicates that by 2020 5-15% of China's trade value, worth \$300-900 billion USD, could pass through the Arctic. The geographic distribution of China's main trade partners and its investments in other regions have led to China's Arctic shipping aspirations to be put in doubt.¹⁸³

Most of this trade is containerized as the majority of trade between China and Europe. The Asia-Europe route is the most important shipping highway in the world with big container vessels carrying 18.400 TEUs

¹⁸⁰ Morrison, W. (2014). China's Economic Rise: History, Trends, Challenges, and Implications for the United States.

¹⁸¹ Morrison, W. (2014). China's Economic Rise: History, Trends, Challenges, and Implications for the United States.

¹⁸² United Nations Statistics Division (n.d.). China.

¹⁸³ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

following regular and precisely timed schedules. As discussed in 1, the Arctic does not allow for either regular services or precisely timed ones.

In 2010, Chinese mainland ports increased their share of total world container throughput to 24.2%, further strengthening their participation in global maritime businesses. World trade is expected to grow by three quarters by 2025 and the world cargo fleet by around 25% by 2020. That means over 100.000 vessels above 500 deadweight tonnage (dot) and further increase in traffic congestion and accidental collisions.¹⁸⁴ By 2030 China will dominate global trade among 17 of the top 25 trade routes, according to PricewaterHouse Coopers.¹⁸⁵

Chinas Arctic shipping aspirations are tied to trades with Europe, especially Central and Northern Europe. Other regions, including Africa, the Americas and the Middle East where China imports most of its oil from, will not use the Arctic for transits. Chinas major trade routes are far removed from the Arctic as most of its imports come from neighbouring countries like Japan and South Korea, countries near or south of the equator like Australia and Brazil or the Middle East, like Iran.¹⁸⁶

Trades with Northern Europe accounts for just 2.9% of China's international trade. Europe in total accounted for 16% of China's imports in 2012. Germany is the only European country to make the top 10 list of China's import partners per trade value, sitting in fifth place with \$92 billion USD value, far behind the top four as table 2-1 shows. Geographic distribution of China's main trade partners therefore suggests that Arctic shipping is not necessarily that high on the agenda for China.

¹⁸⁴ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

¹⁸⁵ PricewaterhouseCoopers. (2011). Future of world trade.

¹⁸⁶ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

Table 2-1 China's import and export partners in 2012. The export box shows how USA and Hong Kong dominate China's exports. It also shows that China imports in abundance from its near neighbours.¹⁸⁷

China's imports		China's exports	
<i>Trade partner</i>	<i>Value, \$USD in billions</i>	<i>Trade partner</i>	<i>Value, \$USD in billions</i>
Japan	177.7	United States	352.6
South Korea	168.5	Hong Kong	323.6
United States	133.7	Japan	151.7
Taiwan	132.2	South Korea	87.7
Germany	92	Germany	69.1
Australia	84.6	Netherlands	58.9
Malaysia	58.2	India	47.7
Saudi Arabia	54.9	UK	46.3
Brazil	52	Russia	44
Russia	44	Singapore	40.8

The importance of Europe as China's trading partners is expected to decline in the coming decades but other regions will increase their stake, Africa and South America in particular. The bulk of China's exports are shipped within Asia, over half, with Japan and Hong Kong the biggest trade export places. United States is the biggest single trade partner for China's exports. China's exports to Europe in 2012 accounted for 19% and the USA 17%.

China surpassed USA in 2012 as the largest trading nation in the world. By 2030, four European countries are projected by PricewaterhouseCoopers to be on China's top 20 trade partners list; Germany, United Kingdom, France and the Netherlands. Germany is seemingly the only one to benefit from a shorter route through the Arctic, and the only one on the top 10 projected trade list in 2030.¹⁸⁸

With improved technologies, a new generation of ultra-large container ships and bulk carriers offering improved economies and reduced

¹⁸⁷ PricewaterhouseCoopers. (2011). Future of world trade.

¹⁸⁸ PricewaterhouseCoopers. (2011). Future of world trade.

costs is perhaps so close to the savings from Arctic shipping that the economic feasibility of Arctic shipping is questioned.¹⁸⁹

Chinese shipping commercial sector

The interest of the commercial sector in China is fairly recent. Chinese officials and researchers have been aware of the opportunities presented, but as with many other countries and commercial markets, the recent projections of ice melt has changed the Arctic perspective. Opportunities in shipping, resources and fishing are of interest for the Chinese commercial market.

Utilizing the Arctic for shipping goods has been of interest for Chinese companies in recent years, mainly for one of the biggest shipping companies in the world, and the biggest one in China: China Ocean Shipping (Group) Co. (Cosco). But Chinese shipbuilding companies lack the experience in building vessels for polar conditions and China sought Finnish expertise when designing its developing icebreaker.

Chinese shipping industry has been in a downturn in recent years. Many companies faced serious losses in 2011 and 2012 and the priority of the development of new shipping routes is not feasible for many actors in China. Many would rather play a wait-and-see game, presumably following Cosco's process to see to what extent the sea ice will melt in the next to medium term.¹⁹⁰

Cosco and China Shipping (Group) Co., both owned by the Chinese government, signed a cooperation agreement in 2014 strengthening the ties between China's top two shipping companies. The government had put severe pressure on the companies after overcapacity led to financial problems after the economic crisis in 2008. Some analysts have said that this closer collaboration could lead to the two giants merging. The two companies had been competing on international routes but now the companies said they hope to "improve the influence of Chinese shipping companies in the world shipping industry."¹⁹¹

¹⁸⁹ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

¹⁹⁰ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

¹⁹¹ Chiu, J. (2014). Two Chinese Shipping Companies Form Alliance. Wall Street Journal.

China has already invested in numerous ports in Asia, the Middle East, Africa and Europe and built an extensive network of ports. Cosco has invested heavily in ports along the Suez Canal route.¹⁹²

Cosco sent its first merchant vessel through the Northern Sea Route in 2013. The Yong Sheng, a 19.000-tonne vessel travelled from Dalian in northeastern China to Rotterdam via the Northern Sea Route, saving two weeks of its travel time compared to the Suez Canal. It carried steel and industrial machinery.¹⁹³ It was carrying 16.651 tones of general cargo,¹⁹⁴ a fraction of what could go through the Suez Canal.¹⁹⁵

“This sea route will offer our clients more convenience and choice, while allowing us to save time, lower costs and reduce emissions,” the chairman of Cosco Ma Zehua, declared in 2013. Danish shipping company Maersk, does not agree. “We do not see [the Northeast Passage] having a major impact on routes via Suez,” said Lars Mikael Jensen, head of Asia-Europe trade at Maersk.¹⁹⁶

Representatives from Cosco and other major shipping companies in China have visited Iceland and discussed investments with various sources, including the Icelandic government.¹⁹⁷ The Icelandic Minister of Foreign Affairs addressed the issue with a Chinese minister, who encouraged further cooperation.¹⁹⁸ Cosco has worked with Eimskip, the biggest shipping company in Iceland, on possible cooperation with Arctic shipping on the agenda.¹⁹⁹

¹⁹² Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

¹⁹³ Mitchell, T. & Milne, R. (2013). First Chinese cargo ship nears end of Northeast Passage transit. *Financial Times*.

¹⁹⁴ Northern Sea Route Information Office. (n.d.). NSR Transit 2013.

¹⁹⁵ The Suez Canal Authority. (n.d.). Rules of Navigation.

¹⁹⁶ Mitchell, T. & Milne, R. (2013). First Chinese cargo ship nears end of Northeast Passage transit. *Financial Times*.

¹⁹⁷ Unnarsson, K. (2012). Kínverjar vilja fjárfesta í umskipunarhöfn á Íslandi. *Vísir.is*.

¹⁹⁸ Ministry for Foreign Affairs. (2013). Mikil tækifæri í viðskiptum við Kína.

¹⁹⁹ Ármannsson, Ó. (2014). Coscon og Eimskip horfa til enn aukins samstarfs. *Vísir.is*.

2.2 Chinese Arctic research

Science is the first step and bridgehead for China into the Arctic to pursue interests defined by the Chinese government: political stability, territorial integrity and economic growth. As a part of the Chinese foreign policy, the country's Arctic interests and activities are linked with the government's defined interests.²⁰⁰

In 2010 it was stated that China had adopted a wait-and-see approach to Arctic developments as it was wary that active overturns would cause alarm in other countries due to China's size and status as a rising global power. Chinese officials were therefore cautious when formulating their views on China's Arctic interests and stressed that its primary focus was on climatic and environmental consequences of climate change. China's initial focus on the Arctic was indeed scientific but commercial, political and security interests have followed.²⁰¹

China has had a long-standing interest in the Arctic as a research area. Numerous articles were published in Chinese journals between 1988 and 2008 on topics like Arctic glaciology, climatology, oceanographic science, upper atmospheric physics, biology and the environment.

An informal survey in the biggest Chinese database for scientific articles in 2012 showed that 680 articles included the word "Arctic" in their title that were published before 2008. Half was on climate issues, 23% on biodiversity and others on the environment, technology, history and linguistics. No major scientific article was published on Arctic politics before 2007.

Recent years there have been several publications on politics, legal issues and strategic interests like shipping published. Several of them talk about the development of "strong traffic" in the Arctic Ocean.²⁰²

But Zhao Jun, Chinese ambassador in Norway said in a speech at the Arctic Frontiers conference in 2013 that "however, generally speaking, China's Arctic scientific research is still at the starting stage."²⁰³

²⁰⁰ Xing, L., & Bertelsen, R. (2013). The Drivers of Chinese Arctic Interests: Political Stability and Energy and Transportation Security.

²⁰¹ Jakobson, L. (2010). China prepares for an ice-free Arctic.

²⁰² Huang, L., Lasserre, F. & Alexeeva, O. (n.d.). Arctic Shipping and China's shipping firms: A special role for State Corporators?

²⁰³ Zhao, J. (2013). China and the High North.

The Chinese government recognizes that China is “one of the countries most vulnerable to the adverse impacts of climate change.”²⁰⁴ It was reported in 2011 that 430 million people in China were affected by climate change due to severe storms and natural disasters, and the economy suffered a 309.6 billion yuan loss, \$49.6 billion US dollars.²⁰⁵

“China is neither an Arctic nor Antarctic country, but its climate is greatly influenced by polar abnormal events. The snow disaster [that] unusually happened in South China in January 2008 has been attributed to the unprecedented retreat of sea ice in September in the Arctic Ocean. If the Arctic and Antarctic ice sheets all melt, the coastline of China would retreat 400km inland and the most populated and prosperous areas, such as Guangzhou, Shanghai and Tianjin etc. would be totally under seas,” Dr. Huigen Yang, director of the Polar Research Institute of China, said in 2012.²⁰⁶

China’s focus on climate research in the Arctic is therefore of little surprise. China is also eager to learn about changes, as climate will also affect the Himalayan cryosphere, a key concern for the countries around the “third pole”. India, China, Pakistan, Nepal, Bhutan and neighbouring countries are worried about the melting of the cryosphere to pose drastic human security threats. Millions are dependent on the Himalayan water source and changes could have severe effects.²⁰⁷

“The Arctic, the Himalayas and Antarctica are not isolated and separate parts of the globe...their fate and the fate of the people and future are closely connected,” president Ólafur Ragnar Grímsson of Iceland has said.²⁰⁸

China plays an important role in climate governance. On one hand it is a developing country where millions still live in poverty but on the other hand it is the world biggest emitter of carbon dioxide due to poor energy efficiency and extreme use of coal as an energy source. But as a leader of the developing world, China is an important actor in setting an example for other

²⁰⁴ Kopra, S. (2013). China’s Arctic Interests. p.5.

²⁰⁵ Kopra, S. (2013). China’s Arctic Interests. p.5.

²⁰⁶ Arctic Portal. [arcticportal1]. (2010). Dr. Huigen Yang: Chinese Arctic Research and CHINARE5. [Video file].

²⁰⁷ Kopra, S. (2013). China’s Arctic Interests. p.5.

²⁰⁸ Grímsson, Ó.R. (2011). Our ice dependent world.

emerging powers, namely the BASIC, Brazil, South Africa, India and China, as well as for other developing countries in climate negotiations.

Chinas future efforts thought to be crucial for future climate negotiations. China has been working diligently to cut emissions and work towards more environmental protection.²⁰⁹

Chinas views on Arctic cooperation have been widely discussed. In a speech at the establishment of the China Nordic Arctic Research Center (CNARC) in 2013, Jia Guide, deputy-director general from the Department of Treaty and Law, Ministry of Foreign Affairs of China, described Arctic cooperation as “the mainstream in Arctic affairs.”²¹⁰

Guide stressed that cooperation needed to be strengthened, “not only among Arctic states, but also among Arctic and non-Arctic states,” as there were many trans-national issues in the Arctic, namely climate change and shipping “which involve the common interests of all states.”²¹¹

Chinare 5

China’s last Arctic expedition was named *Chinare5*, China Research Expedition number five. It was a historic expedition for the history of China’s polar exploration as it was the first time that a Chinese expedition transited the Arctic through the Northern Sea Route.

Chinare5 started its journey in Qingdao in late June 2012. The route taken was through the Sea of Japan, through the Bering Strait, to the Northern Sea Route and to Reykjavík, Iceland. It also visited Akureyri in the north of Iceland. China’s plan was to sail Central Arctic shipping route back, going straight over the North Pole on its journey home. It did not succeed and had to avoid the Pole due to harsh conditions.

The Xuelong visited Iceland as a token in the aftermath of the country’s newly established Framework Agreement on Arctic Cooperation signed between the Government of the People’s Republic of China and the Government of the Republic of Iceland.

²⁰⁹ Kopra, S. (2013). China’s Arctic Interests.

²¹⁰ China-Nordic Arctic Research Center. (2013). Speech by Deputy Director-General JIA Guide in the Inaugural Ceremony of the CNARC.

²¹¹ China-Nordic Arctic Research Center. (2013). Speech by Deputy Director-General JIA Guide in the Inaugural Ceremony of the CNARC.

Xuelong had a scientific staff of 60; amongst them were experts in the fields of Physical oceanography (22 scientist), marine geology and geophysics (10 scientists), marine & atmospheric chemistry (16 scientist), marine biology and ecosystem (12 scientists).

The main areas of Chinese research in its five Arctic expeditions were the North Pacific Ocean, the Pacific Arctic Ocean, Svalbard, the Atlantic Arctic Ocean and the Central Arctic Ocean.²¹²

2.3 China's growing need for imported resources

Exploration of oil, gas and minerals are all projected to increase in the Arctic, with new technologies and less ice conditions have improved. China's cooperation in energy aspects in the Arctic could result in more shipping activities through the Arctic Ocean.²¹³

The resources within the area north of the Arctic Circle have been projected, famously, of the US Geological Survey to account for about 22% of the undiscovered, technically recoverable resources in the world. In addition the Arctic is said to account for about 13% of the undiscovered oil, 30% of the undiscovered natural gas, and 20% of the undiscovered natural gas liquids in the world. About 84% of the estimated resources are expected to occur offshore.²¹⁴

Large-scale resource production is one of the main pillars of the Arctic economy; with other being traditional activities and small sale/family resource production and finally the transfers from higher levels of government supported much of the consumption through the public sector.

The Arctic economy is a term used in the Arctic Human Development Report II, released in 2014. It's key are the production and distribution activities, driving the economy as a fundamental component of human development. The Arctic economy has been growing since the start of the 21st century. As the Arctic economy is an important part of the world resource economy, changes in it reflect changes in the world economy. The

²¹² Chinare5.com. (n.d.). The Research.

²¹³ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

²¹⁴ U.S. Geological Survey. (2008). 90 Billion Barrels of Oil and 1,670 Trillion Cubic Feet of Natural Gas Assessed in the Arctic.

Arctic economy serves two different markets. One part produces resources for the international market, including diamonds, iron, gold, zinc, oil, natural gas, fish and timber. The other part of the economy serves the local market.

Production for the international market in the Arctic economy is determined by the world's demand for its resources, the cost of producing and moving the resources to market. The Arctic is a high cost region, distinguishing for the region, partly a consequence of the harsh and ever-more unpredictable Arctic climate, affecting the amount and type of resource production in the region. Adding to the high costs are sparse settlements, remoteness of resource deposits from centers of consumption, production and decision-making. The distance from markets and population centers increased transportation costs to markets.

Global warming is improving access to these resources which would lower the cost of access and development for Northern resources. Improved access would also lower costs of shipping resources to markets that would increase possibilities of resource developments in the Arctic.²¹⁵

China is the world's dominant consumer of raw materials and hydrocarbon resources. In 2013 it surpassed USA as the largest importer of crude oil. The Middle East generates half of China's oil imports with Africa in second place with 15%.

China has been the largest importer of iron ore since 2003 with more than half of its imports from countries near the equator, far away from the Arctic. Australia is China's biggest supplier of iron ore with Brazil second.²¹⁶

As a major consumer of energy and raw materials, sources of such are in great demand, and one of China's interests in the Arctic. China is the world largest importer of many commodities, including copper, steel and crude oil. The rise in the world prices of many commodities in recent years has been linked with China's demand for these sources.²¹⁷

Premier Wen Jiabao stressed on building a resource-saving society in 2005 and it had a great bearing on China's modernization and national security, Chinese peoples fundamental interests and the survival and long-term development of the Chinese nation. Wen said a large population; in-

²¹⁵ The Arctic Human Development Report II will be released in 2014. The author gained access from the Reports' authors to exclusively use for this thesis.

²¹⁶ Humpert, M. (2013). The Future of Arctic Shipping: A New Silk Road for China?

²¹⁷ Xing, L., & Bertelsen, R. (2013). The Drivers of Chinese Arctic Interests: Political Stability and Energy and Transportation Security.

adequate resources and a vulnerable environment comprise China's basic national conditions. As it seeks to build a well-off society in an all-round way, China will further pursue economic growth, continued industrialization, gradual upgrading of residents' consumption structure and rapid urbanization. Consequently, the demand for resources will increase, resulting in a wider gap between resource supply and demand and heightened pressure on the environment.²¹⁸

In 2004, China consumed 30% of the world's iron ore, 31% of the coal, 27% of the steel and 25% of the world's aluminium. In the beginning of the 21st century China's demand for steel, nickel and copper increased by 100% for each. This growth has had worldwide effects as China's energy demand has more than doubled during the past decade.

It has been estimated that China will consume 17% of the global energy supply by 2050 and 41% of the global coal consumption. China's oil consumption is predicted to increase as well as natural gas. China's energy consumptions from 2007 are predicted to multiply by 2.5 in 2050 and in 2100 that China will need to import 1.3 Gtoe²¹⁹ of primary energy out of 4 Gtoe usages.²²⁰

China is not a resource rich country on a per capita basis, being home to a quarter of the world's population, representing less than half of the world's average. Water shortages affect two-thirds of the countries in the world and China is one of the countries suffering most severely. The problem is exacerbated by water pollution.²²¹

China has adequate coal reserves but concerns for the environment; water resources and work safety considerations have restricted coal exploitation. Oil resources are inadequate; the potential of natural gas has yet to be tapped; and less than one percent of China's nuclear energy resources have been exploited because of technological barriers and high costs.

Given this reality, the Chinese government has put forward some guidelines on the development of the country's energy sector. It will adhere to the principle of "putting energy saving first, relying on domestic reserves, taking coal as the basic energy source and seeking diversification." It will

²¹⁸ Qiu, T. (2007). Natural resources: present and future.

²¹⁹ *gigatons of oil equivalent*

²²⁰ Xing, L., & Bertelsen, R. (2013). The Drivers of Chinese Arctic Interests: Political Stability and Energy and Transportation Security.

²²¹ Qiu, T. (2007). Natural resources: present and future.

focus on saving energy, reducing energy consumption, adjusting the energy mix and reining in excess production capacity. It will accelerate the development of clean energy, shed backward production capacity, optimize the structure and step up the upgrading of the energy industry, and promote the comprehensive development of energy resources. It will also foster a sustainable economy, develop renewable energy and new energy resources, promote the exploration of domestic oil and gas resources, and enhance the strategic oil reserve capacity.²²²

China is therefore in a long-term journey towards a resource saving and environmentally friendly society. But due to the extensive economic growth, it is projected that China is still a long way from achieving its goals. China's oil imports have increased year by year over the past 20 years, heightening its foreign oil dependency. Statistics show that China's crude oil imports increased 28% annually on average from 1990s to 2004. Experts predict that China's oil demand will reach 450-600 million tons by 2020, and over 50% of it will have to be imported.²²³

Chinese companies have already invested in Greenland in their search for new exploration sites. In 2009 a private company acquired prospecting rights to explore metals and minerals in southern Greenland. Another company invested in a joint prospecting project in Greenland with United Kingdom's Nordic Mining Corporation. Investments by Xinye Mining in an iron ore mine have been investigated but not developed.²²⁴

The first attempt of transporting hydrocarbons between the Arctic and China along the Northern Sea Route was made in 2010. The vessel was *Baltica* and it took 27 days to deliver natural gas condensates from Murmansk to Ningbo. It was escorted by a Russian icebreaker.

The trial journey was followed by a long-term commercial agreement between the Russian sea shipping company Sovcomflot and China National Petroleum Corporation in November 2010. The agreement was signed by high ranking officials from the countries, Igor Setchin, the Russian vice prime minister and the president of the Board of the Rosneft oil company –

²²² Qiu, T. (2007). Natural resources: present and future.

²²³ Qiu, T. (2007). Natural resources: present and future.

²²⁴ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

the second largest oil producer in Russia, and Wang Qisha, vice president of China.

In 2011 and 2012 some Chinese bulk ships transported iron ore from Murmansk or Kirkenes to China via the Northern Sea Route and tankers and LNG carriers delivered oil or gas between Vitino and China.²²⁵

In 2012, PetroChina became the first Chinese state-owned company to own a whole oil sand development site in Canada when buying out its partner.²²⁶ Sinopec has been in talks over investments in Canada over gas projects²²⁷ and China National Offshore Oil Corporation (CNOOC) is working with other companies in the prospect of exploring an area in Icelandic jurisdiction, the Dreki Area. The Icelandic National Energy Authority granted its license for exploration and production of hydrocarbons in 2014. The Chinese partner owns 60% of the license and is also the operator of the license.²²⁸

PetroChina, SinoPec and CNOOC are the three biggest oil companies in China.²²⁹ They have all looked to the Arctic in their resource hunt, although the interest varies and seems at the beginning of its prospects.

2.4 Political aspects of China's shipping interests

China's overall foreign policy can be split to three parts, first is political stability, second is sovereign security, territorial integrity and national unification, and third is China's sustainable economic and social development. An underlying, but unstated, objective of China seems to be

²²⁵ Huang, L., Lasserre, F. & Alexeeva, O. (n.d.). Arctic Shipping and Chinas shipping firms: A special role for State Corporators?

²²⁶ Jones, J. (2012). PetroChina buys control of Canada oil sands project. Reuters.

²²⁷ Vukmanovic, O. (2014). Sinopec in talks to buy 15% in Petronas' Canada LNG project. Financial Post.

²²⁸ National Energy Authority. (2014). License for Exploration and Production of Hydrocarbons No 2014/01.

²²⁹ Johnson, CT. (2009). PetroChina, SinoPec and CNOOC Grab Oil Assets Ahead of Recovery. China Stakes.

respect as a major power and its wish to be seen as a responsible member of the international community.

The overriding motives of China's desire to understand the implications of the changes in climate and sea-ice melt and strengthen its Arctic are economic. The Chinese government's most important concerns are how the economy in China will benefit from the new economic opportunities in the Arctic and how the challenges faced will come into play.

China's economy is reliant on foreign trade. If shipping routes would be shorter to important designations for the western markets, it could benefit the nation greatly. Nearly half of China's GDP is dependent on shipping.²³⁰

Li Zhenfu of Dalian Maritime University, a public university, led a team of Chinese specialists that assessed China's advantages and disadvantages of Arctic shipping becoming available. The specialist panel made a SWOT²³¹ analysis for China's use of the Arctic sea routes. The graph was released in 2009 in an article called *Analysis of China's strategy on the Arctic route*.²³²

The strengths, according to the specialists, are China's status as a major export country, the elevation of China's global status, the enhancement of China's Arctic exploration and research capacity and the strengthening of Chinese shipping companies.

The weaknesses are that China does not have the "absolute right" to speak in global affairs, China's cultural elements mean that most international laws are based on western culture, China is not an Arctic Ocean coastal state and China's vessel-building technology and logistic planning techniques are not advanced globally.

The threats to the Arctic shipping routes problem are that the current international laws are not favourable to China's interests in Arctic shipping, there are scrambles in the Arctic amongst the coastal states such as Canada, Russia and USA, Chinese shipping companies will face fierce competition and the negative effects on China's ports in lower latitudes, meaning that China would have to sacrifice ports it already owns or operators for new ports for the Arctic sector.

²³⁰ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

²³¹ SWOT stands for strengths, weaknesses, opportunities and threats.

²³² Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

The opportunities are that the logistic cost of shipping companies will be reduced, Asia's high latitude ports will become new centers for international shipping, Arctic shipping has high tourist value and that global trade and shipping partners will change in a way that favours China.²³³

Li has been critical of China's lack of comprehensive planning to protect the country's interest in utilizing the Arctic shipping routes. "China's research fails to provide fundamental information and scientific references for China to map out its Arctic strategy".²³⁴ As a result, China was limited in protecting its right in the international area.

Li also said that the Arctic "has significant military value, a fact recognized by other countries," adding to his criticism of China's governance. Han Xudong, a Senior Colonel in the Peoples Liberation Army, warned that the possibility of use of force couldn't be ruled out due to its complex sovereignty issues.²³⁵

Guo Peiqing of the Ocean University of China criticized the lack of commercial research in 2007 for the opportunities that await China in the Arctic and the predominantly natural science orientated research focus. He said that it was not in China's interest to remain neutral and "stay clear of Arctic affairs". He said that as a global power, China should be more active in international affairs. "Any country that lacks comprehensive research on Polar politics will be excluded from being a decisive power in the management of the Arctic and therefore be forced into a passive position."²³⁶

Chen Xuelong of the China Institute of International Studies has said that China should have a long-term vision regarding Arctic shipping. He added that after successful test voyages by German vessels between the Netherlands and Holland, discussed in chapter 1, that "the opening of the Arctic route will advance the development of China's north-east region and eastern coastal area...it is of importance to East Asian cooperation as well."²³⁷

Arctic shipping could contribute to economic development in east and northeast China. Known as the "rust belt", China is actively promoting

²³³ Jakobson, L., & Peng, J. (2012). *China's Arctic Aspirations*.

²³⁴ Jakobson, L. (2010). *China prepares for an ice-free Arctic*.

²³⁵ Jakobson, L. (2010). *China prepares for an ice-free Arctic*.

²³⁶ Jakobson, L. (2010). *China prepares for an ice-free Arctic*.

²³⁷ Jakobson, L. (2010). *China prepares for an ice-free Arctic*.

the economic and industrial revitalization of this region, which lags behind other major industrial and manufacturing centers.

But China is not alone on the prospects. Japan and South Korea could for example benefit as much as China. It has even been said beneficial for China and Japan to work together as they have many mutual interests in the Arctic. Finding ways to jointly use an ice-free Arctic has the potential to create a genuine win-win situation for both China and Japan, the two East-Asian powers which in so many other areas find it difficult to find common ground.²³⁸

2.5 The Malacca dilemma and the need to diversify import routes

China faces dilemmas on its crucial sea-lanes. Imports from Europe, the Middle East and Africa all face transits through Chinas strategic competitors, USA and India. They are also faced with piracy threats and chokepoints, as in the Strait of Malacca, the Strait of Hormuz and the Gulf of Aden, as discussed in chapter 1.1. China is therefore seeking ways to diversify its transportation network.²³⁹

This growing need for imported energy sources, as discussed above, will have significant impacts on Chinese energy security and strategy. China faces competition from other buyers as well, for example Japan and South Korea who both import energy in masses. All three are also dependent on the same shipping lanes. A crucial aspect of the global shipping lanes is their dominance by the US Navy. China is therefore different from Japan and South Korea, who both are close allies with USA. China is almost totally dependent on ocean transport for its energy supply and raw materials as well as for exporting its goods.

Chinas governmental goals of a “harmonious society” and the “Chinese dream” are under threat as the countries energy security is an

²³⁸ Östreng, W. (2012). Shipping and Resources in the Arctic Ocean: A Hemispheric Perspective.

²³⁹ Xing, L., & Bertelsen, R. (2013). The Drivers of Chinese Arctic Interests: Political Stability and Energy and Transportation Security.

essential premise of these goals that are based on continuous economic growth. Chinese leaders and scholars have raised concerns about the energy security as it is a key driver for economic development, and if this development would be hampered it could cause a dilemma resulting in social unrest and popular resentment. That could in turn threaten the continued political authority of the state and the Communist Party.²⁴⁰

A total of 80% of China's trade passes through the Malacca Strait, including 77% of its oil imports. Increased traffic and the threat of piracy and hostile takeover are among reasons that China is concerned about the enormously important trading route. Hu Jintao, president of China, has called it the "Malacca Dilemma." China's increase in trade will further add to the dilemma, and has led to China looking towards alternative routes, namely the Arctic.

China has also diversified its trading with the Sino Myanmar pipeline and has looked to other pipeline options. The pipeline in Myanmar, stretching from the Shwe gas field to Kunming in China, cost China \$2.5 billion USD. China sees this project as one of huge importance to its energy security, helping in the Malacca dilemma.

But any changes in the Malacca Strait could still lead to significant changes in the Chinese economy, having worldwide effects, and the pipeline project has problems as well. Ships can be rerouted away from the Malacca Strait, but the pipeline not. The sea route to Myanmar is not well placed strategically for China and terrorism could cause millions of dollars of damage to China with a single attack.

China's oil imports are increasing so fast that the pipeline will only help, not solve the dilemma. It could buy China some time in slowing down on oil shipment through the Malacca Strait, but other options will still be observed.²⁴¹

A leading newspaper in China said in 2004 that "it is no exaggeration to say that whoever controls the Strait of Malacca will also have a stranglehold on the energy route of China."²⁴² China does not only have

²⁴⁰ Xing, L., & Bertelsen, R. (2013). *The Drivers of Chinese Arctic Interests: Political Stability and Energy and Transportation Security*.

²⁴¹ Sarma, J. & Reinert, M. (2013). *The Malacca Dilemma*.

²⁴² Pineda, G. (n.d.). *The Strait of Malacca as one of the most important geopolitical regions for the People's Republic of China*.

economic and security issues to think about in the Malacca Strait, but military and political as well.

Since 2003 the Chinese government has increased its economic investments in the region in order to contain foreign control of the Strait. A story in the New York Times in 2010 said that China was concerned that the strait was “an area of American influence.”²⁴³

Chinas energy strategy relies in part on developing diversified sources of energy. China does not want to over rely on the Middle East for oil. Therefore other prospects are open and desirable for China, buying oil from the Arctic and shipping it through the Bering Strait is one as discussed above. The military and geopolitical reasons are varied and actors many because of the economic importance.²⁴⁴

2.6 Case study: Are Chinese companies interested in Arctic shipping? ²⁴⁵

The interest of Chinese companies to develop active service along the Arctic waterways has been studied. A study from 2013 stated the lack of critical analysis of the feasibility or economic profitability of the Arctic as a shipping route for China. As described in chapter 1.2, many uncertainties await for Arctic shipping and many reports assume that as the Arctic routes are shorter, they are better.

A different view began to emerge in Chinese articles from 2013 as more scholars stressed the need for more research of the feasibility of Arctic shipping. The Polar Research Institute of China began a project in 2012 on the development of Arctic shipping, with the shipping company Cosco involved, but few articles from China point to the challenges of Arctic shipping now dominant by Western scholars, the difficult circumstances, high costs, seemingly unprofitable shipping depending on the cost structure

²⁴³ Bradshier, K. (2010). Security Tops the Environment in China’s Energy Plan. New York Times.

²⁴⁴ Pineda, G. (n.d.). The Strait of Malacca as one of the most important geopolitical regions for the People’s Republic of China.

²⁴⁵ Huang, L., Lasserre, F. & Alexeeva, O. (n.d.). Arctic Shipping and Chinas shipping firms: A special role for State Corporators?

and the market. This view is now largely present in the scientific debate among western scholars.

The Chinese Ministry of Commerce published a short analysis calling for more research on Arctic shipping after a test by the Yong Sheng, a Cosco-owned multipurpose ship, from Rotterdam to China in 2013.

Researchers interviewed 23 Chinese shipping and forwarding companies directly in September 2013. Only two companies expressed a real interest for Arctic shipping, Cosco and a private shipping firm. Cosco said that the profitability of the Arctic routes was questionable, and the other firm was mostly interested in destinational traffic, in transporting natural resources from Siberia to China. This shows that Cosco is the only Chinese company contemplating Arctic shipping, and is questioning its profitability.

Several firms said that they though the Arctic had potential due to shorter distances but none confirmed they had done an extensive cost/benefit or a SWOT analysis for the route. The reason why companies were not keen on definitive answers is manifold. High investments cost required for ice-strengthened ships, just-in-time market constraints, small ships limiting economies of scale, physical risks and insurance costs all add to the reasoning, along with a few players with patient capital.

The Chinese government has multiplied declarations regarding Arctic resources rather than Arctic shipping. This points to that Chinese shipping firms and the government are more interested in the Arctic resources rather than the shipping routes. The reasons are the same as other shipping firms.

Other surveys have pointed to few companies showing interest in transiting the Arctic; more are lured by destinational traffic and some by general cargo operations servicing local communities in Canada, Alaska and Greenland.

In 2012 Cosco signed an agreement with Russian authorities to study the potential profitability of transit commercial routes along the Northern Sea Route. Cosco is a state owned company and that could have an effect on case studies and surveys on the interest of Chinese companies' interest in the Arctic. China is unlikely to have more than one company looking into the Arctic as a possibility at this stage with the increased cooperation between companies.

Cosco is currently suffering from severe financial losses, 1.7 billion Euros in 2011 and 1.6 billion Euros in 2012, due to the economic downturn in Europe and China. Poor management has also been thought as a factor.

The future is uncertain for Cosco and Chinese shipping operations in the Arctic. With Cosco developing research as well as the Polar Research Institute of China, it seems that the near term will lead to a small increase in Chinese shipping, but not in a great deal. The Arctic is seen as having potential because of the shorter distances and fuel savings, but the risks and investments are a big hurdle.²⁴⁶

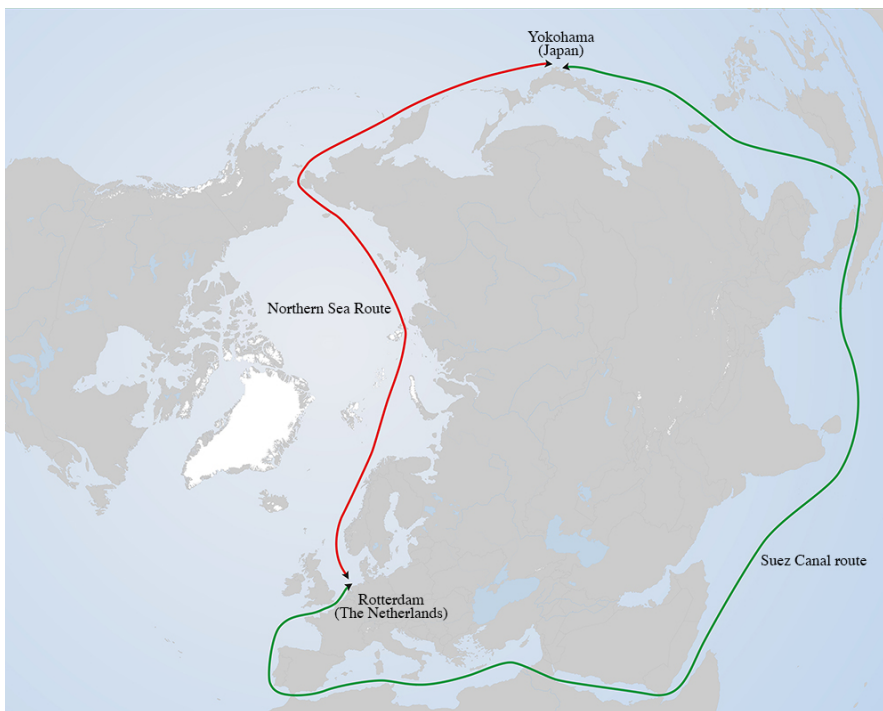


Figure 2-1 Shipping routes between Asia and Europe. The route is shown as a circle, starting in Japan and ending in Rotterdam. According to this source, the Northern Sea Route is 8.452nm and the Suez Canal route 12.894nm.²⁴⁷

²⁴⁶ Huang, L., Lasserre, F. & Alexeeva, O. (n.d.). Arctic Shipping and Chinas shipping firms: A special role for State Corporators?

²⁴⁷ Map by Arctic Portal.

2.7 Conclusions

China is a growing economic power. As such, it wants to keep its status as a world power. The Arctic is not very high on the agenda for the Chinese government, in line with the overall Chinese foreign policy. China seeks to assure its own economic interests and with cooperation and presence, they remind the world that it is certainly a global power.

It has increased its interest in Arctic affairs for numerous reasons, one of them the prospect of a shorter shipping route for their merchandise to the demanding western markets. It has already shown intent by sending its research icebreaker Xuelong through the Central Route in the summer of 2012, although it did not reach the North Pole.²⁴⁸ After Xuelong became the first Chinese vessel to successfully navigate the Northern Sea Route, there is no question China will try to reach the North Pole again soon.

Dr. Huigen Yang, director of the Polar Research Institute of China, said that 5-15% of China's international trade could use an Arctic shipping route by 2020.²⁴⁹ Although it could, it does not mean it will. China has numerous trade partners all over the world and with 19% of its exports in 2012 going to Europe.²⁵⁰ Put into perspective, it does seem like a high number if one focuses on the bigger number Yang mentioned. That would result in almost 80% of China's European exports transported through the Arctic. Yang was referring to a study his institute did, and as a director of a governmental institution, the comment is interesting. It shows that China has strong ambitions to Arctic shipping.

Chinese thinking is often for longer terms and it would seem realistic for China to actively research and test the Northern Sea Route, while waiting to see how the Central Arctic Ocean Route will develop. By conducting research and sending an increased number of vessels in the near term, China would show its interest and remind others that it has a stake in the Arctic, something that it is keen to highlight.

Only two companies out of 23 showed any interest in a case study among shipping companies in China when asked about the prospects of the Arctic as a shipping route. One company said it would be interested in

²⁴⁸ Chinare5.com (n.d.). Snow Dragon estimated Arctic route. [Map].

²⁴⁹ Kopra, S. (2013). China's Arctic Interests.

²⁵⁰ PricewaterhouseCoopers. (2011). Future of world trade.

destinational shipping. That could for example be transport of energy hydrocarbons to hubs in Russia where they would be distributed. The other company was Cosco, which has already demonstrated will by sending the Yong Sheng through the Northern Sea Route. But the study showed that even Cosco was questioning the profitability of the Arctic.

It would seem smart for other companies to play a waiting game and see what Cosco does. Other companies will gain from Cosco's research and increased activities and although there is competition between Chinese shipping companies, there is cooperation as well. Cosco will most likely continue the development of Arctic shipping, but to what extent is unknown. Cosco has already penned cooperation projects with Russian and Icelandic partners to strengthen their foothold in the Arctic.

Although China has not released an official Arctic policy, scholars, academics and others have declared their views on China's stance in the Arctic. They bring aspects to the discussion, but do not necessary talk for the Chinese government. Like in any country, various people speak up on various issues. The same can be said for China and Arctic matters. For China, many are speaking as experts or on behalf of their respected institutions and they all bring views to the table. But that does not mean that it is "China's" view. However, they bring the discussions to the table as experts in other countries would.

An example is Li Zhenfu of Dalian Maritime University. He led a team of specialists which assessed China's use of the Arctic shipping routes and released a report in 2009. The report included an interesting SWOT analysis on the advantages and disadvantages when the Arctic sea routes open up. He was also quoted to say, "whoever has control over the Arctic route will control the new passage of world economics and international strategies."²⁵¹ Zhenfu's University is one of China's leading maritime educational establishments.²⁵² In most countries such a report and a SWOT analysis would trigger discussions, but although Zhenfu is speaking as a government employee since the University is directly under the Ministry of Transport, his comments do not necessarily reflect that.

²⁵¹ Jakobson, L., & Peng, J. (2012). *China's Arctic Aspirations*. p.6.

²⁵² Mitropoulos, E. (2006). Graduation ceremony speech at the Dalian Maritime University.

There does however remain a small group of people who wants China to take a more assertive stance in its Arctic affairs. It is highly unlikely China would contemplate such actions. It has successfully strengthened its stance in Arctic governance by becoming an observer to the Arctic Council and with numerous cooperative projects it does not want to cause disputes with the western world.

Another problem for Arctic-enthusiasts regarding China's interest is the lack of comments from the governments, or an Arctic policy. Many articles, reports and stories are written about China and the Arctic but the language barrier is a hindrance.

Chinese officials have also been translated incorrectly in western media outlets. An example is a story which said "A Chinese admiral said earlier this year since China has 20% of the world's population, they should have 20% of Arctic resources,"²⁵³ referring to Rear Admiral Yin Zhuo. His comments have been translated to "according to the UN law of the Sea, the North Pole and areas surrounding it do not belong to any country but are common wealth of the whole human population,"²⁵⁴ and that "China must play an indispensable role in Arctic exploration as we have one-fifth of the world's population."²⁵⁵

The media will continue to follow China closely, as it has, for example in Iceland where its presence has been criticized.²⁵⁶ The media will also continue to highlight comments from Chinese people about the Arctic, often portrayed as China's stance. China will continue to work on cooperation, but the media will seek bigger headlines.

Napoleon once said about China, "Let her sleep, for when she wakes, she will shake the world."²⁵⁷ Every move China makes evokes interest, even alarms, as the rise of other large powers throughout history.²⁵⁸ The same applies in the Arctic.

China's economy has been on a steady rise for numerous years. It is currently the world's second-largest economy, largest merchandise exporter

²⁵³ Lilley, B. (2013). Canadian jets repel Russian bombers. *Toronto Sun*.

²⁵⁴ Kopra, S. (2013). China's Arctic Interests.

²⁵⁵ Chang, G. (2010). China's Arctic Play. *The Diplomat*.

²⁵⁶ Arnarsson, S. (2014). Norðurljósarannsóknir í Reykjadal yfirskin? *Akureyri Vikublað*.

²⁵⁷ Xinran, X. (2011). Why China won't conquer the world. *The Telegraph*.

²⁵⁸ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

and the second-largest merchandise importer.²⁵⁹ China's Arctic shipping is tied to western markets for both imports and exports. Other regions, including Africa, the Americas and the Middle East where China imports most of its oil from, will not use the Arctic for transits. The importance of Europe as China's trading partners is projected to decline in the coming decades, but other regions will increase their stake.²⁶⁰ Therefore China's need to actively pursue Arctic shipping is met with sceptism.

China has been an active member of the scientific community for numerous years. It has a research station in Svalbard and topics like glaciology, oceanographic science, and upper atmospheric physics were frequent. Climate change in the Arctic has been linked to weather changes in China and the glacier melt in the Himalayan Mountains have also been projected to cause problems for China's food security. In addition, much Chinese land would go under seas if all the Arctic and Antarctic ice sheets would melt. In recent years, studies on shipping and governance have increased and social science could be on the agenda soon.

One if China's driver for Arctic interest is its need for natural resources. Exploration of oil, gas and minerals are all projected to increase in the Arctic. China is the world's dominant consumer of raw materials and hydrocarbon resources and expected to increase in the future. The three biggest oil companies in China have all started projects in the Arctic. If China would secure vast resources in the Arctic, it could result in increased shipping activities. Arctic states are keen to exploit China's need for resources, and its will to diversify its energy imports, and its money, to sell their abundance of resources. Greenland is an example of a resource rich country, but it lacks necessary knowledge, expertise and infrastructure to exploit it. China is already looking into projects in Greenland, among them an iron ore mine. China would be on the market as other nations, but as the biggest importer of iron ore in the world, it would naturally be interested in exploiting such resources. And it would indeed need to ship resources to China. The Arctic could be beneficial for such projects, depending on numerous things, including the positions of such projects.

²⁵⁹ Morrison, W. (2014). *China's Economic Rise: History, Trends, Challenges, and Implications for the United States*.

²⁶⁰ Humpert, M. (2013). *The Future of Arctic Shipping: A New Silk Road for China?*

As well as being interested in diversifying its energy imports, China would be interested in diversifying its shipping lanes. The Malacca dilemma is a term used for problems in the Malacca Strait. A total of 80% of China's trade passes through the Strait, including 77% of its oil imports, and easy math shows that disruptions in the Strait would cause severe problems for China. Although it has used other means for energy transport, including a recent oil pipeline from Myanmar, China could still look to the Arctic as an alternative to the Malacca Strait.

3 Governance of Arctic shipping: Balance between feasible routes and a strong regulatory framework

The governance of Arctic shipping has been described as a complicated mosaic. Three main bodies govern the Arctic shipping routes, UNCLOS, the IMO and the two coastal states, Canada and Russia. UNCLOS is the overarching framework; it is “the Arctic treaty” if anyone is looking for one. UNCLOS governs the world oceans and is the main body of the law of the sea. UNCLOS is a widespread Convention which seven of the Arctic states have signed and ratified. USA is the sole Arctic country not to ratify the Convention.

UNCLOS gives coastal states legislative and enforcement powers over foreign ships according to the maritime zone it establishes. UNCLOS also allows coastal states to implement stricter regulations in waters where sea ice is present for most of the years, for natural protection. Here, the main regulations in UNCLOS related to Arctic shipping are introduced.

In addition to govern the world oceans, including the Arctic Ocean, UNCLOS passes significant amount of provisions to the IMO, referring to “competent international organization.” The UN body sets standards at a global level for safety, environmental protection, security and trade. IMO also allows for stricter regulations to be implemented as UNCLOS does. IMO has also given special attention to governance of polar waters. That includes the forthcoming Polar Code which is awaited with anticipation and is the latest response to increased shipping activities in polar waters.

Special attention is given to environmental governance and liabilities over damage as well. Shipping activities in the Arctic will pollute and be a significant threat to the environment, including through the release of oil, both accidental and illegal discharges. UNCLOS and IMO address vessel source pollution.

Coastal state governance is also of great importance in the Arctic. Both Canada and Russia have inflicted specific requirements to shipping in their waters, on the basis of international law. Canada has drawn straight

baselines in its archipelago and declared its waters as internal, where permission for vessels to pass is always required and the full force of domestic law applies, and Russia says parts of the Northern Sea Route constitute internal waters. USA contests this status which has led to disputes. Russia has recently changed its federal laws and opened the Northern Sea Route Administration to govern its shipping route. It has detailed regulations on numerous aspects and collects tariffs for operations in its waters.

China and Arctic governance is also addressed. As a non-Arctic state China is forced to adapt to the local governance structure, in addition to respect the international conventions and treaties that apply in the Arctic. China seeks influence in Arctic governance and has recently gained an observer status in the Arctic Council. It has yet to release a formal Arctic strategy, but it seems clear that China does have an Arctic agenda. China has recently taken steps to strengthen its foothold in the Arctic, for example by establishing a strong relationship with Iceland and creating a forum with the Nordic countries for Arctic research.

3.1 UNCLOS: The overarching legal framework on the law of the sea

The United Nations Conference on Law of the Sea is the most comprehensive international law-making instrument for the law of the sea. UNCLOS has 320 articles and nine additional annexes establishing a comprehensive regime which was opened for signatures in Jamaica on the 10th of December in 1982.²⁶¹ As of 10th of January 2014, 157 nations had signed the treaty and 166 ratified it. A noticeable absentee amongst the parties is USA, one of the eight Arctic states.²⁶²

²⁶¹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

²⁶² United Nations. (2014). Table recapitulating the status of the Convention and of the related Agreements, as of 10 January 2014.

UNCLOS is an international agreement, often named the UNCLOS Convention or the UNCLOS treaty. Treaties are signed by states to have lawmaking effects. To interpret the text of many international treaties the Vienna Convention on the Law of the Treaties is the most frequently used document.²⁶³ It demonstrates a preference for peaceful settlements and it requires parties to perform their treaty obligations in “good faith.”²⁶⁴

After a convention is signed, it goes into a process of ratification. This means that states must ask their legislative bodies to adopt the convention and to incorporate into domestic laws. Treaties or conventions that are not ratified do not have binding effects on the state.²⁶⁵ UNCLOS entered into force in 1994, meaning that the states that signed and ratified it before then, were legally bound by the Convention from that date. Therefore, USA can sign UNCLOS, but as it has not ratified it, the Convention is not legally binding for the country.²⁶⁶

The first United Nations Conference on the Law of the Sea was held in 1959. The initial origin of UNCLOS was to determine the status and control of the world’s ocean space, but it has developed over time and today it goes well beyond its first thoughts as it has become more detailed over time, as well as expanding its scope and range. Today UNCLOS focuses on the extent of coastal states sovereignty and jurisdiction as the international community has increased its interest in oceans resources, not least in the deep seabed, the high seas and fish stocks. UNCLOS also regulates marine scientific research, which is very relevant in the Arctic and military use of oceans. UNCLOS interacts with almost all other international treaties that affect the world’s oceans. With the critical importance of the world’s oceans it is expected to implicate new areas of international laws to be developed.²⁶⁷

²⁶³ Louka, E. (2006). *International Environmental Law*. p.21.

²⁶⁴ Vienna Convention on the Law of Treaties. (1969). (Article 26).

²⁶⁵ Louka, E. (2006). *International Environmental Law*. p.22.

²⁶⁶ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

²⁶⁷ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

History and development of UNCLOS

The predecessor to UNCLOS reaches back to 1608 when Hugo Grotius made one of the earliest and ultimately the most significant contribution to ocean governance. He released *Mare Liberum* and observed how under the law of nations the ocean was considered the property of no one, a common possession and public property. He stated that the sea should be common to all, “because it is so limitless that it cannot become a possession of any one, and because it is adapted for the use of all, whether we consider it from the point of navigation or of fisheries.” The “Grotian view” prevailed despite debates and it became the doctrine of its time.

The management of the seas enjoyed a period of stability from the 17th to the 19th century but the unrestricted use of naval force was still considered an issue. For example, it allowed vessels to sail close to foreign coastlines allowing for attacks on foreign soil with relative ease.²⁶⁸ This was still existent when World War I broke out, the first global conflict. Over 9 million soldiers lost their lives between 1914 and 1918, including in numerous battles at sea.²⁶⁹

After the war, the law of the sea started to take shape. The possible codification of laws of the sea was discussed in the 1920's by numerous bodies but the 1930 Hague conference, intended to clarify numerous current issues, came to no conclusion and no treaty emerged. The 1930's were not as active in discussions and despite the 1936 Convention Regarding the Regime of Straits, no significant treaties were signed. State practice continued to develop but World War II broke out at the end of the decade and put paid to any resumption of codification efforts.

But as soon as the war was over the Truman Proclamation changed the scope of the law of the sea. The United States took advantage of the multiple opportunities the end of the war signalled for law of the sea and sought by way of unilateral declaration to exercise jurisdiction and control over the natural resources of the subsoil and sea bed of the contiguous continental shelf. This was reasoned by stating, “the continental shelf may be regarded as an extension of the land-mass of the coastal nation and thus

²⁶⁸ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

²⁶⁹ History.com. (n.d). World War I.

naturally appurtenant to it.” The proclamation had no outer limit and was not intended to impact the freedom of navigation, only the resources. This was the first substantive claim by a coastal state to a distinctive offshore resources zone and paved the way for similar efforts by other coastal states. This became a dominant feature in the coming decades.

The International Law Commission (ILC) was established by the United Nations in 1949. Its purpose was to codify and progress international law, which resulted in the obvious chance to develop a treaty for the law of the sea. At its first meeting the “Regime of the High Seas” was given a priority and territorial waters was added to the agenda in 1951. With considerable attention to the law of the sea, scientific views and the ones of governments, the ILC released draft articles for a treaty in 1956, prior to the first *United Nations Law of the Sea Conference* in Geneva in 1958.

A total of 86 countries attended the conference that resulted in four conventions. They were the Convention of the Territorial Sea and Contiguous Zone, The Convention of the Continental Shelf, the Convention of the High Seas and the Convention of Fishing and Conservation of Living Resources of the High Seas. Special attention was also given to landlocked states but no convention was made. It was noticeable that the Convention of the Territorial Sea and Contiguous Zone did not address a specific outer limit for the area. The result was UNCLOS 1, which achieved a great deal and laid the foundations for contemporary international law of the sea but had significant gaps that needed to be addressed.

The second United Nations Conference on the Law of the Sea was convened in Geneva again, only two years after UNCLOS 1. The intention was to address the breadth of the territorial sea and fishery limits. The conference has been branded as a failure since it did not come to a conclusion after lengthy debates.

New coastal state claims emerged after the conference and more countries wanted a say in the evolution of the law of the sea. UNCLOS III was a very different conference than the two previous ones, ranging from 1973 to 1982. It was also much larger, with 151 participating countries in the final session in New York in 1982. At the early stages a consensus was amongst the states on the breadth of the territorial zone to be 12 nm. The deep seabed was also branded as a common heritage to mankind, which later caused disputes, led by the United States.

UNCLOS has led to the establishment of new institutions to implement various parts of the convention. The three main bodies are the International Seabed Authority (ISBA), the International Tribunal for the Law of the Sea (ITLOS) and the Commission on the Limits of the Continental Shelf (CLCS).

ISBA deals with the deep seabed and as it has developed it has an appreciation of the possible environmental impacts associated with deep seabed mining activities. ITLOS is the permanent international court for law of the sea dispute resolutions created by UNCLOS. The CLCS overviews continental shelf claims and makes recommendations to coastal states on the outer limits of their continental shelves. The states send their claims based on their own information and the CLCS recommends changes or status quo.

Other bodies of relevance include the Meeting of the States Parties (SPLOS), the annual meeting of state parties to UNCLOS. Amongst its duties is to review the work of the three above-mentioned UN bodies. Informal Consultative Process (ICP) are informal meetings between states to discuss UNCLOS, The United Nations General Assembly (UNGA) reviews operations and implementations of the law of the sea and the United Nations Security Council (UNSC) has the capacity to adopt resolutions directly impacting the law of the sea.²⁷⁰

3.2 Arctic shipping and UNCLOS

UNCLOS applies to the marine environment of the entire globe, including the Arctic Ocean. All Arctic states are party to the convention, apart from the USA, as presented later in the chapter. The most important parts of UNCLOS for the Arctic are the chapters on internal waters, territorial sea, exclusive economic zone, the continental shelf, high seas and the Area.²⁷¹ However, not

²⁷⁰ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

²⁷¹ Molenaar, E. J. (2008). *Arctic Marine Shipping: Overview of the International Legal Framework, Gaps, and Options*.

all of them apply to Arctic shipping, where international straits in the Arctic, and in UNCLOS, are also important.

The five Arctic Coastal States, Greenland, Canada, USA, Russia and Norway, signed the *Ilulissat Declaration* in 2008, declaring that the “law of the sea” – not specifically UNCLOS as USA is not a part of it – and noted that “we recall that an extensive international legal framework applies to the Arctic Ocean...We remain committed to this legal framework and to the orderly settlement of any possible overlapping claims,” and “therefore see no need to develop a new comprehensive international legal regime to govern the Arctic Ocean.”²⁷² UNCLOS is the main governing instrument of the Arctic Ocean and has been confirmed officially by the Arctic Council as such.

Marine transport is a global industry and leading actors have been eager to avoid spatially fragmented regulation, especially for expensive aspects, or ones who are difficult to modify, including vessel design, construction, manning and equipment. This is one of the reasons coastal states are constrained to the regulatory framework in place.

UNCLOS places maximum standards for what states may request of a vessel flagged by another state. The further away from the coastline that vessel operates, the lower the regulatory ceiling is. In ports and internal waters, coastal states have the same monopoly on regulation and rule enforcement as on land. In the territorial sea, they may adopt laws and regulations for the prevention, reduction and control of pollution from foreign vessels, as long as they do not impede innocent passage, or go beyond the generally accepted international rules and standards, as regards the design, construction, manning or equipment of foreign ships.²⁷³

In the EEZ, coastal states are not allowed to set any rule beyond those “conforming to and giving effect to generally accepted international rules and standards established through the competent international organization,”²⁷⁴ here meaning the IMO.

These constraints on coastal state regulatory action, whether unilateral or regional, mean that IMO-based treaties form the backbone of the

²⁷² Arctic Council. (2008). The Ilulissat Declaration.

²⁷³ Stokke, O. S. (2007). A legal regime for the Arctic? Interplay with the Law of the Sea Convention.

²⁷⁴ UNCLOS. Article 211 (5).

global shipping regime. Under UNCLOS, special rules apply to areas with certain physical or socio-economic characteristics, such as Article 234 on ice-covered areas. Other instruments have been tailored to the polar waters, like SOLAS and STCW.

Therefore, the global shipping regime seeks to balance the quest for universal participation and regulatory harmonization with attention to the special needs of certain regions for substantively stronger norms.²⁷⁵

Coastal state jurisdiction and control

The extent of a coastal state legislative and enforcement control over foreign ships has many aspects and varies between maritime zones. Those zones include internal waters, the territorial sea, the contiguous zone and the exclusive economic zone (EEZ). Internal waters fall within the sovereign territory of coastal states. The State can therefore inflict strict regulations on shipping, stricter than those generally accepted under international law.

Another aspect of navigation of foreign ships in coastal states jurisdiction is in international straits. They give more access to coastal waters but some states, including both Canada and Russia, have claimed Arctic waters as internal waters. This is contested by USA, as discussed later in the chapter.

The determination of the seaward limits of the maritime zones and jurisdiction are based on distances from the low-water mark along the coast, straight baselines or closing in bays methods. A combination of two or more of those can also be used. USA is the only country in the Arctic who has not proclaimed straight baselines along most or all of their Arctic coasts.

Yet another aspect is jurisdiction and control in ice covered waters where greater control can be exercised over foreign ships.

²⁷⁵ Stokke, O. S. (2007). A legal regime for the Arctic? Interplay with the Law of the Sea Convention.

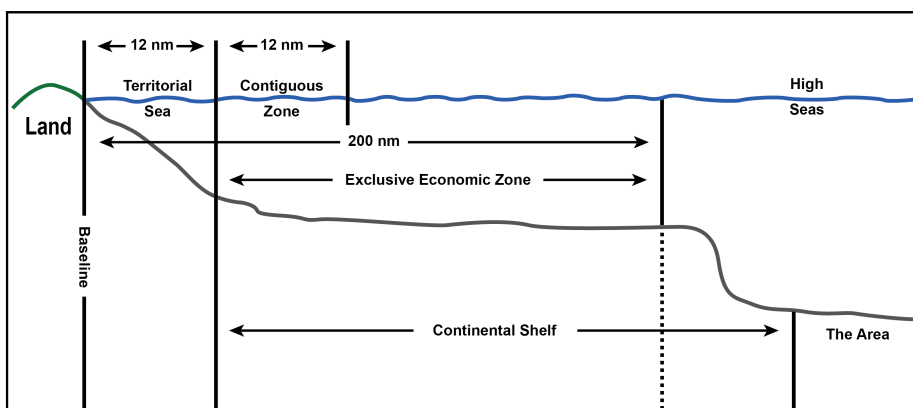


Figure 3-1 Maritime zones as described in UNCLOS.²⁷⁶

Internal waters

Internal waters of a coastal state waters “on the landward side of the baseline of the territorial sea.”²⁷⁷ Coastal ports and harbours are also recognized as parts of internal waters. Other water areas can also be designated as internal, for example where a bay has a natural entrance point not exceeding 24nm, a closing line can be drawn between two-low water marks to make waters internal. Areas can also be designated as internal if they are accepted as historic waters. Enclosed waters are also internal.²⁷⁸

States can also claim internal waters by drawing straight baselines. It can be employed “in localities where the coastline is deeply indented and cut into, or if there is a fringe of islands along the coast in its immediate vicinity.”²⁷⁹ They cannot be drawn on low-tide elevations, unless installations permanently over sea are built on them, for example lighthouses.²⁸⁰

Coastal states enjoy full sovereignty and maximum jurisdiction over all ships entering their coastal or internal waters. They can prohibit entrance of ships carrying hazardous chemicals, such as radioactive wastes or apply a

²⁷⁶ Authors own work. Adopted from Rothwell and Stephens, p. 1.

²⁷⁷ UNCLOS. Article 8 (1).

²⁷⁸ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

²⁷⁹ UNCLOS. Article 7 (1).

²⁸⁰ UNCLOS. Article 7 (4).

“zero discharge” limit on particular pollution sources from ships.²⁸¹ UNCLOS is silent on whether foreign ships have the right of access to a port but the general principle is that a state does not have unlimited power to prohibit access to its ports.²⁸²

Internal waters in the Arctic have been contentious, for example where Canada has drawn straight baselines in its archipelago thereby claiming all waters within as internal. The decision has been contested by USA and other states as discussed below. Two considerations for justifying historic water claims are the exercise of exclusive authority for a long period of time and acquiescence by foreign states.²⁸³

Territorial sea and the Contiguous zone

The sovereignty of a coastal state extends from its internal waters to an adjacent belt of sea, named the territorial sea and includes the air space over the territory, and the ocean bed and subsoil.²⁸⁴ Coastal states have the right to establish a 12nm²⁸⁵ territorial sea from its baselines described in UNCLOS.²⁸⁶

Coastal states have full jurisdiction over foreign ships in its territorial sea, but they do not have unlimited powers to control shipping in the territorial sea as all ships have the right of innocent passage in all territorial seas.²⁸⁷ The development of the territorial sea regime is a cornerstone in the development of law as it encompasses the greatest extent of coastal state sovereignty and jurisdiction and therefore secures the coastal states key interests in a relatively narrow maritime area, including the right of exploitation of resources.²⁸⁸

The right of foreign vessels to enter a coastal states territorial sea is one of the most long-standing areas of contention within the regime of territorial waters. This is highly relevant to Arctic shipping in the Arctic, as

²⁸¹ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

²⁸² Rothwell & Stephens: International Law of the Sea.

²⁸³ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

²⁸⁴ UNCLOS. Article 2 (1 & 2).

²⁸⁵ nm stands for nautical mile and is a unit of length used at sea. One nautical mile is 1.852 kilometers.

²⁸⁶ UNCLOS. Article 3.

²⁸⁷ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

²⁸⁸ Rothwell, D.R. & Stephens, T. (2010). The International Law of the Sea.

vessels need to sail through the territorial waters of coastal states when transiting.²⁸⁹

All ships from all States enjoy the right of an innocent passage through all territorial seas. Passage is defined as navigations for the purpose of traversing the territorial sea without entering internal waters or stopping at port facilities, or “proceeding to or from internal waters or a call at such roadstead or port facility.”²⁹⁰

A passage “shall be continuous and expeditious”²⁹¹, but includes stopping and anchoring if necessary. Passage is considered innocent “so long as it is not prejudicial to the peace, good order or security of the coastal State.”²⁹² Numerous activities are described in UNCLOS to describe what activities of foreign ships are considered prejudicial to the peace, good order or security of the coastal State, and include any threat or use of force, any exercise or practice with weapons of any kind, any fishing activities and any military activity.²⁹³ Submarines are required to navigate on the surface and show their flags in all territorial seas.²⁹⁴

Costal states have limited authority to enforce laws and regulations limiting foreign vessels navigations in their territorial seas.²⁹⁵ Domestic laws related to pollution and safety of navigation can be applied but it prohibits coastal states from imposing laws on the equipment, construction or design of the vessels, as well as crewing.²⁹⁶ They can however design sea-lanes where necessary to the safety of navigation and they can require foreign ships to use them, in particular tankers, nuclear-powered ships or ships carrying nuclear “or other inherently dangerous or noxious substances or materials.”²⁹⁷ The sea-lanes must be designed under recommendations from “the competent international organization,”²⁹⁸ which here means the International Maritime Organization (IMO).²⁹⁹

²⁸⁹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

²⁹⁰ UNCLOS. Article 18.

²⁹¹ UNCLOS. Article 18 (2).

²⁹² UNCLOS. Article 19 (1).

²⁹³ UNCLOS. Article 19 (2).

²⁹⁴ UNCLOS. Article 20.

²⁹⁵ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

²⁹⁶ UNCLOS. Article 21.

²⁹⁷ UNCLOS. Article 22 (1).

²⁹⁸ UNCLOS. Article 22 (3).

²⁹⁹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

Given the various positions on the issue of transit passage in territorial waters and different views and interpretations, navigation rights within the territorial sea is predicted to remain a flashpoint of the law of the sea for some time.³⁰⁰

The contiguous zone is the area adjacent to the territorial sea, up to 24nm from the coastline. The coastal State may exercise control of all ships in the zone necessary to “prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations,”³⁰¹ and “punish infringement...committed within its territory or territorial sea.”³⁰²

Exclusive economic zone

The exclusive economic zone (EEZ) is “an area beyond and adjacent to the territorial sea,”³⁰³ extending up to 200nm “from the baselines from which the breadth of the territorial sea is measured.”³⁰⁴ It is a relatively new innovation to law of the sea, and gives coastal states “sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from water, currents and winds.”³⁰⁵

The main purpose of the EEZ is to secure the right of coastal states to these resources. The majority of the world’s fisheries are within 200nm of coast, so the EEZ also regulates fisheries and that resource management is crucial to the fish stocks. The EEZ forces coastal states to regulate these stocks, as it is in their best interest. The same applies for the submarine hydrocarbon resources; the vast majorities are within 200nm from coastlines.³⁰⁶

States have to claim their EEZ. If a state claims the full 200nm of EEZ, it means that the zone is constituted by a band of waters, seabed and

³⁰⁰ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁰¹ UNCLOS. Article 33 (1).

³⁰² UNCLOS. Article 33 (2).

³⁰³ UNCLOS. Article 55.

³⁰⁴ UNCLOS. Article 57.

³⁰⁵ UNCLOS. Article 56 (1-a).

³⁰⁶ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

subsoil. Most coastal states have claimed their EEZ's to 200nm, with the United Kingdom as a noticeable absentee of full 200nm claims.³⁰⁷

Full EEZ claims of 200nm from coastal States cannot always be declared. For example when the distance between opposite states is less than 400nm or when adjacent states both maintain EEZ claims. In such cases, the maritime boundary is delimited in accordance to Article 74 of UNCLOS, which states that an agreement is to be made according to regulations by the International Court of Justice (ICJ). If no agreement can be made "within a reasonable period of time, the States concerned shall resort to the procedures provided for in Part XV," - Settlement of Disputes.³⁰⁸

The exclusive Economic Zone, EEZ, is crucial in many aspects in the Arctic, especially to resources and shipping. All Arctic shipping traffic goes through EEZ's, apart from areas on the Central Arctic Shipping Route. The six Arctic coastal states – according to the Arctic Council's working group Protection of the Marine Environment (PAME) definition, Canada, Denmark, Iceland, Norway, Russia and USA, all claim 200nm EEZ in the Arctic waters. Norway also claims an extended fisheries protection zone around Svalbard.³⁰⁹

However, Iceland is not recognized as an Arctic littoral state by the Arctic Council as the Ilulissat declaration showed, stating that "representatives of the five coastal States bordering on the Arctic Ocean – Canada, Denmark, Norway, the Russian Federation and the United States of America– met at the political level on 28 May 2008 in Ilulissat, Greenland, to hold discussions."³¹⁰

Iceland was much aware of the meeting and responded furiously. In a proposal for the *Icelandic Arctic Policy* the minister of foreign affairs declared that it was vital that individual states "cannot exclude others from decision making. Doing so invalidates the Arctic Council and Arctic countries, including Iceland."³¹¹

³⁰⁷ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁰⁸ UNCLOS. Article 74 (2).

³⁰⁹ VanderZwaag, et al. (2008). *Governance of Arctic Marine Shipping*.

³¹⁰ Arctic Council. (2008). *The Ilulissat Declaration*.

³¹¹ Congress document [Þingskjal] nr. 408/2010-2011. *Tillaga til þingsályktunar um stefnu Íslands í málefnum norðurslóða*.

The Continental shelf

The continental shelf is the area comprised to the seabed and subsoil of the submarine areas, beyond the territorial sea of the coastal state, to the outer edge of the continental margin, or to at least 200nm from the coastal baselines where the continental margin does not extent to 200nm. The continental shelf does not have to be claimed by coastal states, they are declared automatically when UNCLOS came into force.³¹²

Article 77 states that a coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources,”³¹³ and the rights referred above are exclusive to the State, so these activities cannot take place without the consent of the coastal State.³¹⁴ The continental shelf is therefore crucial for Arctic resources.

Three elements are critical to this jurisdictional entitlement. First is the definition of the “continental shelf” – which can be extended and varies between countries as the criteria for determining the outer edge of the continental margin, second is the characterization of “natural resources” – which has some definitions in UNCLOS, and third the scope of “sovereign rights” – indicating the level of legal entitlement which is greater than mere jurisdiction, but at the same time less than the full sovereignty involved in a territorial claim.³¹⁵

Before international law clarified the rights to resources within the continental shelf, many states sought to ensure their resources with proclamations. The most influential was the Truman Proclamation from 1945 when the US government asserted a claim to the natural resources of the subsoil and seabed of the continental shelf adjacent to the United States. Similar proclamation followed from other states, and they pushed for international law to regulate these areas that the 1958 Geneva Convention ultimately did. This developed throughout the UNCLOS conventions and was finally settled in 1982 when the 200nm limit was accepted.³¹⁶

The continental shelf can be extended through the UN body Commission on the Limits of the Continental Shelf (CLCS). Coastal states

³¹² UNCLOS. Article 76.

³¹³ UNCLOS. Article 77.

³¹⁴ UNCLOS. Article 77 (2).

³¹⁵ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

³¹⁶ Rothwell, D.R. & Stephens, T. (2010). The International Law of the Sea.

send their claims based on their own information and therefore extend their 200nm exclusive economic zones, and the CLCS recommends changes or status quo. All the Arctic states have sent their claims but some time will pass before the CLCS makes its final recommendations. The CLCS is not an adjudicative body and its recommendations are only that, recommendations, and not legally binding. However, if a coastal state bases its proclamation on the recommendations from the CLCS then they become binding for that state. It has been debated whether the recommendations will be binding for the whole international community, but if there is no objection from other states then there will be little doubt that the limits are indeed final.³¹⁷

Flag state control

Every state must set out conditions for ships of its nationality and register it in its territory, resulting in the ship flying its flag. Every state has the right to sail ships flying its flag on the high seas.³¹⁸ “Ships have the nationality of the State whose flag they are entitled to fly. There must exist a genuine link between the State and the ship.”³¹⁹ Ships can only sail under the flag of one state.³²⁰

The flag state has numerous duties to follow for its ships. The state has jurisdiction and control in the ship, meaning that the states’ laws apply onboard, for example regarding technical, administrative social matters and criminal laws. The flag state is also responsible for the ships to conform to international rules, regulations and standards in relation to safety of life at sea, including construction and equipment’s of ships, its manning, labour conditions and training of personnel, the use of signals and communications to prevent collisions. Seafarers must also observe applicable international standards regarding the prevention, reduction and control of marine pollution.³²¹

³¹⁷ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³¹⁸ UNCLOS. Article 90.

³¹⁹ UNCLOS. Article 91 (1).

³²⁰ UNCLOS. Article 92 (1).

³²¹ UNCLOS. Article 94.

Warships and other governmental ships enjoy sovereign immunity³²² and UNCLOS provisions on the protection and preservation of their marine environment do not apply to these ships, including Article 234. Each State is though required to ensure that its ships comply as far as practicable to international standards.³²³

Flags of convenience

As UNCLOS states, there must exist a genuine link between a State registered for a ship.³²⁴ How a “genuine link” between the State and the ship is proved poses an enormous challenge, and therefore ensures that broadly uniform standards are adopted between states.³²⁵ Here, a gap in UNCLOS therefore remains, as motivating factors – such as cheap registration fees, low or no taxes and freedom to employ cheap labour can push countries that own ships to register them in another country.³²⁶ Countries are said to compete for ship registrations by promising lowers costs in exchange for register fees and other taxes.³²⁷ These countries are named Flags of Convenience.

A total of 34 countries have been declared Flags of Convenience states by the International Transport Workers Federation (ITF). The criteria for a country to go on the list include the ability and willingness of the state to enforce international minimum social standards on its vessels, the degree of ratification and enforcement of ILO Conventions and Recommendations, and the safety and environmental record of the country.³²⁸

These States often have a reputation for ignoring standards to ensure safety and working conditions for the crew. Such countries may be undesirable and create significant legal challenges with respect to regulations and laws.

³²² UNCLOS. Articles 95 & 96.

³²³ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

³²⁴ UNCLOS. Article 91.

³²⁵ Rothwell, D.R. & Stephens, T. (2010). The International Law of the Sea. p.159.

³²⁶ International Transport Workers' Federation. (n.d.). What are Flags of Convenience?

³²⁷ The Shipbreaking Platform. (2012). Flags of Convenience.

³²⁸ International Transport Workers' Federation. (n.d.). What are Flags of Convenience?

Among countries that utilize the Flag of Convenience to register ships in another country are China with 1559 registered in other countries and 2030 in China³²⁹, Japan with 3122 in other countries and 684 at home,³³⁰ Greece with 2500 in other countries and 860 at home³³¹, Germany 3500 in foreign countries and 427 at home.³³² Panama is registered for 6413 ships, but 80% of them are foreign-owned.³³³ Even Bolivia, a landlocked nation in South America, has five foreign-owned ships registered, four from Syria and one from the United Kingdom.³³⁴

Countries who register ships in other countries can therefore avoid responsibilities UNCLOS places on States, who are responsible for ships flying its flag.³³⁵

Some problems occur when ships are registered in other countries. An example is the recycling of ships. According to the IMO's Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships from 2009, flag states are responsible for the recycling process.³³⁶ The Hong Kong Convention states "each Party shall require that ships entitled to fly its flag or operating under its authority comply with the requirements set forth in this Convention and shall take effective measures to ensure such compliance."³³⁷ As of the 28th of February 2014 no country had ratified the Hong Kong Convention.³³⁸

Around 1250 ships reached the end of their service life in 2012, but only a fraction was recycled in a sustainable manner. Over 70% were run ashore tidal beaches in developing countries such as Bangladesh, India and Pakistan, where unscrupulous shipbreaking companies exploit minimal enforcement of environmental and safety rules to maximize profits.³³⁹

³²⁹ Central Intelligence Agency, [CIA]. (2014). China. CIA World Factbook.

³³⁰ Central Intelligence Agency, [CIA]. (2014). Japan. CIA World Factbook.

³³¹ Central Intelligence Agency, [CIA]. (2014). Greece. CIA World Factbook.

³³² Central Intelligence Agency, [CIA]. (2014). Germany. CIA World Factbook.

³³³ Central Intelligence Agency, [CIA]. (2014). Panama. CIA World Factbook.

³³⁴ Central Intelligence Agency, [CIA]. (2014). Bolivia. CIA World Factbook.

³³⁵ UNCLOS. Article 94.

³³⁶ The Shipbreaking Platform. (2012). Flags of Convenience.

³³⁷ IMO. (2009). Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships. Article 4 (1).

³³⁸ IMO. (2014). Status of conventions. [Excel Worksheet].

³³⁹ The Shipbreaking Platform. (2012). Flags of Convenience.

The majority of merchant vessels by tonnage are registered in open registries, or flags of convenience states. These states have gained influence in the IMO at the expense of ship-owning states with voting rights and this has caused problems with adopting stricter standards as seen with the length of time some IMO instruments take to be implemented.³⁴⁰

Article 234 and shipping limitations in the Arctic

Of particular interest of the Arctic coastal states is Article 234 of UNCLOS, named *Ice-covered areas*. The Article reads:

*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 exclusive economic zone, 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.*³⁴¹

The article recognized coastal states' right to adopt and enforce special laws and regulations. The purpose is protecting the environment and special procedures can be inserted to EEZ of coastal states where ice covers the Ocean. That applies to the Arctic as Greenland, Canada, USA, Russia, Norway and Finland all experiencing sea ice in their EEZ. It is especially relevant to shipping in the cases of Canada and Russia. Article 234 legitimated the 1970 Canadian Arctic Waters Pollution Prevention Act (AWPPA), which was used as a model for the Soviet Union's regulations on

³⁴⁰ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*. p.348.

³⁴¹ UNCLOS. Article 234.

the Northern Sea Route in 1990.³⁴² Governance by Canada and Russia is discussed later in the chapter.

Article 234 was negotiated during the third UNCLOS conference, primarily between Canada, Russia and USA. The purpose was to provide adaptation of higher international standards than permitted elsewhere in the Convention. The text sets out criteria for the exercise of this significant power that has implications for shipping in the Arctic.³⁴³

UNCLOS does not, however, set the criteria for “ice covering such areas for most of the year,” neither for how long ice has to be present to result in “most of the year”, the extent of the ice or its thickness, resulting in an open area for debates.

UNCLOS and Arctic straits

As UNCLOS developed, there was a need to provide certainty with the respect to freedom of navigation through certain waters: one such topic is that of international straits. The initial focus was to assure freedom of navigation in the territorial sea, resulting in the innocent passage regime that guaranteed certain rights of foreign-flagged vessels. However it was recognized that navigation through straits still was uncertain.

This need arose because of the significance of international straits to commerce. With commerce using the shortest distance between ports in the past, the need to use straits to connect high seas and EEZs is evident. In Europe several straits are considered significant because of the volume of traffic, supplying international trade. These are the Straits of Gibraltar, the Straits of Dover, the Danish Straits and the Turkish Straits. Beyond Europe, other straits had a similar strategic, political and commercial importance, including the Straits of Malacca and Singapore, Sunda Strait, Taiwan Strait, Torres Strait, Bass Strait, Behring Strait, Juan da Fuca Strait, Florida Strait and the Straits of Magellan.

The risk posed to the international community if passage through the straits was prevented or impaired by the adjacent coastal state, resulted in the

³⁴² Byers, M. (2012). *Toward a Canada-Russia Axis in the Arctic*.

³⁴³ VanderZwaag, D. et al. (2008). *Governance of Arctic marine shipping*.

early development of some specific regimes which directly addressed navigational rights through certain terrains. It has always been understood that the legal regimes of canals, for example the Suez and Panama Canals, were separate and distinct from that of the international law of the sea.³⁴⁴

Canada and Russia both maintain that the straits and channels along their coastlines are internal waters. Foreign vessels have no right to access internal waters without permission from the coastal state. When foreign ships access ports they have to get permission from the coastal state, thereby getting permission to access internal waters. The extent of the coastal State jurisdiction in the Northwest Passage and the Northern Sea Route is contested by USA, which states that the narrowest stretches in both waterways are international straits, through which vessels from all countries may pass freely. These disputes over the legal status of these waters could cause tensions in the future. Before the sea ice melted, the status mattered little, but in recent times that has changed.³⁴⁵

UNCLOS defines an international strait as “straits which are used for international navigation between one part of the high seas or an exclusive economic zone and another part of the high seas, or an exclusive economic zone.”³⁴⁶

The ICJ set the criteria for an international strait in the *Corfu channel case* in 1949, discussed below. The “decisive criterion is rather its geographical situation as connecting two parts of the high seas and the fact of its being used for international navigation.”³⁴⁷

The difference under UNCLOS for a foreign ships navigating through a territorial sea or an international strait is that the territorial sea secures the right of an innocent passage whilst the international strait secures an enhanced right of a transit passage.³⁴⁸

Transit passage cannot be impeded,³⁴⁹ which means that foreign ships can pass through the strait without permission from the coastal state. It also frees the from other constraints, including submarines which can sail

³⁴⁴ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁴⁵ Byers, M. (2013). *International Law and the Arctic*.

³⁴⁶ UNCLOS. Article 37.

³⁴⁷ International Court of Justice. (1949). *The Corfu Channel Case*.

³⁴⁸ Byers, M. (2013). *International Law and the Arctic*.

³⁴⁹ UNCLOS. Article 38.

submerged through an international strait, but not through territorial waters.³⁵⁰

Disputes in the Northwest Passage

If Canada's stance would rule, the Northwest Passage would be considered as internal waters, meaning that the full force of Canada's domestic law applies. To claim internal waters, coastal states can claim historic use or draw straight baselines.³⁵¹

Canada drew its straight baselines around the High Arctic islands in its archipelago in 1985. It also claimed the waters as historic as the Inuit had explored the oceans for thousands of years. "From time immemorial Canada's Inuit people have used and occupied the ice as they have used and occupied the land," then Foreign Minister Joe Clark told the House of Commons.³⁵²

The International Court of Justice (ICJ) upheld the legality of straight baselines in the 1951 Anglo-Norwegian Fisheries Case stating that maritime areas within straight baselines constitute internal waters of the coastal states.³⁵³

USA protested Canada's adoption of straight baselines in 1986, and was joined by the European Union in its actions. The US stated that it had no basis in international law to support the claim. "The United States cannot accept the Canadian claim because to do so would constitute acceptance of full Canadian control of the Northwest Passage and would terminate US navigation rights through the Passage under international law."³⁵⁴

This means that a critical aspect in the dispute between Canada and USA is the use of international navigation of the Northwest Passage before 1985 when the straight baselines were drawn. USA was the first country to use the Northwest Passage for commercial transit, when the SS Manhattan delivered oil to the Atlantic Seaboard of USA from Alaska in 1969. USA sent an icebreaker to accompany the ice-strengthened super-tanker. Canada was

³⁵⁰ Byers, M. (2013). *International Law and the Arctic*.

³⁵¹ Byers, M. (2013). *International Law and the Arctic*.

³⁵² Byers, M. (2013). *International Law and the Arctic*.

³⁵³ Byers, M. (2012). *Toward a Canada-Russia Axis in the Arctic*.

³⁵⁴ Byers, M. (2013). *International Law and the Arctic*. p.133-134.

not asked permission for the voyage, as USA thought they would not enter Canadian territory, which extended to only 3nm at the time. It navigated through areas considered as high seas in the Northwest Passage but was forced to go through Canadian territory after getting stuck in ice several times, only to be rescued on numerous occasions by a Canadian icebreaker.

The unanticipated character of the entrance into Canadian territorial waters, in addition with the implicit granting of permission by Canada, and USA acceptance of assistance from the Canadian icebreaker, prevented the voyage from contributing to the development of an international strait.

In 1985 USA informed Canada that its Coast Guard icebreaker Polar Sea would sail through the Northwest Passage “as an exercise of navigational rights and freedoms not requiring prior notification.” Canada responded by saying that although the Northwest Passage was a part of their internal waters – based on their historical usage claim, it was “committed to facilitating navigation” in the Northwest Passage when USA declared an upcoming voyage and that it was “prepared to work toward this objective.”³⁵⁵ The voyage by the Polar Sea prompted Canada to articulate its internal waters position in clear terms, and to define the outer limits of those waters by drawing its straight baselines.

It has therefore been claimed that there was no international navigation in the Northwest Passage prior to the drawing of the straight baselines in 1985, supporting Canada’s claims. Canadian and US academics disagree on the criteria for a strait set out in the Corfu Channel case from 1949, discussed below. Where a straits “geographical situation connects two parts of the high seas and the fact that it is being used for international navigation.”³⁵⁶

The European Union joined the US State Department in 1986 in protesting Canada’s drawing of straight baselines around its High Arctic islands.

The dispute between Canada and USA has not been resolved, but since the states signed the Arctic Cooperation Agreement in 1988 it has not posed a problem. The Agreement removed a problematic issue of the time – navigation by US icebreakers in the Northwest Passage, from the equation of the dispute. USA said it would get a consent from Canada for all future

³⁵⁵ Byers, M. (2013). *International Law and the Arctic*.

³⁵⁶ Byers, M. (2013). *International Law and the Arctic*.

transits in the Passage and Canada promised to “facilitate navigation” for those vessels. It has been noted that the Agreement was essentially an agreement to disagree.

Since then the US has reaffirmed that it considers the Northwest Passage an international strait. But the current situation in the Northwest Passage – with the heavy sea ice, the small number of transits, its narrowness and absence of a specific treaty regime - has been said possible to legally distinguish the Passage from all other potential or existing international straits, apart from the straits in the Northern Sea Route.³⁵⁷

Disputes in the Northern Sea Route

As with Canada’s claim, the United States contests Russia’s claim of internal waters in the Northern Sea Route. Russia claims the Vil’kitskii, Shokal’skii, Dmitrii Laptev and Sannikov Straits, as internal waters.

After USA sent its icebreakers, *Northwind* to survey the Laptev Sea in 1963 and the *Burton Island* in the East Siberian Sea in 1964, the Soviet government send an aide memoire to the US embassy in Moscow stating that the straits were a part of Russia’s internal waters. The memoire stated that “at some points goes through Soviet territorial and internal waters,” and that the above-mentioned Straits did not “serve for international navigation.”³⁵⁸ USA responded by denying the claim.

At the time, the Cold War was ongoing, resulting in tensions between USA and Russia after World War II. A series of international incidents made up the Cold War, not resolved until 1991.³⁵⁹

As a result of USA’s stance, incidents named the Vil’Kitskii incidents had great significance to the Soviet-American dispute. The Vil’Kitskii Straits are the most important chokepoint in the Northern Sea Route and in 1965 the Soviet Union applied strong diplomatic pressure to an US icebreaker approaching them. The icebreaker was turned around by the US after threats from Russia.

³⁵⁷ Byers, M. (2013). *International Law and the Arctic*.

³⁵⁸ Byers, M. (2013). *International Law and the Arctic*.

³⁵⁹ History.com. (n.d). *Cold War*.

In 1985 Russia adopted straight baselines, connecting various island groups to the mainland.

No other country has taken a stance in the dispute.³⁶⁰

The Corfu Channel Case

The Corfu Channel Case from 1949 between the United Kingdom and Albania at the ICJ is a landmark study of international straits. It was the first case before the ICJ.

The Corfu Channel is a strait within the Albanian territorial sea. In 1946 – soon after WWII ended, two British warships collided with mines in the water, resulting in deaths and injuries to British naval personnel. No notification had been given. United Kingdom later undertook a sweep in the Channel to search for more mines, against the wishes of the Albanian government.³⁶¹

The United Kingdom first seized the United Nations Security Council, which recommended that the dispute would go to the ICJ. The two questions that the Court was asked to give judgment on were, is Albania responsible for the explosions, and is there a duty to pay compensation? And has the noted Kingdom violated international law by the acts of its Navy in Albanian waters, first on the day on which the explosions occurred, and, secondly on November 12th and 13th, 1946, when it undertook a sweep of the Strait?

The first question was answered by the Court that Albania was indeed responsible, with 11 votes against 5. The second question was declared 14-2 to that the United Kingdom did not violate Albanian sovereignty when the explosions occurred, but that it had violated the sovereignty of Albania when it undertook the sweep later.³⁶²

Of particular importance to this case was the regime of innocent passage and how warships could exercise that particular right, and in addition the status of the Corfu channel. In 1949 the ICJ recognized that Britain had “a right to send their warships through straits used for international

³⁶⁰ Byers, M. (2013). *International Law and the Arctic*.

³⁶¹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁶² International Court of Justice. (1949). *Corfu Channel Case (merits)*.

navigation between two parts of high seas providing that the passage was innocent.” The Court added that a coastal state could not prohibit innocent passage through a strait in peacetime. That was the first time the right of an innocent passage was recognized in straits and therefore the case gave an authoritative definition as to which straits may be subject to such a regime.³⁶³

United States and lack of UNCLOS ratification

Following the election of the Reagan administration in the United States in 1981, its delegation at the UNCLOS meetings started to question the deep seabed mining regime of the proposed Convention, especially those aspects which sought to give effect to certain common heritage principles, such as technology transfer. This was too late for the US to change, with UNCLOS accepted in 1982, and although a vote was casted, which USA lost, it remained unsettled.

When UNCLOS III was implemented in 1982 and countries started to ratify the convention, it was apparent that many states were concerned about the provisions in chapter Part XI – The Area – joining USA in its critique. But as time passed and UNCLOS was closer to its 1994 date of coming into force, it was apparent that a breakthrough was needed, as many western states had not ratified the convention. If UNCLOS would not have the full support of the international community, it could have struggled for legitimacy.

In 1994 the UN Secretary General brought together key states in the conflict and brokered a resolution which resulted in modifications and adjustments to Part XI prior to its entry into force. The 1994 Implementation Agreement sought to address many of the key concerns the USA and other states had raised and UNCLOS entered into force on November 16th 1994.³⁶⁴

Scholars have pushed for USA’s ratification³⁶⁵ but as of January 1st 2014 it has not ratified the treaty although it was signed by USA during the two years it was open for signature between 1982 and 1984.³⁶⁶ It is therefore not legally binding for USA.

³⁶³ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁶⁴ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁶⁵ Burt. A. (2012). *Why U.S. Senate should ratify Law of the Sea Treaty*.

³⁶⁶ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

3.3 IMO and Arctic shipping

The International Maritime Organization (IMO) is a specialized institution of the United Nations, responsible for measures to improve the safety and security of international shipping and to prevent marine pollution from ships. It is also involved in legal matters, including liability and compensation issues and the facilitation of international maritime traffic.

The IMO was established by the United Nations in Geneva in 1948 but met for the first time in 1959, the same year as UNCLOS I. It has 170 members and has a slogan: *Safe, secure and efficient shipping on clean oceans*.

The IMO is financed by shipping nations, based on the size of their fleets. As Panama has the biggest shipping fleet of the world, it pays over 18% of the IMO budget. Liberia pays around 10%, the Marshall Islands 6 and United Kingdom, Bahamas, Singapore, Malta, Greece, China and Japan between 3% and 5%.³⁶⁷ As discussed above, the flag states do not necessarily reflect the biggest shipping nations of the world as such, as many of them are flags of convenience.

The IMO has an assembly that meets once every two years and five major committees. They are on maritime safety, marine environment and protection, technical co-operation, facilitation and legal matters. The IMO also has several sub-committees and can assemble working groups to resolve matters.

IMO has 50 Conventions and Protocols, hundreds of codes, guidelines and recommendations and almost every aspect of shipping covered, including design, construction, equipment, maintenance and crew. There main regulations apply to 99% of the world's fleet.³⁶⁸

UNCLOS makes several claims to “competent international organizations”, meaning the IMO, showing its importance.

³⁶⁷ IMO. (n.d.). IMO – the International Maritime organization.

³⁶⁸ IMO. (n.d.). IMO – the International Maritime organization.

*Table 3-1 Status of selected IMO Conventions as of January 31st 2010.*³⁶⁹

Instrument	Entry into force	Number of parties	Percentage of world merchant shipping tonnage
MARPOL	1983	150	99.14%
SOLAS	1980	159	99.04%
Load Lines	1968	159	99.02%
STCW	1984	153	99.01%
<i>Other instruments</i>			
IMO Convention	1958	168	97.22%
Search and Rescue	1985	96	59.48%

The IMO has developed a number of requirements, guidelines and recommendations regarding navigation in polar waters, relating to maritime safety (construction, search and rescue, navigation, life-saving, etc.) and marine pollution prevention (designation of special areas, carriage of heavy fuel oil, etc.) as well as certification and qualification of seafarers on ships operating in polar areas.

The drivers are the numbers of risks await ships operating in polar waters. Extreme weather conditions are frequent and the relative lack of good charts, communication systems and other navigational aids pose challenges for mariners. The Arctic and the Antarctic are both remote and search and rescue operations can be difficult and the same applies to operations concerning environmental disasters. And due to the cold ships need to tolerate extreme temperatures without damaging machinery and emergency equipment and when ships sail in ice damage to hulls, the propulsion system and appendages are a big threat.

The main IMO instruments related to Arctic shipping are the International Convention on the Safety of Life at Sea (SOLAS), the International Convention for the Prevention of Pollution from Ships (MARPOL), the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), the Guidelines for ships operating in Polar Waters and the Polar Code. The International Convention on Load Lines can also be applied as it regulates the draught to which a ship may be loaded make a significant contribution to her safety.

³⁶⁹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*. p.352.

SOLAS

The SOLAS Convention is the primary source of rules concerning the safety of shipping and therefore, in its successive form, generally regarded as the most important of all international treaties concerning the safety of merchant ships. Its origin lies in an early convention concluded in 1914 in response to the Titanic disaster.³⁷⁰ The Titanic sank on 15th of April 1912 on its maiden voyage, after hitting an iceberg off Newfoundland where 1501 lost their lives.³⁷¹

SOLAS developed over time and new conventions were agreed in 1929, 1948, 1960 and when it was updated and adopted in 1974 it had gone through wholesale changes resulting in a revised convention extensively amended via a tacit³⁷² amendment procedure. It is a universal regime and as table 1 shows, it has been signed by 159 states, reaching over 99% of the world shipping merchant tonnage.

The primary purpose of SOLAS is to secure the seaworthiness of ships by setting standards for construction, equipment and operation. The core of SOLAS is the responsibility of flag states to ensure that ships under their flag comply with the requirements of the convention and its annex, including by promulgating all laws, decrees, orders and regulations necessary to do so.³⁷³

International safety standards are under constant review by the IMO. As Arctic shipping increases the IMO has developed further regulations, introducing the Polar code as discussed below. It might be necessary for the IMO and the Arctic states to undertake studies and tests on ships, equipment and techniques used in the Arctic. Considerations for safe carriage and care of dangerous goods, regulated by the International Maritime Dangerous Goods, a code part of SOLAS, might have to be reviewed for the purpose of identifying specifically dangerous chemicals for the Arctic.³⁷⁴

³⁷⁰ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁷¹ Frey, B. S., et al. (2010). Interaction of natural survival instincts and internalized social norms exploring the Titanic and Lusitania disasters.

³⁷² Something that is understood or implied without being stated.

³⁷³ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁷⁴ VanderZwaag, et al. (2008). *Governance of Arctic Marine Shipping*.

The only requirements in the SOLAS Convention specially related to the Arctic is contained in chapter V, Safety of navigation. Regulation 5 (Meteorological services and warnings) requests nations who have signed the convention to “encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation, including, inter-alia, to issue at least twice daily whether information suitable for shipping containing data, analyses, warnings and forecasts of weather, waves and ice.”³⁷⁵

Regulation 6, Ice Patrol Service, provides requirements concerning safety of life at sea in the North-Atlantic, “safety and efficiency of navigation and protection of the marine environment in that area and requires ships transiting the region of icebergs guarded by the Ice Patrol during the ice season to make use of the services provided by the Ice Patrol.”³⁷⁶

Guidelines for ships operating in Polar areas

Navigation in polar waters was first addressed by the IMO in the Guidelines for ships operating in Arctic ice-covered waters, issued in 2002, providing recommendatory provisions additional to those of the SOLAS and MARPOL Conventions for navigation in Arctic waters. In 2009 the revised Guidelines for ships operating in Polar Waters were accepted. Member governments were invited to bring the guidelines to the attention of ship-owners, ship designers, shipbuilders, ship repairers, equipment manufacturers, and installers and all other parties concerned with the operations of ships in Arctic ice-covered waters.³⁷⁷ The Guidelines are structured in four parts.

Part A provides construction, subdivision and stability on damaged condition requirements for Polar Class ships. Pollutants should not be carried directly against the hull in areas where ice impact is of significant risk. Operational pollution of the environment should be minimized by selecting

³⁷⁵ Deggim. H. (2009). International requirements for ships operating in polar waters.

³⁷⁶ Deggim. H. (2009). International requirements for ships operating in polar waters.

³⁷⁷ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

the appropriate equipment and practices and safety related survival and pollution control should be appropriate for the low temperature conditions faced in the Arctic. Communication and navigational equipment should be sufficient for high latitudes, in areas where limited infrastructure remains and in unique atmospheric interference.

Part B applies to Polar Class ships and includes recommendations on fire safety and other security equipment, including for navigation. For example, all ships should be provided with an automatic identification system (AIS).

Part C concerns ship operations, crewing and emergencies.

Part D enlists provisions for environmental protection and damage control.

The Guidelines state that it is required to take into account specific climatic conditions in the area “in order to meet appropriate standards of maritime safety and pollution prevention.”

They aim at mitigating the additional risk imposed on shipping due to the harsh environmental and climatic conditions existing in polar waters. They address the fact that the polar environment imposes additional demands on ship systems, including navigation, communications, life-saving appliances, main and auxiliary machinery, environmental protection and damage control, etc., and emphasize the need to ensure that all ship systems are capable of functioning effectively under anticipated operating conditions and provide adequate levels of safety in accident and emergency situations.

In addition, the Guidelines recognize that safe operation in such conditions requires specific attention to human factors including training and operational procedures. They provide that all ships operating in polar ice-covered waters should carry at least one Ice Navigator and that consideration should also be given to carrying one when planning voyages into polar waters.

Furthermore, continuous monitoring of ice conditions by an Ice Navigator should be available at all times while the ship is underway in those regions. The IMO also has a Guide to cold water survival, providing advice to ships operating in cold water areas on how to prevent or minimize hazards of cold exposure, emphasizing individual responsibility to effect survival in cold water and advising on simple self-help techniques.³⁷⁸

³⁷⁸ IMO. (2010). Guidelines for ships operating in Polar waters.

Standards of Training, Certification and Watchkeeping for Seafarers

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, STCW, is a training guidance for officers and masters on ships operating in ice-covered waters. The chapter on polar waters was added in 2010, named the Manila amendments to the STCW Convention and Code.

The newly adopted guidance stresses importance for officers in charge of a navigational/engineering watch on board ships operating in polar waters to have sufficient and appropriate experience with polar waters. It also measures to ensure the competency of masters and officers of ships operating in polar waters and recommends that Governments adopt measures to ensure that masters and officers of ships operating in polar waters have appropriate training and experience.³⁷⁹

According to the resolution, they masters and officers should be able to plan voyages to polar waters, taking into account glaciological, hydrographic, oceanographic and meteorological factors; navigate safely in polar waters, in particular in restricted ice-covered areas under adverse conditions of wind and visibility; and supervise and ensure compliance with the requirements deriving from intergovernmental agreements and with those relating to safety of life at sea and protection of the marine environment.³⁸⁰

Convention on the International Regulations for Preventing Collisions at Sea

Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs) was adopted in 1972 to update and replace the Collisions Regulations of 1960. It gives recognition to traffic separation schemes, giving guidance for states to determine safe speed, the risk of collisions and the conduct of vessels operating in or near traffic separation schemes. It includes 38 rules divided into five sections, general provisions,

³⁷⁹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

³⁸⁰ IMO (n.d.). *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)*.

steering and sailing, light and shapes, sounds and light signals and exemptions.³⁸¹

COLREGs applies to navigation in the Arctic, but does not contain specific rules for ice-covered waters. It has been projected that as COLREGS covers a situation where a ship is constrained in its ability to maneuver due to its size, draft or other reason, such as ice, and the extended Arctic shipping activities, that COLREGs will assume greater importance.³⁸²

The Polar Code

The IMO is developing a mandatory International code of safety for ships operating in polar waters, the Polar Code. It covers the full range of topics relevant to ships operating in the inhospitable waters surrounding the North and South Poles. The topics are listed in table 3-2 and include design, constructions and equipment of ships, to training, search and rescue and environmental protection. It has been in development since 2010 and a draft text was agreed in principle in January 2014.³⁸³

Operations in the polar areas have been a concern for the IMO as seen by the many relevant requirements, provisions and recommendations developed over the years. The IMO calls the polar areas “harsh, remote and vulnerable” and states that trends and forecasts indicate that polar shipping will grow. “These challenges must be met without compromising either safety of life at sea or the sustainability of the polar environments.” The result of these concerns will be the Polar Code.³⁸⁴

The structure of the Polar Code will be twofold, the mandatory Part A and the recommendatory part B. The chapters in the Polar Code will set out goals and functional requirements for ships. Table 3-2 shows the topics covered in the Polar Code.

³⁸¹ IMO. (n.d.). Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs).

³⁸² Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report. p.57.

³⁸³ Deggim, H. (2014). Progress towards the development of an international Polar Code. [PowerPoint slides].

³⁸⁴ IMO. (2014). IMO Polar Workshop Opening remarks.

Table 3-2 Polar code structure³⁸⁵

Mandatory <i>Safety measures and pollution prevention measures</i>	Recommendatory <i>Additional guidance regarding the provisions of Part A</i>
<ul style="list-style-type: none"> ○ General ○ Polar Water Operational Manual ○ Ship structure ○ Stability and subdivision ○ Watertight and weathertight integrity ○ Machinery installation ○ Operational safety ○ Fire safety/protection ○ Prevention of oil pollution ○ Prevention of pollution from noxious liquid substances ○ Prevention of pollution by harmful substances in packaged form ○ Prevention of pollution by sewage from ships ○ Prevention of pollution by garbage 	<ul style="list-style-type: none"> ○ Life saving appliances and arrangements ○ Safety of navigation ○ Communication ○ Voyage planning ○ Crewing/ manning/ training ○ Ballast water management ○ Anti-fouling ○ Bio-fouling

The Code will not be a Convention for countries to sign. To make the Polar Code mandatory it will be adopted by the Maritime Safety Committee and Marine Environmental Protection Committee resolutions, a new chapter will be adopted in SOLAS, associated amendments will be added to each of the MARPOL annexes and other amendments added to other pollution-related instruments, the BWM conventions and the AFS convention.³⁸⁶

Ships intended to operate in polar waters will be required to apply

³⁸⁵ Deggim, H. (2014). Progress towards the development of an international Polar Code. [PowerPoint slides].

³⁸⁶ Deggim, H. (2014). Progress towards the development of an international Polar Code. [PowerPoint slides].

for a Polar Ship Certificate, which will classify ships in three categories. These categories are based on the requirements for Polar Class ships, listed in table 1-1, where Polar Classes 1-5 are jointed to Category A, Polar Classes 6 and 7 make up Category B and other ships are in Category C. Category A is for ships at least medium first-year ice, which may include old ice inclusions, Category B will for ships not in Category A, ships that can operate in at least thin first-year ice, which may include old inclusions. Category C will be for ships who can operate in open water or in severely less ice conditions than those in Categories A and B.

To acquire a Polar Ship Certificate ships must undergo an assessment where the anticipated range of operating conditions and hazard the ships may encounter in the polar waters are taken into account. The assessment would also include information on identified operational limitations and plans or procedures or additional safety equipment necessary to mitigate incidents with potential safety or environmental consequences. The Polar Water Operational Manual will also be mandatory to have on board for the ships master and crew to take decisions on routes and other factors based on the capabilities of the ship according to the assessment.³⁸⁷

Stakeholders released a draft of the Polar Code from 10th of October for review. It was prepared by the Intergovernmental Working Group on the Polar Code, held from the 30th of September to the 4th of October 2013 at the IMO Headquarters. A delegation from 29 countries was present, amongst them from all the eight Arctic states. A delegation from China was also present, along with other Asian countries, including Japan, Republic of Korea and Singapore. Intergovernmental organizations were also invited as observers as well as non-governmental organizations.³⁸⁸

The committee responsible for the draft Polar Code met in January 2014 where it agreed in principle the draft text of the Code. It also agreed in principle to proposed draft amendments to the IMO's safety and pollution prevention treaties to make it mandatory. The next committee to take action meets in May 2014.³⁸⁹

³⁸⁷ IMO. (n.d.). Shipping in polar waters.

³⁸⁸ The author got a copy of a draft Polar Code sent. The version has not been released to the general public and is therefore not available online.

³⁸⁹ IMO. (n.d.). Shipping in polar waters.

The Polar Code could come into force in 2016. It has been both praised and criticized although not yet finalized. “The Polar Code is a very good step forward, we endorse it but it is just a step forward, we can't stop now. Any risk mitigation measures that produce fewer insurance claims will of course on average make insurance prices go down,” said Stein Are Hansen, the Assistant Director of the Norwegian Hull Club, a mutual marine insurance firm.

Environmentalists point out that the problem of ballast water discharge, which often introduces non-native species to a region, is not dealt with adequately in the Polar Code. It also continues to allow vessels to use heavy fuel oil, a risk, as the fuel would contaminate waters in case of an accident. “We are concerned that there are important aspects that the Polar Code doesn't address,” Nina Jensen, the head of environmental group WWF's Norwegian branch said.³⁹⁰

Case study: Putting the Polar Code to work for insurers³⁹¹

Michael Kingston from DWF Fishburns, a company specializing in the management services for the insurance sector, held a presentation at the IMO's Workshop on Safe Ship Operations in the Arctic Ocean in February 2014. He presented how the Polar Code of the IMO could come into force for insurers. Insurance is crucial for Arctic shipping as discussed in chapter 1. According to Kingston, the Polar Code could make insurance in the Arctic more feasible.

His presentation was called *Operationalizing the Polar Code in the Arctic Ocean: Insurance Industry Contributions*. He introduced the Lloyds of London first and its report on the Arctic opening from 2012.

After an introduction his first slide about insurers general attitude to insuring above 70° north was simple, a smiley face showing a big thumb down, meaning that insurers are less than interested in the scenario.

Kingston talked about the Polar Code and the IACS Polar Class Rules and said that they must be linked to an ice regime system - where ice class requirements to different regions depending on the season are applied. He

³⁹⁰ Koranyi, B. (2014). Expanding Arctic ocean to get its own shipping rules. Reuters.

³⁹¹ Kingston, M. (2014). Operationalising the Polar Code in the Arctic Ocean: Insurance Industry Contributions. [PowerPoint slides].

took the example of first year ice at -1° varying a lot from first year ice at -40°. “If Polar Class Rules are not linked to Ice Regime, then rules have little practical value as they cannot be applied in “real world” operations.”

Kingston said that the nature of the operation is a critical factor when determining the ice class required. He questioned whether individual vessels would have the freedom to choose a line with the least ice, or if the route would be previously selected and left to chance. Kingston also points out that ice classes are assigned to vessels for single vessel operations, and although being escorted by icebreakers the ship must be able to handle the ice-filled waters.

Kingston asked: What can we do about this to make it work? He suggested that the Arctic should be divided into distinct geographical areas, based on ice conditions and it should be not too detailed to begin with. “There should be a number of seasons established in a year – perhaps 3-4 – that captures ice seasons with ice coverage and hardness.” Those parameters should reflect the IACS and the IMO Polar Code.

He also said that politics should be avoided and that each Arctic country should be responsible for rules in their “sector” of the Arctic. It could be justified by placing the Arctic Search and Rescue Agreement, signed by the Arctic Council member states, to work in practice.

He concluded by saying that insurers would be happy to insure above 70° north with the Polar Code, the ice regime put in work plus best practice, resulting in insurance and therefore trade and investment and therefore sustainable Arctic development.

He concluded his presentation by showing a smiley face with big thumbs up.³⁹²

Voyage planning in remote areas

The IMO adopted Guidelines on voyage planning for passenger ships operating in remote areas in 2007. The guidelines were a response to growing popularity of tourism where exotic destinations were increasingly popular, including the polar areas. Special consideration needs to be given to the natural environment of the area of operation when developing a plan to

³⁹² Kingston, M. (2014). Operationalising the Polar Code in the Arctic Ocean: Insurance Industry Contributions. [PowerPoint slides].

remote areas. They can have limited resources and navigational information and the guideline specifies detailed voyage and passenger plans.

The plan should include information on where safe areas are and which areas are a no-go, they should have surveyed marine corridors and contingency plans for emergencies if limited support is available. In addition the plans should include information on areas containing ice or icebergs which cannot be seen because of darkness, swell, fog, and pressure ice, safe distance from icebergs, and safe speed in areas where ice and icebergs are present.³⁹³

Ships reporting in the Arctic region

A new mandatory ship reporting system was adopted in 2013 for ships passing through or proceeding to and from ports and anchorages in the Barents area. The ships required to use the system are all ships with a gross tonnage of 5000 and above, all tankers, all ships carrying hazardous cargoes, a vessel towing than the length of the tow exceeds 200 meters and any ship not under command, restricted in their ability to manoeuvre or having defective navigational aids. The system was adopted after a proposal from Russian and Norwegian authorities at a Maritime Safety Committee session.³⁹⁴

3.4 The Arctic Council

In addition to international law, the eight Arctic states domestic laws and governance, the Arctic Council is a governing body in the Arctic. The Ottawa declaration signed in 1996, marked the official establishment of the Arctic Council. The Council is a high-level intergovernmental forum “to provide a means for promoting cooperation coordination and interaction among the eight Arctic states, with the express involvement of Arctic indigenous

³⁹³ Deggim. H. (2009). International requirements for ships operating in polar waters.

³⁹⁴ IMO. (n.d.). Shipping in polar waters.

communities and other Arctic inhabitants on common Arctic issues, especially issues of sustainable development and environmental protection in the Arctic.”³⁹⁵

The forum is therefore for political and scientific discussions on issues common to the governments of the Arctic region and its inhabitants. The members are Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America. The Chairmanship of the Council rotates every two years among the eight Member States.³⁹⁶

In addition there are several permanent participants at the council all of whom are organizations of indigenous people. The Permanent Participants have full consultation rights in connection with the Council’s negotiations and decisions.³⁹⁷

Observers of the Arctic Council are on different levels and open to non-arctic states, inter-governmental and inter-parliamentary organizations, global and regional and non-governmental organizations. To be admitted as observer’s special criteria has to be accomplished. The observers are invited to the meetings of the Arctic Council but their role is to observe the Councils work and make relevant contributions, primarily through the working groups.³⁹⁸

The Arctic Council working groups engage in issues such as monitoring, assessing and preventing pollution in the Arctic; also, climate change, biodiversity conservation, sustaining use of resources, emergency preparedness and prevention, and living conditions of Arctic residents. The resulting reports provide knowledge, advice, and recommendations to the Arctic Council. The six working groups are: Arctic Contaminants Action Program (ACAP), Arctic Monitoring and Assessment Programme (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR), Protection of the Arctic Marine Environment (PAME), Sustainable Development Working Group (SDWG).³⁹⁹

³⁹⁵ Arctic Council. (1996). Declaration on the establishment of the Arctic Council.

³⁹⁶ Arctic Council. (2011). About the Arctic Council.

³⁹⁷ Arctic Council. (2011). Permanent Participants.

³⁹⁸ Arctic Council. (2011). Observers.

³⁹⁹ Arctic Council. (2011). Working Groups.

The Arctic Council is only briefly introduced here as it does not related directly to Arctic shipping and China in many ways, but the work of the Arctic Council is frequently mentioned in the thesis.

3.5 Environmental shipping governance

As discussed in chapter 1, concerns for the marine environment grow as Arctic shipping activities increase. The most significant threat from ships in the Arctic marine environment is the release of oil, accidental or with an illegal discharge. Concerns also relates to strikes on marine mammals, introduction of alien species and noise from shipping activities. Black carbon emissions from ships may also have regional impacts.⁴⁰⁰

UNCLOS addresses vessel-source pollution by requiring states to act through “competent international organizations”, where the IMO is the most important actor, and through sophisticated jurisdictional framework so that such standards are enforced efficiently.⁴⁰¹

IMO has implemented conventions to regulate pollution from shipping. The MARPOL Convention is the most important international treaty covering the prevention of pollution by ships. It has also put in place a series of measures designed to ensure that the victims of pollution can be financially compensated as well as other topics, including the management of ships ballast water, the removal of shipwrecks and toxic substances in ships’ anti-fouling systems.⁴⁰²

UNCLOS and vessel pollution

UNCLOS supplies the overarching legal framework for marine environmental protection, supplemented by a multitude of other treaties and soft law instruments. The key chapter of UNCLOS regarding marine

⁴⁰⁰ Arctic Council. (2009). Arctic Marine Shipping Assessment 2009 Report. p.5.

⁴⁰¹ Rothwell, D.R. & Stephens, T. (2010). The International Law of the Sea.

⁴⁰² IMO. (2012). International Shipping Facts and Figures – Information Resources on Trade, Safety, Security, Environment. Maritime Knowledge Centre.

environmental protection is Part XII, Protection and preservation of the Marine Environment. In addition there are several mentions throughout the convention on the topic. UNCLOS also provides a definition of marine pollution.⁴⁰³

*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.*⁴⁰⁴

It is significant that UNCLOS is inclusive of all sources of marine pollution, including not only traditional concerns of marine pollution control, vessel source pollution but also from land based activities and from the atmosphere. The definition also adopts an open definition to include any type of pollution where it results in harmful effects.⁴⁰⁵

Article 192 establishes the fundamental duty of UNCLOS parties to “protect and preserve the marine environment.”⁴⁰⁶ Importantly, it is elevated above the sovereign right of states to exploit their natural resources, the content of Article 193 which says “states have the sovereign right to exploit the natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment.”⁴⁰⁷

Part XII of UNCLOS has general observations on environmental protection.

Article 194 states that parties shall take, individually or jointly as appropriate, all measures necessary to prevent, reduce and control pollution of the marine environment from any source.⁴⁰⁸ The same article also specifies the need for measures to address all sources of pollution, to minimize release

⁴⁰³ Rothwell, D.R. & Stephens, T. (2010). The International Law of the Sea.

⁴⁰⁴ UNCLOS. Article 1 (4).

⁴⁰⁵ Rothwell, D.R. & Stephens, T. (2010). The International Law of the Sea.

⁴⁰⁶ UNCLOS. Article 192 (1).

⁴⁰⁷ UNCLOS. Article 193 (1).

⁴⁰⁸ UNCLOS Article 194 (1).

of toxic substances, pollution from vessels and pollution from installations.⁴⁰⁹ Special emphasis is put on the importance of protecting and preserving rare or fragile ecosystems and habitats of threatened marine species,⁴¹⁰ which the Arctic is thought to be.

Other topics of Part XII include the duty “not to transfer damage or hazards or transform one type of pollution to another”⁴¹¹, five Articles on global and regional cooperation,⁴¹² two Articles on technological assistance for developing States,⁴¹³ and three Articles on monitoring and environmental assessments about monitoring the risks or effects of pollution, the publication of reports and the assessment of potential effects of activities.⁴¹⁴

An example could be the projections of shipping activities in the Northern Sea Route, which would according to Article 206, require Russia to “assess the potential effect of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205,”⁴¹⁵ which covers publication of reports “at appropriate intervals to the competent international organizations, which would make them available to all states.”⁴¹⁶

UNCLOS addresses pollution from vessels in Article 211, called Pollution from vessels. It serves two main purposes; it requires states to act through a “competent international organization”, in this case the IMO, to “establish international rules and standards to prevent, reduce and control pollution of the marine environment from vessels,”⁴¹⁷ and secondly to establish a sophisticated jurisdictional framework so that such standards are effectively enforced by flag states, port states and coastal states. As flag states cannot always be relied upon to apply pollution control standards to their vessels, “flags of convenience” or “open registers” as regulations on standards are not as strict in all countries.⁴¹⁸

⁴⁰⁹ UNCLOS Article 194 (3).

⁴¹⁰ UNCLOS. Article 194 (5).

⁴¹¹ UNCLOS. Article 195 (1).

⁴¹² UNCLOS. Section 2.

⁴¹³ UNCLOS. Section 3.

⁴¹⁴ UNCLOS. Section 4.

⁴¹⁵ UNCLOS. Article 206.

⁴¹⁶ UNCLOS. Article 204.

⁴¹⁷ UNCLOS. Article 211 (1).

⁴¹⁸ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

MARPOL

UNCLOS points to international standards to control vessel-source pollution. It effectively points to IMO's *International Convention for the Prevention of Pollution from Ships* (MARPOL), considered the main international convention on prevention of pollution in the marine environment from ships from both normal operations and accidental causes.⁴¹⁹

The management and discharge of operational wastes on board ships has been a major global concern for the international for decades. Before regulations were made, ships would directly discharge the marine environment before onboard waste management regulations were made. MARPOL can be expected to play an important role in the protection of the Arctic marine environment.⁴²⁰

MARPOL aims to prevent and minimize pollution from ships. It has six annexes. Annex I, Regulations for the Prevention of Pollution by Oil, entered into force in 1983. It covers prevention of pollution by oil from both accidental discharges and from normal operations. Other topics covered by MARPOL are regulations for the control of pollution by noxious liquid substances in bulk, prevention of pollution by harmful substances carried by sea in packaged form and prevention of pollution by sewage, garbage and air pollution from ships.⁴²¹

MARPOL and the Arctic

Annex I of MARPOL is perhaps the most significant one for the protection of the Arctic environment. It requires oily ballast discharges by oil tankers to occur more than 50nm from the nearest land and it must not exceed 30 liters per nm. The total quantity of oil released is also controlled; it cannot exceed 1/15,000 of the cargo capacity for older tankers and 1/30,000 for new tankers. Vessels have to maintain an oil record book where all movement of cargo oil and residues from loading and discharging is written.

⁴¹⁹ Rothwell, D.R. & Stephens, T. (2010). *The International Law of the Sea*.

⁴²⁰ VanderZwaag, et al. (2008). *Governance of Arctic Marine Shipping*.

⁴²¹ IMO. (n.d.). *International Convention for the Prevention of Pollution from Ships* (MARPOL).

MARPOL has made amendments and gotten stricter over time. An example are oil tankers who have been a major concern for oil trade as they were only single hull until around 1992 when MARPOL required all oil tankers to be double hulled.

MARPOL does allow for discharge of some garbage generated by normal operations of a ship. Paper, rag, glass, metal and bottles can for example be discharged beyond 12nm offshore. Packing materials can be discharged 25nm offshore. A garbage record book and a garbage management plan are required.⁴²²

As discussed above, the Polar Code will supplement MARPOL when implemented.

Special areas under MARPOL

MARPOL defines “special areas” in the world oceans, where for their oceanographically and ecological condition and to their sea traffic, the adoption of special mandatory methods for the prevention of sea pollution is required. Under the Convention, these special areas are provided with a higher level of protection than other areas of the sea.⁴²³

It is noticeable that the Arctic is not defined as a special area. Among them are the Antarctic area, the Mediterranean Sea, the Baltic Sea, the Black Sea and the Red sea (special areas under Annex I because of oil and Annex V because of garbage), and Antarctica is also on the list under Annex II for noxious Liquid Substances.⁴²⁴

IMO establish guidelines for the designation of special areas under MARPOL 73/78 where requirements for areas are laid down. A Special Area is defined as "a sea area where for recognized technical reasons in relation to its oceanographically and ecological conditions and to the particular character of its traffic, the adoption of special mandatory methods for the

⁴²² Deggim. H. (2009). International requirements for ships operating in polar waters.

⁴²³ IMO. (n.d.). Special Areas under MARPOL.

⁴²⁴ IMO. (n.d.). Special Areas under MARPOL.

prevention of sea pollution by oil, noxious liquid substances, or garbage, as applicable, is required."⁴²⁵

The criteria that must be satisfied for an area to be given Special Area status are grouped to three categories, oceanographic conditions, ecological conditions, and vessel traffic characteristics.

The first condition, oceanographic conditions, the guidelines state that the area possesses conditions "which may cause the concentration or retention of harmful substances in the waters or sediments of the area, including extreme ice state and restricted hydrology." The Arctic would therefore likely fulfill the criteria for the first category.

The second category, ecological conditions, states that an area needs to preserve some of five conditions, including endangered marine species, spawning, breeding and nursery areas for important marine species and areas representing migratory routes for sea-birds and marine mammals; rare or fragile ecosystems and critical habitats for marine resources including fish stocks and/or areas of critical importance for the support of large marine ecosystems." The Arctic is also likely to fulfill the conditions for category number two, which includes the habitats of polar bears for example. In addition, indigenous people in the Arctic depend on the land and resources for cultural reasons and should their resource base be impaired it could be argued to fulfill this category.

The third category, vessel traffic characteristics, states that "The sea area is used by ships to an extent that the discharge of harmful substances by ships when operating in accordance with the requirements of MARPOL 73/78 for areas other than Special Areas would be unacceptable in the light of the existing oceanographic and ecological conditions in the area."

It is unclear if the Arctic Ocean would fulfill this category. The shipping transits are few, but it has been pointed out that it is not the numbers of ships as much as the nature of the threat. For example the potential discharge of oil or oily waste as may be permitted by MARPOL in an environment that is very sensitive to even the smallest of discharges.

⁴²⁵ IMO. (2002). Guidelines for the Designation of Special Areas under MARPOL & Guidelines for the Designation of Special Areas and the Identification of Particularly Sensitive Sea Areas.

Should the Arctic be considered as a special area, the Arctic states would have to enhance the infrastructure, for example regarding reception facilities in the ports to ensure compliance with the designation.⁴²⁶

The IMO has another tool for special area protection, the Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas (PSSA). These areas are defined as “an area that needs special protection through action by IMO because of its significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to damage by international maritime activities.”

The IMO issues the guidelines but states that the provisions of UNCLOS are also relevant. For areas designated as special under PSSA, it can result in specific measures to control maritime activities in the area, such as routing measures, strict application of MARPOL discharge and equipment requirements.

No Area in the Arctic is designated as a PSSA area, but amongst them are the Great Barrier Reef in Australia, the sea around the Florida Keys in USA, the Galapagos Archipelago and the Baltic sea area.⁴²⁷

Environmental damage liability

Environmental damage from ships carrying oil cargo is regulated under the IMO. The International Convention on Civil Liability for Oil Pollution Damage (CLC) was adopted in 1969 and was amended and replaced by a protocol adopted in 1992. It was adopted to ensure adequate compensations to persons suffering after oil pollution damage. The Convention places the liability under such circumstances on the owner of the ship which caused the damage.

The liability is strict but specific exceptions are made to who is liable. In such cases the ship owner has to prove that exceptions should be operated. The Convention requires ships to be insured in sums equivalent to the owner's total liability.

⁴²⁶ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

⁴²⁷ IMO. (n.d.). Particularly Sensitive Sea Areas.

The Convention applies to all vessels carrying oil in bulk as cargo, but only ships carrying over 2000 tons of oil are required to maintain insurance in respect to oil pollution damage.

The compensation is limited, depending on the ship size but the amount is based on the official value of gold, as used by the International Monetary Fund. The amount is therefore not determined by specific amounts as their value fluctuates, but by special calculations as accepted in the Convention. It was raised in 1992 and again in 2000. Furthermore, the 1992 protocol widened the scope of the Convention to cover damage in the EEZ of the State party.

Alongside the CLC, the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund Convention) addresses gaps the CLC did not satisfactorily deal with. They included legal and financial issues. The Fund Convention compromised victims by establishing an international fund which provided additional compensation to the victims of pollution damage in cases where compensation under the 1969 Civil Liability Convention was either inadequate or unobtainable, and relieved the ship owner of the burden by the requirements of the new convention, therefore he was not required for compensation under two Conventions.

The movement of hazardous waste on vessels is also governed by an international convention, but under the United Nations. The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted in 1989. It was adopted in the industrialized world in the 1970's and 1980's when the general public became increasingly aware of pollution from hazardous waste. The waste includes materials characterized as explosive, flammable, toxic, or corrosive.⁴²⁸

It does, however, not address radioactive waste. The International Maritime Dangerous Goods (IMDG) Code by the IMO does. It was made mandatory in 2004, after being adopted first in 1961. The dangerous goods are classified in different classes which include explosives, gases, flammable

⁴²⁸ IMO. (n.d.). International Convention on Civil Liability for Oil Pollution Damage (CLC).

liquids and radioactive material. IMDG covers matters such as packing, container traffic and stowage.⁴²⁹

3.6 Coastal state governance in the Arctic

As described above the governance of shipping is largely adopted at an international level with various conventions, but UNCLOS allows for special laws and regulations imposed under certain circumstances. One such scenario is under Article 234 - Ice Covered Waters where non-discriminatory laws can be enforced “for the prevention, reduction and control of marine pollution from vessels in ice-covered areas.”⁴³⁰

The Article describes the scenario as “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.” Here the legislative and regulatory measures developed under Canada and Russia are described.⁴³¹

Article 211 also allows coastal states to adopt laws and regulations “for the prevention, reduction and control of marine pollution from foreign vessels, including vessels exercising the rights of innocent passage.”⁴³²

Canada and Russia are both coastal states but the amount of control varies with the zones of the coastal state jurisdiction. They have the greatest jurisdiction over internal waters, followed by the territorial waters within 12 nm of their baselines and the weakest powers in the EEZ beyond 12 nm.

⁴²⁹ IMO. (n.d.). International Maritime Dangerous Goods (IMDG) Code.

⁴³⁰ UNCLOS. Article 234.

⁴³¹ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

⁴³² UNCLOS. Article 211 (4).

Beyond 200 nm, there is no coastal state jurisdiction and the high seas allow the freedom of all ships.⁴³³

Canada and Russia have also adopted straight baselines in their waters, thereby declaring them as internal waters, putting restrictions on shipping. These declarations and disputes related to them are discussed in the chapter about international straights.

Canada and Russia are the only countries discussed here, as they are most relevant for Arctic shipping as determined with the shipping routes described in this thesis. An overview of the Central Arctic Ocean route is also given for comparison as the third shipping route in the Arctic.

Canada and governance of the Northwest Passage

The Northwest Passage consists of several shipping routes, most of them surrounded by islands in the Canadian Arctic. The Canada High Arctic islands are counted in thousands and were almost impassable for hundreds of years. But as USA acquired powerful icebreakers and, more recently, climate started to melt the sea ice ownership and control of the water was on the agenda after status quo when no navigation was possible.⁴³⁴ Canada's two main instruments are the Arctic Waters Pollution Prevention Act (AWPPA) and the Shipping Act.

The National maritime administration of Canada is Transport Canada. Its principal responsibilities are performed through Marine Safety, a line organization of the government. Transport Canada has numerous responsibilities for marine issues, including regulatory development and administration, navigational and marine safety, pollution prevention, security and port state control while the Canadian Coast Guard deals with operational safety.⁴³⁵

Restriction on pollution in the Canadian Arctic waters and the minimum requirements for pollution prevention are set out in AWPPA and its supporting regulations. AWPPA is a 'zero discharge' act, which states,

⁴³³ VanderZwaag, D. (2010). Law of the Sea and Governance of Shipping in the Arctic and Antarctic.

⁴³⁴ Byers, M. (2013). International Law and the Arctic.

⁴³⁵ VanderZwaag, D. (2010). Law of the Sea and Governance of Shipping in the Arctic and Antarctic.

“no person or ship shall deposit or permit the deposit of waste of any type in the Arctic waters.”⁴³⁶

AWPPA is based on the principles of both UNCLOS and MARPOL to establish special laws for the protection of the marine environment. Canada released the Shipping Safety Control Zones Order in 1978 which divided the Canadian Arctic waters into 16 shipping safety control zones. It sets out a complex array of shipping control measures, including AWPPA.⁴³⁷

Canada also has pollution prevention officers who “may inspect any ship within the Shipping Safety Control Zones for compliance,” enforcing AWPPA. Canada’s National Aerial Surveillance Program uses aircraft patrols to observe its waters to prevent ships from making illegal discharges.⁴³⁸

AWPPA, Article 4, states that “no person or ship shall deposit or permit the deposit of waste of any type in the arctic waters or in any place on the mainland or islands of the Canadian arctic under any conditions where the waste or any other waste that results from the deposit of the waste may enter the arctic waters.”⁴³⁹

Article 18 sets out the punishment for violation of Article 4, a fine not exceeding 5000 Canadian dollars for a person and 100.000 Canadian dollars for a ship.⁴⁴⁰

AWPPA has two key regulations, the Arctic Shipping Pollution Prevention Regulations (ASPPR), and the Arctic Waters Pollution Prevention Regulations (AWPPR). ASPPR governs navigation in coastal waters within Canadian jurisdiction north of latitude 60°N. It regulates the construction of ships, bunkering stations, gives out Arctic Pollution Prevention Certificate, issues and regulates ice navigators whom are required to be on board all tankers in the Canadian Arctic waters, ensures that enough fuel and water is on board ships, regulates sewage deposit and oil deposit mishaps who are only allowed to deposit to save a life or from a stranded ship to prevent further damage. All vessels above 100 tons that navigate Canadian Arctic

⁴³⁶ Transport Canada. (2012). Arctic Waters Pollution Prevention Act (AWPPA).

⁴³⁷ VanderZwaag, et al. (2008). Governance of Arctic Marine Shipping.

⁴³⁸ Transport Canada. (2012). Arctic Waters Pollution Prevention Act (AWPPA).

⁴³⁹ Canadian Minister of Justice. (1985). Arctic Waters Pollution Prevention Act. Article 4.

⁴⁴⁰ Transport Canada. (2012). Arctic Waters Pollution Prevention Act (AWPPA).

waters must comply with ASPPR regulations.⁴⁴¹

AWPPR regulates the deposit of domestic and industrial waste in Arctic waters, or in any location on the mainland or islands of the Canadian Arctic, and the liability for such deposits. The deposit of waste is allowed if strict regulations are followed.⁴⁴²

The Canada Shipping Act

The Canada Shipping Act from 2001 is both aimed at general control and registration of ships but also applies MARPOL pollution standards, as described above, to the marine area between 100nm and 200nm in the outer limit of Canada's EEZ. The Act authorized regulations to be passed establishing Vessel Traffic Services (VTS) zones in an Arctic shipping safety control zone whereby vessel reporting and clearance would be mandatory.

It also establishes a framework for search and rescue operations in Canadian offshore waters. Canada's SAR capabilities are coordinated by the Marine Rescue Coordination Center but Canadian Coast Guard vessels operating in the Arctic would be tasked for assignments.

The Act allows regulations to be passed controlling or prohibiting navigation in order to protect the environment in a shipping safety zone. Canada has however not adopted any mandatory routing requirements in the Arctic for commercial ships. Vessels can receive ice maps and other information to assist them to select routes through the Canadian archipelago, depending on ice conditions.

Collisions avoidance has not been an issue to date as so few ships operate in the Canadian Arctic, communicating directly between them when navigating through the ice. Canada sees routing - the practice of following predetermined routes for shipping⁴⁴³ as an option if ice contains change and the shipping season extends.

Canada has adopted security in the Arctic through its Marine Transportation Security Act and its Marine Transportation Security Regulations. They require all ships to meet a variety of repairing

⁴⁴¹ Transport Canada. (2010). Arctic Shipping Pollution Prevention Regulations (ASPPR).

⁴⁴² Canadian Minister of Justice. (1985). Arctic Waters Pollution Prevention Act.

⁴⁴³ IMO. (n.d.). Ships' routing.

requirements and to develop shipboard security plans. There is a compulsory 96-hour reporting requirement before entering Canadian waters.

Canada has made various commitments to enhance the security in the Arctic waters. They include the building of new Arctic patrol ships, expansion of aerial surveillance, the establishment of Canadian Forces Arctic Training Centre in Nunavut and the establishment of a docking and refuelling facility in Nunavut. It will serve as a staging area for naval vessels in the High Arctic as well as the Canadian Coast Guard. Canada is also planning to build a new Polar Class icebreaker.

Canada has numerous other codes and guidelines related to Arctic shipping, including the Guidelines for the Operation of Tankers and Barges in Canadian Arctic Waters, the Arctic Waters Oil Transfer Guidelines, the Guidelines for Operation of Passenger Vessels in Canadian Arctic Waters, Ice Navigation in Canadian Waters, and the Marine Environmental Handbook – Arctic, Northwest Passage.⁴⁴⁴

Russia and governance of the Northern Sea Route

Russia (including the Soviet Union) has been developing the Northern Sea Route governance since the first existence of it was proven in 1648. The first initiative to open the route for foreign vessels was made in 1967 during the height of the Cold War. However, it was never used by foreign vessels during this period. It was not until Mikhail Gorbachev renewed the offer in 1987 that foreign ship-owners paid serious attention. “Depending on the evolution of the normalization of international relations, we could open the Northern Sea Route for foreign shipping subject to the use of our icebreaker pilotage”.⁴⁴⁵

Russia confirmed the offer by adopting the Regulations for Navigation on the Seaways of the Northern Sea Route in 1990. It was not until 1991 that a foreign vessel made a through passage when the French ship *Astrolabe* made history.⁴⁴⁶

⁴⁴⁴ VanderZwaag et al 2008: Governance of Arctic Marine Shipping

⁴⁴⁵ (Gorbachev, 1987 - Tekið úr VanderZwaag).

⁴⁴⁶ VanderZwaag et al 2008 Governance of Arctic shipping

Russia adopted legislations on the Northern Sea Route in 1996 but it was replaced by the current legal regime that based on new federal laws - “on Amendments to Specific Legislative Acts of the Russian Federation Related to Governmental Regulation of Merchant Shipping in the Water Area of the Northern Sea Route”. It was adopted in the summer of 2012. Russia consequently established the Northern Sea Route Administration,⁴⁴⁷ and bases its marine transportation regulations on the Northern Sea Route on the principles of Article 234 of UNCLOS.⁴⁴⁸

Russia also defined the Northern Sea Route as:

The water area of the Northern Sea Route shall be considered as the water area adjacent to the Northern coast of the Russian Federation, comprising the internal sea waters, the territorial sea, the adjacent zone and the exclusive economic zone of the Russian Federation and confined in the East with the Line of Maritime Demarcation with the United States of America and Cape Dezhnev parallel in Bering Strait, with the meridian of Cape Mys Zhelania to the Novaya Zemlya Archipelago in the West, with the eastern coastline of the Novaya Zemlya Archipelago and the western borders of Matochkin Strait, Kara Strait and Yugorski Shar.

The Northern Sea Route Administration portrays a map of the Route as seen on figure 3-2. The map shows various shipping corridors between the Bering Strait and the Kara Strait, and two corridors between two Russian archipelagos, Franz Josef Land and Novaya Zemlya. The map also includes a table with shortening of distances on the Route compared to the Suez and Panama Canal. It states that between Shanghai and Murmansk a vessel saves 46% of the distance and 23% if going to Rotterdam. The difference between Yokohama and Murmansk is even greater, 56% shortening according to the Russian Administration.

⁴⁴⁷ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route.

⁴⁴⁸ Northern Sea Route Information Office. (n.d.). Legislation.



Figure 3-2 The Northern Sea Route, as defined by the Russian Northern Sea Route Administration. The red lines show the Route, the yellow lines are parts of other shipping routes.⁴⁴⁹

The Northern Sea Route Administration is a part of the federal Agency of Sea and River Transport and is Russia's response to increased activities on the route, as Russia wanted to strengthen its control of the route. The office is responsible for organizing procedures for shipping, including security and environmental measures.

The office also handles applications for sailing along the route, monitors weather, ice and navigational conditions on the vast area. The office will be responsible for harmonizing search and rescue operations if needed, environmental cleanup operations and providing information services and recommendations about shipping developments. The office is based in Moscow but has a branch in Arkhangelsk.⁴⁵⁰

Clause 14 of Russia's federal laws states that "Navigation in the water area of the Northern Sea Route, the historically emerged national transportation route of the Russian Federation, shall be performed according to the commonly accepted principles and norms of the international law, international agreements of the Russian Federation, this Federal Law, other

⁴⁴⁹ Northern Sea Route Information Office. (n.d.). NSR.

⁴⁵⁰ Staalesen, A. (2013). Opening the Northern Sea Route administration. Barents Observer.

Federal Laws and other regulatory legal documents issued in relation with the above.”⁴⁵¹

Russia consequently released Rules of navigation on the water of the Northern Sea Route. They were approved by the Ministry of Transport in Russia on January 17th 2013.⁴⁵²

The establishment was made in order to organize the navigation of ships in the water area of the Northern Sea Route, set out rules of icebreaker assistance, rules of ice pilotage, rules on the track assistance of ships, provisions on the navigational-hydrographic and hydrometeorological support of the navigation of ships, requirements to ships in relation to the safety of navigation and protection of the marine environment against pollution from ships and “other provisions relative to the organizations of ships.”⁴⁵³

The laws place strict regulation on insurance for companies applying for a permit which is only issued if the ship owner “submits the documents to confirm insurance required by international agreements of the Russian Federation, the law of the Russian Federation, or other financial security of civil liability against damage caused by pollution or other damage caused by the vessel.”⁴⁵⁴

This has been interpreted by environmentalists as to “If the shipping operators are to bear all costs related to spills, the route might ultimately not be so popular, after all,” Igor Kudrik said.⁴⁵⁵

The navigation of ships in the Northern Sea Route is described in chapter II. The NSR Administration grants permissions for the navigation of ships in the Northern Sea Route. The permission is based on an application from the ship-owner, who is required to furnish various pieces of

⁴⁵¹ State Duma. (2012). Federal law on amendments to specific legislative act of the Russian Federation related to governmental regulation of merchant shipping in the water area of the Northern Sea Route.

⁴⁵² State Duma. (2012). Federal law on amendments to specific legislative act of the Russian Federation related to governmental regulation of merchant shipping in the water area of the Northern Sea Route.

⁴⁵³ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route.

⁴⁵⁴ State Duma. (2012). Federal law on amendments to specific legislative act of the Russian Federation related to governmental regulation of merchant shipping in the water area of the Northern Sea Route. Clause 4.

⁴⁵⁵ Staalesen, A. (2012). Northern Sea Route without Murmansk. Barents Observer.

information, including about the ship itself, leaders, copies of classifications, measurements and insurance confirmation.

The applications should be sent not earlier than 120 calendar days and not later than 15 working days before the intended date of the ship entering the Northern Sea Route. Ships cannot enter the route earlier than the application states and “should leave the water area of the Northern Sea Route not later than on the date of the end of the term of validity of the permission.”⁴⁵⁶ If the ship cannot leave the Route before the expiry of the validity of the permission, for example in the case of severe weather, the shipmaster must immediately inform The NSR Administration and follow its instructions on procedure.

The rules also imply detailed requirements for shipmasters to stay in contact with the NSR Administration, giving out information about estimated times of arrivals, and other information.⁴⁵⁷

The rules of icebreaker assistance to ships are described in chapter III. The rules state that the icebreaker assistance involves securing safety of navigation of ships in the Northern Sea Route. The NSR Administration provides information on the necessity of assistance under heavy, medium or light ice conditions.

The fee rate for icebreaker assistance is determined according to the legislation of the Russian Federation “about natural monopolies taking into account the capacity of ship, ice class of ship, distance of the escorting and period of navigation.”⁴⁵⁸

The ship-owner decides the point and time of the beginning of the icebreaker assistance with the organization rendering the service. That organization decides the specific meeting point and a special channel is given for communication between the icebreaker and the accompanying vessel. The master of the icebreaker takes over command after the ice-convoy starts.⁴⁵⁹

⁴⁵⁶ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 2 (13).

⁴⁵⁷ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route.

⁴⁵⁸ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 4 (24).

⁴⁵⁹ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route.

The Rules of the pilot ice assistance of ships in the water area of the Northern Sea Route are described in chapter IV. “Pilot ice assistance of ships is carried out with the purpose of ensuring safety of the navigation of ships and prevention of accidents as well as protection of the marine environment,”⁴⁶⁰ in the Northern Sea Route. The fee rate is determined “in accordance with legislation of the Russian Federation about natural monopolies taking into account the capacity of ship, ice class of ship, distance of the escorting and period of navigation.”⁴⁶¹

The rules state that the person carrying out the pilot ice assistance has a service record of at least three years as a ship master or chief mate of ships with 3000ton capacity or more, out of which six months must be under ice conditions. The pilot gives recommendations to the ship master during the navigation of ship under ice conditions regarding assessments of ice assistance, the possibility of safe navigation of the ship in those conditions, the selection of the optimal route, the selection of speed and ways of performing manoeuvres of ships avoiding dangerous interactions of the hull and the propeller system in ice, ways of maintaining safe speed and distance to an icebreaker or a ship when moving in a convoy and ways of executing instructions of masters of the icebreaker rendering icebreaker assistance.⁴⁶²

The ice pilot needs to have access to various information aboard the ship about the Northern Sea Route, provided by the ship-owner, including navigational nautical charts, guides and manuals describing the Northern Sea Route, navigational, hydrometeorological and hydraulic information in relation and even special warm clothing matching climatic conditions. The ice pilot is required to have access to all equipment and information about the ship and related information.⁴⁶³

The Rules of the assistance of ships on seaways of the Northern Sea Route are described in chapter V. Ships in the Northern Sea Route must send information every day at 12.00 Moscow time to the NSR Administration with

⁴⁶⁰ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 4 (Article 31).

⁴⁶¹ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 4 – (Article 32).

⁴⁶² Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 4 – (Article 33).

⁴⁶³ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 4 – (Article 34, 35 & 37).

various logistic information, including the geographical coordinates, planned time of the ship leaving the Northern Sea Route, the route of the ship with an accuracy of one degree, ice information, weather information and the safety of navigation, including if the ships has had any damage or concerns about protection of the marine environment occur.⁴⁶⁴

The rules also state that ships moving towards icebreaking assistance should stay in areas safe in compliance with the category of ice it can navigate in.⁴⁶⁵

Provisions about the navigational-hydrographic and hydrometeorologic support of the navigation of ships are described in chapter IV. The navigational-hydrographic support of the navigation of ships involves the investigation of the submarine relief in order to maintain navigational nautical charts, guides and manuals for the navigation at the up-to-date level and making provision for the navigation facility equipment as well as informing seafarers of change of the navigational situation.⁴⁶⁶ The NSR Administration daily allocates hydrometeorological and ice analysis as well as hydrometeorological and ice forecast for 72 hours on its website.⁴⁶⁷

Rules of the radio communication during the navigation of ships is described in chapter VII. Specific guidelines explain which radio frequencies are used. They are listed in the rules and frequent communication with the NSR Administration is required.⁴⁶⁸

Requirements to ships pertaining to the safety of navigation and protection of the marine environment from the pollution from ships are described in chapter VIII. It gives out specific requirements for environmental protection which ships are required to follow. Included are supplementary emergency equipment for ice conditions, including “one searchlight with power of at least two kW with a set of spare lamps which

⁴⁶⁴ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 5 – (Article 42).

⁴⁶⁵ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route.

⁴⁶⁶ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 5 – (Article 46).

⁴⁶⁷ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 6 – (Article 52).

⁴⁶⁸ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 7 – (Article 53).

can be installed in the forebody of ship or at one of the wings of conning bridge,” in addition to warm clothing and hydrosuits for the crew.

Requirements for the ship include that the tank capacity for oil residues must be sufficient taking into consideration type of ship power plant and duration of voyage in the water area of the Northern Sea Route; and storage tanks for waste produced in the ships operation must be on board. The ship is also required to have enough fuel, fresh water and provision “without replenishment taking into consideration maximum possible duration of navigation.”⁴⁶⁹ In addition, ballast tanks adjoining external side above operating waterline have to be heated in the periods of November to June.

Finally, discharge of oil residues into the water area of the Northern Sea Route is prohibited.⁴⁷⁰

Fee structure and running costs

Russian authorities collect tariffs for ships operation in the Northern Sea Route. The fees are intended to cover infrastructure costs, including the maintenance of the aging Russian icebreaker fleet. For compatible ships, the fees are about two times more expansive in the Northern Sea Route than rights of passage in the Suez Canal. Data in operational costs are uncertain but the estimated maintenance of the icebreaker fleet was estimated to \$120 million annually in the mid 2000’s. No data is available on infrastructure costs but estimates show that it is around the same amount.⁴⁷¹

The amounts depend on the size of the vessel transiting – the bigger the ship the lower tariff per ton, its ice class, the route it is taking and the level of support it needs. In addition to the ice-breaking service provided, the fee includes guidance by reconnaissance aircraft, hydrographic and meteorological services and the use of communication systems.

Soon after the Northern Sea Route became open for foreign vessels,

⁴⁶⁹ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 8 – (Article 61).

⁴⁷⁰ Ministry of Transport of Russia (2013). Rules of navigation on the water area of the Northern Sea Route. Chapter 8 – (Article 65).

⁴⁷¹ Verny, J., & Grigentin, C. (2009). Container shipping on the Northern Sea Route.

the volume of cargo was around 4 million tons per year and the cost 2-4 USD per ton of cargo. When cargo declined to around 2.5-2.8 million tons per year the operations became unprofitable and authorities increased the fee to 7.5 USD per ton of cargo in the late 1990's.

During that period the authorities also granted additional subsidies to help maintain the icebreakers. But in 2003 the subsidies were cancelled and to elaborate the change the rates were increased to around 23 USD per ton. The fees vary different as said earlier, but these calculations were for compatible vessels.⁴⁷²

The Northern Sea Route Administration Information Office lists tables on its website for three different costs. They are all dated the 7th of June 2011. One TEU will be considered as 24 tons of cargo.⁴⁷³

*Table 2-3 The maximum rates for selected services of the icebreaker fleet on the Northern Sea Route to ensure the transportation of cargo.*⁴⁷⁴

Cargo	Rate per ton (rubles/USD as of 8.4.2014)
Cargo in standard containers	1048 / \$29
Articles out of metals of industrial purpose	1747 / \$49
Bulk cargo	707 / \$20
Bulk liquid	530 / \$15
Products of timer	148 / \$4

⁴⁷² Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe.

⁴⁷³ Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe.

⁴⁷⁴ Northern Sea Route Information Office. (n.d.). NSR Tariffs.

*Table 3-4 Maximum rates for services of the icebreaker fleet along the Northern Sea Route, collected from transport ships sailing in ballast, towing, technical, auxiliary (including research) and other floating craft, not intended for cargo transportation.*⁴⁷⁵

Area of escorting	Rate per ton of full displacement (rubles / USD as of 8.4.2014)
Transit along the waterways of the Northern Sea Route	1000 / \$28
To ports of the Laptev Sea from west or from east, to ports of the East Siberian Sea from west or from east	690 / \$19
To ports of the Kara Sea and to ports situated on Ob and Yenisei rivers from west	200 / \$6

*Table 3-5 Maximum rates for services of the icebreaker fleet along the Northern Sea Route to ensure the transportation of cargo to the Far North areas.*⁴⁷⁶

Nomenclature of cargo	Rate per ton (rubles/USD on 8.4.2014)
Bulk liquid cargo	248 / \$7
Other cargoes	486 / \$14

In addition to the icebreaker fees, pilotage is compulsory for voyages transiting the route,⁴⁷⁷ “performed to ensure safe navigation and prevent accidents at sea, as well as to protect the marine environment in the Northern Sea Route water area.”⁴⁷⁸ Russian authorities require two pilots on board which foreign captains must follow directives from. The Russian pilots

⁴⁷⁵ Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe.

⁴⁷⁶ Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe.

⁴⁷⁷ Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe.

⁴⁷⁸ Northern Sea Route Information Office. (n.d.). Ice Pilot Services.

communicate in Russian. All operational decisions, such as exact route selection, time for departure and mode of pilotage is taken by the two Russian pilots. The foreign captain is allowed no navigational decisions-making autonomy.

Additional fees and expenses can also be incurred during the voyage, including bunker-filling fee and fees for supplies of fresh water.⁴⁷⁹ Shipping companies are thought to be able to negotiate fees with the Russian NSR Administration.⁴⁸⁰

In general it is thought that shipping companies find the fees to high.⁴⁸¹ They have pointed out that they should, for example, not pay for icebreaker services when they don't need it. Russia responds by saying that there is a permanent need for icebreaking capacity, and any ship can have problems leading to the need for icebreaking assistance.

Atomflot is the company that operates the icebreakers. The head of Atomflot said in 2010 that an optimal fee would be 4-5 dollars per ton, which would permit an increase in traffic, resulting in higher income. But much of the costs of Atomflot are fixed, independent on whether the icebreakers are used or not. That results in a conflict of interest between users who would like to use the sea route without icebreaker assistance, and Atomflot which needs all the traffic it can get to secure income. Other companies have established fleets of ice-resistant ships, including Norilsk Nickel and Lukoil. They are seen as a threat to the nuclear icebreaker fleet.⁴⁸²

The future fees will be influenced by the amount of cargo, financial resources for maintaining Russian icebreakers, but most importantly the Russian states policy and desire to introduce market mechanism into the Northern Sea Route.⁴⁸³

⁴⁷⁹ Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe.

⁴⁸⁰ Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁴⁸¹ Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁴⁸² Jensen, Ø., & Moe, A. (2010). Opening Of New Arctic Shipping Routes.

⁴⁸³ Liu, M., & Kronbak, J. (2010). The potential economic viability of using the Northern Sea Route (NSR) as an alternative route between Asia and Europe.

Governance of the Central Arctic Ocean Route

The direct distance across the Central Arctic Ocean from the Bering Strait across the North Pole to the Fram Strait, which lies between Svalbard and Greenland, is 2100 nautical miles. The biggest portion of the Arctic water is what is designated as the High Seas,⁴⁸⁴ with all the navigational freedom UNCLOS enlists for that area, including the right of navigation for every State.⁴⁸⁵

The route, as described in chapter 1, is no single route, but the definition can be applied to being outside the jurisdictions of Canada and Russia. But the route has been defined and divided into two sections of water expanses. The first is the Central Arctic Basin, an area of 4.7 sq. million km in area, beyond 200nm from the baselines of the nearest coastal state. Here, no coastal state has jurisdiction and therefore they cannot inflict additional regulation, but flag states exercise jurisdiction over their own ships and crews.

The other section includes all ocean areas beyond the territorial seas of 12 nautical miles and within the outer limits of the 200 nautical miles exclusive economic zones, a distance of 188nm. In that zone, coastal states and other states have shared rights and responsibilities. Coastal states have, for example, sovereign rights over certain issue areas, including “exploration and exploitation, conservation and management of natural resources – living and non- living – on and in the seabed and in the water column above”.⁴⁸⁶

As figure 1-7 in chapter 1 shows, the Central Arctic Shipping Route lies almost entirely outside of EEZ of the coastal Arctic states.

The Central Route involves only limited legal uncertainties or controversies, in contrast to the other two shipping routes. As a result, shipping companies have been projected to increasingly focus on the Central Route, national jurisdictions.⁴⁸⁷

⁴⁸⁴ Östreng, W. (2012). Shipping and Resources in the Arctic Ocean: A Hemispheric Perspective.

⁴⁸⁵ UNCLOS. Article 90.

⁴⁸⁶ Östreng, W. (2012). Shipping and Resources in the Arctic Ocean: A Hemispheric Perspective.

⁴⁸⁷ Humpert, M., & Raspotnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route.

The Central Route will be regulated for navigation in according to the IMO treaties and regulations, including SOLAS, MARPOL and the Polar Code.⁴⁸⁸

3.7 China and Arctic governance

Many non-Arctic states and stakeholders are interested in utilizing the recent and forthcoming changes in the Arctic. China is particularly interested to have a greater influence in Arctic affairs, but as many other non-Arctic states, it is lacking a comprehensive Arctic policy.⁴⁸⁹ As an outside actor, China must therefore adapt to the local governance in the Arctic and cooperate with the Arctic states.

Although China has not released a formal strategy, which it is not obligated to do, it has been noted that China is indeed following a clear agenda for the Arctic. It has been noted that China has for the past few years taken steps to ensure their key interest in the Arctic. China is not expected to release an official Arctic strategy in the near- to medium-term.⁴⁹⁰

One cannot state that every Chinese scholar is speaking on the behalf of China with comments on the Arctic. However, some experts can. One of them is Jia Guide, deputy-director general from the Department of Treaty and Law, Ministry of Foreign Affairs of China, who described China's views on Arctic cooperation in a speech at the establishment of the China Nordic Arctic Research Center (CNARC). Guide stressed that cooperation needed to be strengthened, "not only among Arctic states, but also among Arctic and non-Arctic states," as there were many trans-national issues in the Arctic,

⁴⁸⁸ Humpert, M., & Rasputnik, A. (2012). The future of Arctic shipping along the Transpolar Sea Route.

⁴⁸⁹ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

⁴⁹⁰ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations. p.v.

namely climate change and shipping “which involve the common interests of all states.”⁴⁹¹

Guide is therefore keen to state that Arctic shipping involves the common interests of all states and the rights are international rights, not only of the Arctic states.

China has not taken an official position on neither the Northwest Passage nor the Northern Sea Route. It is not necessarily Chinas interest to enter into disputes with the Arctic coastal states as Canada and Russia are the only countries operationally positioned to provide adequate charts, navigation aids, ports of refuge, weather and ice forecasting, search and rescue and a police presence for deterring and dealing with pirates, terrorists and smugglers, all things Chinese shipping companies will need.⁴⁹²

China wants to influence discussions and decisions on how the Arctic should be governed and is already represented in numerous international organizations, a part of international treaties direct or indirectly related to Arctic governance. One of the most significant tools of China is its veto-wielding membership of the United Nations Security Council, the ultimate authority of UNCLOS. China has signed the Svalbard treaty and is a member of the IMO.⁴⁹³

China’s Arctic governing bodies

Several Chinese government entities work on Arctic, and Antarctic matters, often named together as polar affairs. The chief government body on polar affairs is the State Oceanic Administration (SOA). It is responsible for polar issues in all spheres, from scientific research to strategic issues. It reports administratively to the Ministry of Land and Resources. The SOA’s mandate is to oversee all maritime activities along Chinas coast. It also drafts Chinas maritime-related laws and regulations and facilitates Chinas participation in international maritime treaties. Its political standing has risen in recent years due to its maritime law enforcement agency China Maritime Surveillance (CMS). The CMS patrols waters and has been engaged in several

⁴⁹¹ China-Nordic Arctic Research Center. (2013). Speech by Deputy Director-General JIA Guide in the Inaugural Ceremony of the CNARC.

⁴⁹² Byers, M. (2009). Who Owns The Arctic?

⁴⁹³ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

international maritime incidents, resulting in added support from the government, and therefore the SOA.

The Chinese Advisory Committee for Polar Research (CACPR) is headed by the SOA. CACPR is an important governmental coordinating body on polar issues comprised of 13 experts from thirteen ministries or bureaus, all under the State Council and the General Staff Department of the People's Liberation Army (PLA), which carries out Arctic studies in its research institutions.

The Communist Party of China entrusts the State Council of China for day-to-day administration of the country. It is the highest governmental body of China. It was responsible for the decision to build a new polar icebreaker.

Chinese ministries are the next level in the governmental hierarchy. Several ministries and agencies fund polar activities from China.

The Ministry of Finance consulted with the National Development and Reform Commission that approves funds for construction of polar facilities and vessels.

The Ministry of Science and Technology provides financial support for polar scientific research and approves scientific research projects.

The Ministry of Environmental Protection implements international cooperation between China and the eight Arctic states in the field of climate change and environmental protection.

The Ministry of Foreign Affairs leads Chinese international Arctic cooperation. Its law department issues official public statements, coordinates Chinese representation at Arctic Council meetings, and serves as the Chinese counterpart in bilateral and multilateral engagement on Arctic matters. The assistant foreign minister is the highest-ranking official to address Arctic issues.

The Chinese Arctic and Antarctic Administration (CAA) directly manages polar affairs and is administratively in charge of China's polar expeditions. It has a staff of around 40.⁴⁹⁴

⁴⁹⁴ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

The China-Arctic cooperative mindset

China realizes that cooperation is key for it to becoming an important Arctic actor. Chinese officials highlight cooperation in speeches, a good example being Chinese Ambassador Zhao Jun at the Arctic Frontiers Conference in 2013.

*“Today, cooperation has become the mainstream way in dealing with the Arctic issues,” he said. In his speech, cooperation was high on the agenda. He added that Arctic cooperation was becoming more and more institutionalized and mature and its focus was now more on sustainable development than the environment. “Under the new situations of a changing Arctic, it will be of great importance for the Arctic and non-Arctic states to do research and address the trans-regional issues in a joint way.”*⁴⁹⁵

His choices of words highlighted cooperation as stated, but also on ‘the international community’. He said: “What’s more, the Arctic is still facing a number of trans-regional issues. By enhancing cooperation, the international community could effectively handle and find solutions to relevant issues with joint hands,” he said, adding that they included “climate change, maritime shipping and so on, which need to be addressed with the joint efforts of the international community. Therefore, China always maintains that the Arctic and Non-Arctic States should become cooperation partners.”⁴⁹⁶

He stressed that because of the pressing commercial possibilities, “both Arctic and Non-Arctic States need to carry out in-depth discussions on how to further develop their partnership of cooperation based on mutual respect, trust, interaction and benefits. China holds that this partnership of cooperation should be established on the legal basis of recognition and respect of each other’s rights, so as to commit ourselves to peace, stability and sustainable development of the Arctic. To this end, we must understand and trust each other at the political level, and carry out joint research

⁴⁹⁵ China-Nordic Arctic Research Center. (2013). Speech by Deputy Director-General JIA Guide in the Inaugural Ceremony of the CNARC.

⁴⁹⁶ China-Nordic Arctic Research Center. (2013). Speech by Deputy Director-General JIA Guide in the Inaugural Ceremony of the CNARC.

activities to address the trans- regional issues. China will make its own efforts to achieve this goal.”⁴⁹⁷

China’s Arctic interest have been describes as twofold: the affairs of regional nature which can be resolved within the region, and then there are affairs of global implications.⁴⁹⁸ China maintains that these affairs should be handled through global governance. These global implications include climate change, ice-melt, pollution to the environment. And the vice president of the Shanghai Institutes for International Studies has said that China should abide three main principles in Arctic affairs and protects its interests.

They are to act according to the relevant international law, follow the trend of globalisation and to maximise bilateral interest between China and the Arctic Countries. “It is China's belief that cooperation with the Arctic countries not only provides more opportunity for China to make contributions to the region, but also demonstrates China's resolution as a protector of the environment and strong supporter of Arctic governance.”⁴⁹⁹

As discussed in chapter 2, China has numerous cooperative projects with the Arctic states.

China and the Arctic Council

The Arctic Council is the highest governance institution in the Arctic. The eight member states enjoy the intergovernmental forum to promote cooperation, coordination and interaction.

In recent years the focus of the Arctic Council has move more towards a political and economic aspect, having started as an environmental protection forum and looking to the rights of indigenous peoples. Although that has not quit the Council’s focus has needed to shift towards the policy and governance as interest in the region has risen.

Chinese Arctic specialists, both in the government and academia, have expressed concerns that the Arctic Council eight member states are the sole decisions makers for the region.⁵⁰⁰ They see it as an inadequate

⁴⁹⁷ China-Nordic Arctic Research Center. (2013). Speech by Deputy Director-General JIA Guide in the Inaugural Ceremony of the CNARC.

⁴⁹⁸ Yang, J. (2012). China and Arctic Affairs.

⁴⁹⁹ Yang, J. (2012). China and Arctic Affairs.

⁵⁰⁰ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

governance structure given the global consequences of the melting ice. Chinese scholars have pointed to the opportunities and challenges for non-Arctic states.

Chinas policies today are based on a premise that the more the Arctic states recognize the potentially lucrative implications of the melting ice, which China looks to signalling adopted policies to maximize their interests in the region, the more China should look after its own interest and what it perceives as its rights.⁵⁰¹

The mainstream thinking among specialists in China is that the country has a legitimate right to participate in Arctic governance.⁵⁰² The reason is global challenges faced with the climatic changes in the Arctic. The environmental changes have major impacts on China's ecological system and therefore its agriculture and economic development. China also claims the right to explore the area of the Arctic Ocean that is considered as high seas, according to Article 86 of UNCLOS. Academics advocate that China should make every effort to ensure that it will be included in discussions and decisions pertaining Arctic governance.

As an ad hoc observer in 2007 and 2009, China had to get a formal invitation to Arctic Council ministerial meeting and other activities. Observers are granted access automatically, although they do not have voting rights.⁵⁰³

At the Nuuk 2011 ministerial meeting, the "criteria for admitting observers and role for their participation in the Arctic Council" was released. It states that new observers have to "recognize Arctic States' sovereignty, sovereign rights and jurisdiction in the Arctic."⁵⁰⁴

In May 2013, China gained an observer status in the Arctic Council. Therefore China has access to all Arctic Council meetings and activities, but does not have any direct participation in decision-making.

The criteria "of general suitability of an applicant for observer status" has seven points as declared in the Senior Arctic Official report to ministers after the Nuuk ministerial meeting in May 2011.⁵⁰⁵

⁵⁰¹ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

⁵⁰² Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

⁵⁰³ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

⁵⁰⁴ Arctic Council. (2011). Senior Arctic Officials (SAO) Report to Ministers. p.50.

⁵⁰⁵ Arctic Council. (2011). Senior Arctic Officials (SAO) Report to Ministers.

They include that observers must accept and support the objectives of the Arctic Council defined in the Ottawa declaration from 1996, where the Arctic Council was formally established. The declaration includes that the Arctic Council is established as a high level forum to “provide a means for promoting cooperation, coordination and interaction among the Arctic states.”⁵⁰⁶

Observers must also recognize Arctic States' sovereignty, sovereign rights and jurisdiction in the Arctic, as China does by being a party to UNCLOS. Observers must also recognize that an extensive legal framework applies to the Arctic Ocean including, notably, the Law of the Sea and that this framework provides a solid foundation for responsible management of this ocean. China does that by being a party to UNCLOS, but the criteria only states the need to recognize that UNCLOS provides a solid foundation, but does not demand that observers must ratify UNCLOS, presumably because USA has not.

Observers must also demonstrate political willingness, and financial ability, to contribute to the work of the Permanent Participants and other Arctic indigenous people. The term “political willingness” is not explained further.

And observers must also demonstrate concrete interest and ability to support the work of the Arctic Council, including through partnerships bringing Arctic concerns to global decisions making bodies. This criteria could be one of the reasons China has actively increased their cooperation in the Arctic.

Some Chinese scholars have criticized that China has accepted these terms. One of them is Guo Peiqing, professor at the Ocean University of China, who stated: “Arctic states announce to the world: The Arctic is “Arctic-States” Arctic. They oppose the idea that the Arctic is a common property of the whole mankind and desire to advance their own interests and to impair the participation of non-Arctic state through Monroe Doctrine⁵⁰⁷.”⁵⁰⁸

Other scholars have responded to the Arctic Council's criteria by insinuating that the Arctic Council risks making itself obsolete. According to

⁵⁰⁶ Arctic Council. (1996). Declaration on the establishment of the Arctic Council. Article 1-a.

⁵⁰⁷ Monroe Doctrine is an American foreign policy opposing interference in the western hemisphere from outside powers.

⁵⁰⁸ Kopra, S. (2013). China's Arctic Interests.

Zhang Xia: “If many countries were to be excluded from the Arctic Council, the power of the council would be weakened and it would be difficult for it to remain the primary institution to negotiate Arctic affairs.”⁵⁰⁹

Hu Zhengyue, an assistant minister of the Ministry of foreign affairs - the highest-ranking official to address Arctic issues - stated in 2009 the Arctic Council was the most influence regional governmental organization. He also stressed for the need for cooperation between Arctic and non-Arctic states. Hu acknowledged that the Arctic is mainly a regional issue, but said that due to climate change and international shipping an inter-regional as well.⁵¹⁰

China and UNCLOS

The Arctic states refer to UNCLOS and its provisions on EEZ’s and the possible extended continental shelves to extend their sovereignty over as much area as they can in the Arctic Ocean. Canada and Russia claim the Northwest Passage and the Northern Sea Route as internal waters and have put restrictions on transits.

The Asian emerging powers are starting to challenge these Arctic legal positions, referring to UNCLOS as well with the aim of maximizing the international space. Non-Arctic states are seeking to build a discourse around the Arctic as a “common heritage of mankind” as stated in Article 136 of UNCLOS, talking about the high seas – all waters outside EEZ of coastal states. They are first and foremost important for access to natural resources as UNCLOS secures the right of shipping in the high seas.

It has been described as “quite clear that there is a zero-sum game of sovereignty versus international jurisdiction between Arctic coastal states and Asian powers. The Arctic coastal states are seeking to use preconditions for states seeking a status as an observer in the Arctic Council, as a tool to guarantee their legal recognition, while the Asian powers are trying to build a discourse strengthening their access to resources, sea lanes and access to decisions making.”⁵¹¹

⁵⁰⁹ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

⁵¹⁰ Jakobson, L. (2010). China prepares for an ice-free Arctic.

⁵¹¹ Xing, L., & Bertelsen, R. (2013). The Drivers of Chinese Arctic Interests: Political Stability and Energy and Transportation Security.

Hu Zhengyue, an assistant minister of the Ministry of foreign affairs, stated in 2009 that UNCLOS needed to be refined and developed due to circumstances arising because of the melting polar ice.⁵¹²

UNCLOS constitutes the legal basis for Chinas activities in the Arctic. China acknowledges that it has no sovereign rights in the region. The highest-ranking Chinese official on Arctic issues, the assistant foreign minister, said in 2010 that:

“In accordance with the United Nations Convention on the Law of the Sea and other relevant international laws, Arctic states have sovereign rights and jurisdiction in their respective areas in the Arctic region, while non-Arctic states also enjoy the rights of scientific research and navigation. To develop partnership of cooperation, Arctic and non-Arctic states should, first and foremost, recognize and respect each other’s right under international law.”
Liu Zhenmin.⁵¹³

This is a crucial aspect of China’s acceptance as an observer in the Arctic Council as they confirmed the criteria the Arctic Council states established for their observers, which they had already done as a party to UNCLOS.

China’s maritime and marine legislation is generally consistent with UNCLOS and other multinational instruments. But it has been said that China does not recognize flag states’ right in some areas, including historic title claims, and: foreign warships in its territorial sea, foreign hydrographic and military surveys in its EEZ, foreign cables and foreign installations and structures on its continental shelf and foreign military aircraft in the airspace over its EEZ.

These policies have been said to possibly limit Chinas rights in the marine Arctic under reciprocity terms, i.e some states could point out that as China does not recognize these policies in its own jurisdiction and therefore should not be able to use them for their gain in the Arctic. China interest and relations to the Arctic has been examined and no evidence has been found

⁵¹² Jakobson, L. (2010). China prepares for an ice-free Arctic.

⁵¹³ Jakobson, L., & Peng, J. (2012). China's Arctic Aspirations.

that China's statements or policy steps relating to the marine Arctic fall outside of this scope.⁵¹⁴

There is a general consensus in China in the Arctic policy debate, discussions and deliberation in China that the Arctic belongs to all humankind and not to any one country or a group of countries.⁵¹⁵ However these declarations seem to be very general and very broad and not necessarily linked to a specific topic.

But China's insistence that respect for state sovereignty has been put into question. China has frequently stated that it repeats the sovereignty and jurisdiction of the Arctic states at the same time of pointing out that they have to consider the interests of mankind, pointing to Article 136 of UNCLOS.⁵¹⁶

"The Arctic belongs to all the people around the world, as no nation has sovereignty over it. . . China must play an indispensable role in Arctic exploration as we have one-fifth of the world's population," said Chinese rear admiral Yin Zhuo in 2010.⁵¹⁷ Although he was not clear, he seems to be referring to the area surrounding the North Pole.

Most Chinese officials state their appreciation for UNCLOS. Liu Huirong and Yang Fan of Ocean University's School of Law and Political Science have bemoaned the lack of a comprehensive Arctic treaty, especially when it comes to resolving disputes. "Looking far and wide at the legal documents which can resolve disputes related to the Arctic and how each state implements them, [it is our opinion that] UNCLOS is the most effective path for balancing the rights and interests among each of the signatory Arctic states."⁵¹⁸

They also point out that UNCLOS has some defects, especially regarding "ice-covered-areas" and they also say that UNCLOS needs to resolve the issue of its conflict with other treaties.⁵¹⁹

⁵¹⁴ Gayazova, O. (2013). China's Rights in the Marine Arctic.

⁵¹⁵ Wright, D. C. (2011). The Dragon Eyes the Top of the World.

⁵¹⁶ Jakobsson (2010) China Ice free Arctic.

⁵¹⁷ Wright, D. C. (2011). The Dragon Eyes the Top of the World.

⁵¹⁸ Wright, D. C. (2011). The Dragon Eyes the Top of the World.

⁵¹⁹ Wright, D. C. (2011). The Dragon Eyes the Top of the World.

Chinese Shipping Guidelines

China will release its first Arctic shipping guidelines in the summer of 2014. They are jointly compiled by the Ministry of Transport, the Polar Research Institute of China (PRIC) and the Ship Navigation Engineering Research Center in Fujian Jimei University. The compilation of the guidelines started in October 2013 and will mainly serve Chinese merchant ships on the Arctic sailing routes.⁵²⁰

Zhang Xia, Head of Strategic Studies Division of PRIC, will present a part of the guidelines in a conference in Akureyri, Iceland, in the summer of 2014. His abstract for the presentations, called *From Mandatory Icebreaker Guiding to Permit Regime: Changes About Northern Sea Route in the New Russian Laws*, said that a comparative study was made on Russian legal instruments enacted before 2013 and the new legislation in 2013.

The study focused on two main issues, Russia's definition of the Northern Sea Route (NSR) and its mandatory icebreaker guiding. The abstract states that the study illustrated that although there was no change of Russian views on NSR being a historically emerged national transportation route; the scope of the NSR is redefined clearly by the new law. The new laws state that the water area of the NSR comprises Russia's internal waters, territorial sea, adjacent zone and exclusive economic zone, but does not go beyond the scope of its exclusive economic zone. Russia therefore removed the dispute of the NSR extending to the high sea.

Secondly the study says that there was a change from mandatory icebreaker guiding before to a present permission-granting regime. The new law has provisions on concrete, practical and predictable conditions for independent navigation, under which the foreign ships' independent navigation in the NSR is now possible. "Hence, there is a massive change with the Russian policy of NSR, and it has a further tendency to open NSR to the international community."⁵²¹

⁵²⁰ China to complete Arctic shipping guidelines in June. (2014). Sinoship news.

⁵²¹ The author received an abstract from a presentation for a Chinese research conference in June 2014. The author is Zhang Xia, head of Strategic Studies Division of PRIC. The presentation is called *From Mandatory Icebreaker Guiding to Permit Regime: Changes About Northern Sea Route in the New Russian Laws*. The document is private and not available on the Internet.

China and marine environmental protection

The Ministry of Transport in China regulates shipping in China but the Maritime Safety Administration of China (MSA) is responsible for maritime safety, security, prevention of pollution from ships and protection of seafarers rights. MSA is therefore responsible for implementing policies, regulations, code and standards it comprehensively supervises safety and prevents marine pollution, to both Chinese national standards and international conventions. It is also responsible for inspections and qualifications of ships, it is in charge of Chinese flag ships registration, it controls foreign flag ships entry and exits in Chinese ports and waters and conducts supervision over ships carrying dangerous goods. Finally, it administers training for seafarers.⁵²²

China ratified UNCLOS in 1996 and has further regulated its ocean management with numerous laws and regulations. This includes laws on the Territorial Sea and the Contiguous Zone enacted in 1992, laws on the Exclusive Economic Zone and the Continental Shelf in 1998, laws on Marine Environment Protection (MEPL), laws on the Use of Sea Areas and laws on Fisheries.⁵²³

In addition, China has issued a framework for ocean management, for example the China Ocean Agenda 21 where China's marine policies are comprehensively outlined. The agenda includes the prospects to "effectively safeguard the China marine rights and interests, rationally develop and utilize marine resources, give positive protection to the marine eco-environment and realize the sustainable utilization of marine resources and the marine environment as well as the coordinated development of the work in this field."⁵²⁴

After China adopted the Law of the People's Republic of China on Its Territorial Seas and Adjacent Zones in 1992, UNCLOS was ratified by China in 1996 and China stated that disputes over maritime areas would be settled through friendly consultation but with "regard to issues that cannot be solved

⁵²² Maritime Safety Administration of the People's Republic of China. (n.d.). Introduction.

⁵²³ Jiayu, B. (2009). Ocean policy in China and its response to UNCLOS.

⁵²⁴ Information Office of the State Council Of the People's Republic of China. (1998). The Development of China's Marine Programs.

for the time being, China stands for pigeonholing them and for strengthened cooperation and joint development.”⁵²⁵

It also insisted to strengthen its comprehensive development and administration for coastal zones, to rationally utilize marine resources, to plan and implement the development of marine resources and the protection of the marine environment simultaneously, to reinforce oceanographic technology research and development, to developing a comprehensive marine management system and finally to actively participating in international cooperation in the field of marine development.⁵²⁶

Maritime interest is said to have gained an increasing amount of interest in recent years. The China State Council announced plans to restructure the country's top oceanic administration, the State Oceanic Administration (SOA), to enhance maritime law enforcement capabilities in 2013 as a reform in the legal system became a top concern for the National People's Congress of China, its top legislative body.

NPC deputies have signalled that new regulations will aid China in upgrading its maritime capabilities and secure its maritime rights and interests.

More than 80 sea-related laws and regulations have been adopted after the 1980s, but China first began to legislate its oceans in 1958. "Although new laws have created positive results in the past, they are no longer sufficient to develop and safeguard maritime rights and interests in the 21st century," said deputy Dai Zhongchuan, vice dean at Fujian's Huaqiao University Law School.⁵²⁷

He referred to the Marine Environmental Protection Law that needs to be revised to prevent further ecological damages to China's marine habitat, especially by sea reclamation, a growing problem for China's coastal cities. Oil spills and garbage dumping are also a growing problem, but are said to have been ignored before the Bohai sea oil spill in 2010.

China's Marine Environmental Protection Law was implemented in 1992 and revised in 1999. "We need to revise the law and increase penalties for criminals who contribute to sea pollution and destruction, and increase

⁵²⁵ Information Office of the State Council Of the People's Republic of China. (1998). The Development of China's Marine Programs. Section 1.

⁵²⁶ Information Office of the State Council Of the People's Republic of China. (1998). The Development of China's Marine Programs.

⁵²⁷ Fang, Z. (2013). New laws help China grow into maritime power.

monitoring activities of enterprises to insure that they comply with the new law," Dai said.⁵²⁸

And China has recently strengthened its regulations on pollution from ships. The Chinese State Council promulgated the Regulations of the People's Republic of China on the Prevention and Control of Marine Pollution from Ships in 2010. They contain regulations for ship owners to sign contracts in an approved Ship Pollution response Organization. MSA issued a model contract that ships have to fulfill.⁵²⁹

The regulations state that the contract must be signed for any ship "carrying polluting and hazardous cargoes in bulk or (b) any other vessel above 10,000 gt."⁵³⁰

The contract to be signed states that the ship must conclude the agreement "prior to ship's operation or entering into or leaving from a port,"⁵³¹ and the ships must pay a pollution response agreement fee. The regulations include tariffs for pollution control and cleanup actions in case of accidents. If a ship causes pollution in Chinese waters which lasts more than 30 days, it must pay an interim sum every 30 working days "to ensure the smooth performance of the actions."⁵³²

After the pollution control and cleanup actions are terminated, the Chinese party presents the ships with evidence for expenses incurred with attached bills showing all expenses. "Party A shall within 30 working days pay the undisputed sum and provide an appropriate security for the sum in dispute if required, such security to be in the form of a letter of undertaking from a P&I Club if offered. Any dispute between the parties shall be resolved in accordance with the agreed procedure in Article 7."⁵³³

⁵²⁸ Fang, Z. (2013). New laws help China grow into maritime power.

⁵²⁹ Assuranceforeningen Gard. (2014). Pollution Regulations in the People's Republic of China.

⁵³⁰ Assuranceforeningen Gard. (2014). Pollution Regulations in the People's Republic of China.

⁵³¹ Assuranceforeningen Gard. (2012). Agreement for Ship Pollution Response. Section 1. (2).

⁵³² Assuranceforeningen Gard. (2012). Agreement for Ship Pollution Response. Section 1 (3).

⁵³³ Assuranceforeningen Gard. (2012). Agreement for Ship Pollution Response. Section 3. (4).

Article 7 sets out regulations on disputes, stating that if the parties cannot reach a decision with normal negotiations, the case is presented in a Chinese court.

The ship must also prove it has adequate P&I insurance to meet its liabilities under the contract. The Chinese contractor “shall maintain insurance to cover its liabilities under the contract,” ranging from 500.000 Chinese RMB to 2 million RMB.⁵³⁴

Case study: Environmental protection or protecting China’s economy?

An example of Chinas recent regulations are from 2014 when it banned megaships from its ports. The rules limits the size off vessels in Chinese ports to 250.000 deadweight tons, citing environmental protection.⁵³⁵ Analysts have said that China is clearly trying to protect its own shipping industry, which has been in a downturn.⁵³⁶

Brazilian mining company Vale, the worlds largest iron-ore miner - accounting for more than a quarter of all seaborne trade in iron ore, spent billions of US dollars on the Valemax ships, the largest bulk carriers in the world. Their length is 362m, a beam of 65m and are able to carry 400.000t of iron-ore, three times the cargo of a Capesize bulk carrier who currently carry 80% of the world’s seaborne iron-ore. Vale is the second largest mining group in the world.⁵³⁷ China is the world’s largest importer of iron-ore, the main ingredient in steel.⁵³⁸

As much of the iron-ore is shipped to China, Vale planned to use its megaships to carry the cargo to Chinese ports, but as Chinese shipowners

⁵³⁴ Assuranceforeningen Gard. (2012). Agreement for Ship Pollution Response. Section 5 (4).

⁵³⁵ Murphy, C. (2014). China Regulations Threaten Vale's Shipping Plans. Wall Street Journal.

⁵³⁶ Wong F., & Park, J. (2012). China mega ships ban aimed at helping own shippers. Reuters.

⁵³⁷ Campbell, K. (2012, May 25). Brazil’s Vale invests to get around Chinese megaship ban. Mining Weekly.

⁵³⁸ Wong F., & Park, J. (2012). China mega ships ban aimed at helping own shippers. Reuters.

were alarmed by the competitive threat they pose, and are said to have persuaded the Chinese authorities to ban them from that country's ports.

Vale, which now has eight Valemax ships but has ordered 35 of them, was forced to build floating transfer stations outside of Chinese waters, in the Philippines. They allow Vale to use the Valemax ships to transport the iron-ore from Brazil 85% of the route to China, shipping it to the floating stations. Smaller vessels carry the iron-ore the cargo to different ports in China, effectively creating a transshipment hub for iron-ore. Vale is currently building another floating station and distribution centers in Oman and Malaysia to distribute the cargo from the 35 Valemax ships.

Chinese steelmakers are said to be pressuring the government to lift the ban, as they are eager to benefit from the cost reduction the Valemax ships could bring. Sixteen Valemax ships out of the 35 are built in China, the rest in South Korea.⁵³⁹

The first Valemax vessel was allowed to go to China, offloading 350,000 tons of iron-ore in 55 hours, a new world record. The head of the Chinese steel industry said that the ships would help lowering costs.⁵⁴⁰

3.8 Conclusions

UNCLOS is the main governing body of Arctic shipping. At the same time it secures access for vessels and gives coastal states rights to enforce laws and regulations on access. It is recognized by the Arctic states, excluding USA who has not ratified it, and China. It is supplemented by the United Nations agency IMO which inflicts specialized regulations on numerous aspects related to governance of the world oceans, including regulations for the Arctic.

The idea of a binding legal regime for the Arctic has been discussed for a number of years. It has been said that the Antarctic Treaty could inspire

⁵³⁹ Campbell, K. (2012, May 25). Brazil's Vale invests to get around Chinese megaship ban. *Mining Weekly*.

⁵⁴⁰ Murphy, C. (2012). Beijing Wields Big Stick Against Megaships. *Wall Street Journal*.

such a regime.⁵⁴¹ Among high-level organizations to push for an Arctic Treaty are the International Union for Conservation of Nature and Nature Protection (IUCN), the World Wide Fund for Nature (WWF),⁵⁴² and the European Parliament.⁵⁴³

From the shipping aspect there seems little need for a comprehensive Arctic treaty at present times. History has shown that laws of the sea have developed to tackle topical issues. UNCLOS was first amended in 1958 but additions were later made, especially for the third Convention opened for signatures in 1982. The latest addition is the Polar Code, mandatory regulations for ships that sail in polar waters.

Russia and Canada have already established strict regulations on shipping in their waters and these states seem content to work under UNCLOS as witnessed by the Ilulissat Declaration which confirmed that the five signature states; Canada, USA, Russia, Norway and Greenland/Denmark, agreed that there is “no need to develop a new comprehensive international legal regime to govern the Arctic Ocean.”⁵⁴⁴

However, UNCLOS leaves gaps for Arctic shipping, the primary example being Article 234 on “Ice-covered areas”. The article leaves gaps to speculate on wording and leaved the interpretation to coastal states for their own benefit. Article 234 states that coastal states have the right to adopt laws and regulations for the prevention, reduction, and control of marine pollution from vessels “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.”⁵⁴⁵

The Arctic Council has strengthened governance in the Arctic in numerous ways regarding environmental issues; by improving the knowledge base for environmental measures; by preparing practical guidance on how to reduce risks associated with activities that involve threats to the Arctic

⁵⁴¹ Stokke, O. S. (2007). A legal regime for the Arctic? Interplay with the Law of the Sea Convention.

⁵⁴² Stokke, O. S. (2007). A legal regime for the Arctic? Interplay with the Law of the Sea Convention.

⁵⁴³ Byers, M. (2013). International Law and the Arctic. p.4.

⁵⁴⁴ Arctic Council. (2008). The Ilulissat Declaration.

⁵⁴⁵ UNCLOS. Article 234.

environment; by highlighting problems like long-range transportation of hazardous compounds; and by supporting the capacity of Arctic states to implement existing commitments. Although mostly limited to soft law, the Council has negotiated a legally binding instrument, the SAR Agreement, the first legally binding agreement on any topic ever negotiated among all the eight Arctic states.⁵⁴⁶

A new Arctic shipping treaty, legally binding for all Arctic states, would probably not serve to enhance any of those functions significantly. Such a treaty would most likely be extremely difficult to construct and accept. The states have different interest relating to different topics such as shipping and oil and gas activities, adding difficulties to acceptance of a binding treaty. Many of the issues raised are also already governed by global or regional legally binding treaties.⁵⁴⁷

One solution to criticism by environmentalists would be to designate the Arctic as a “Special Area” under MARPOL or as a Particularly Sensitive Sea Area (PSSA). However, such scenario would not be of interest to Russia which is trying to activate the Northern Sea Route as a shipping lane. But the tools for stricter regulations are there, albeit the interest of the Arctic states.

Therefore, creating treaties on many important topics, such as shipping, would be incredibly hard to conclude. Whilst one country wants to increase shipping activities, others might want to decrease it. Environmental issues might concern some players while others find the issue trivial. If the Arctic Council were interested in such a treaty, it would result in widespread protests, where China would likely be in the forefront. The IMO would be another candidate to structure such a treaty, but it is already adding significantly to Arctic shipping governance with the Polar Code.

Further to world governing bodies responding to increased activities, Russia has done the same. By establishing the Northern Sea Route Administration, Russia placed new law on the Northern Sea Route which entered into force in 2013 to regulate shipping on the route. The laws place strict regulation on insurance for companies applying for a permit to transit, stating that a permit is only issued if the ship owner “submits the documents to confirm insurance required by international agreements of the Russian

⁵⁴⁶ Arctic Council. (2011). Search and Rescue in the Arctic.

⁵⁴⁷ Stokke, O. S. (2007). A legal regime for the Arctic? Interplay with the Law of the Sea Convention.

Federation, the law of the Russian Federation, or other financial security of civil liability against damage caused by pollution or other damage caused by the vessel.”⁵⁴⁸

The laws have been cited as long-awaited and much-needed piece of legislation, but critics say that it insufficiently addresses the environmental challenges in the vulnerable area. According to Igor Kudrik from the Bellona Foundation, a major oil spill in the remote area will have huge environmental consequences for nature, and financial consequences for the shipping company. “If the shipping operators are to bear all costs related to spills, the route might ultimately not be so popular, after all,” he says.⁵⁴⁹ However, striking a balance between strong regulations based on environmental concerns and advertise the future of shipping at the same time, poses a challenge for Russia.

As evident in this chapter, the IMO has been concerned about shipping activities in both polar areas and the Polar Code responds to that apprehension. It will be a mandatory code, not recommended guidelines, covering topics such as design, constructions and equipment of ships, to training, search and rescue, and environmental protection. It will therefore respond to the added pressure of Arctic shipping activities. A firm Polar Code is a strong response and adds a regulatory framework to shipping which has been vague. But since it has not been made public and will not go into force in 2016, the experience from it is yet to be realized. Only time will tell how strong it will be and what, if any, gaps will remain to govern Arctic shipping activities.

The Code has been welcomed by the shipping industry and insurers⁵⁵⁰ but already criticized, including by Lawson Brigham, chair of the Arctic Marine Shipping Assessment of the Arctic Council. Brigham stated: “In my view, the Polar Code does not cover all of the polar marine safety and environmental protection issues. Some issues must be addressed in other conventions such as MARPOL.”

⁵⁴⁸ State Duma. (2012). Federal law on amendments to specific legislative act of the Russian Federation related to governmental regulation of merchant shipping in the water area of the Northern Sea Route. Clause 4.

⁵⁴⁹ Staalesen, A. (2012). Northern Sea Route without Murmansk. Barents Observer.

⁵⁵⁰ Lloyds. (2014, March 14). Lloyd’s develops Arctic ice regime to compliment Polar Code.

The head of the environmental group WWF's Norwegian branch said that it is concerned that there are important aspects that the Polar Code doesn't address."⁵⁵¹ Other environmentalists have criticized the Code after its draft was released in 2014, stating that "a Polar Code which fails to address the major environmental dangers of increased shipping opens the door to potentially catastrophic consequences should a disaster happen."⁵⁵²

This signals that debate about the Code is impending, but as it has not been finalized and could still be amended, its influence will have to be assessed later. Nevertheless, it certainly shows intent that world governing bodies are responding to the increased activities in Arctic shipping with actions.

Disputes related to shipping have already emerged in Arctic governance. USA believes that the Northern Sea Route and the Northwest Passage are international straits, allowing foreign vessels to pass without permission. However, Russia and Canada hold the opposite view. Canada states that the Northwest Passage constitutes internal waters, where permission for navigation is always required and the full force of domestic law applies, and Russia says parts of the Northern Sea Route encompass internal waters. USA further states that the status of the Northwest Passage threatens its national security.

Attention has been called to USA becoming a "strait state" in relation to both Bering Strait and the Unimak pass – with all the security, environmental and jurisdictional challenges it entails and that would call for negotiations to conclude treaties on various Arctic straits to address the challenges and take the straits out of the field of traditional international laws.⁵⁵³ The 1988 Arctic Cooperation Agreement between the US and Canada is a bilateral agreement which allows for practical cooperation regarding matters relating to the Northwest Passage while recognizing that the two countries agree to disagree about the status of the passage under applicable international law. It demonstrates a capacity to collaborate in functional terms without resolving legal differences. With increased interest

⁵⁵¹ Koranyi, B. (2014). Expanding Arctic ocean to get its own shipping rules. Reuters.

⁵⁵² Seas at Risk. (2014). IMO's 'Polar Code' ignores environmental dangers of increased Polar shipping [Press release].

⁵⁵³ Byers, M. (2013). International Law and the Arctic. p.170.

and stakes in shipping, it might be time for the two neighboring countries to sit at the negotiating table to work out a permanent solution.

China must adapt to local governance and cooperate with the Arctic states to influence and shape its Arctic agenda. China has ratified UNCLOS and is a member of the IMO and is now an observer to the Arctic Council. But by ratifying UNCLOS it has accepted the comprehensive legal regime of the Arctic Ocean. But China has already shown that it is ready to do what it takes to protect their own economic interest, as seen by the laws it enacted to limit access of megaships who threatened the Chinese shipping industry.

As China has not released a formal Arctic strategy, it can be difficult to recognize which Chinese scholars, academics, specialist and officials are speaking on the behalf of China. Language barrier poses another problem, and the lack of articles and research by Chinese scholars in English.

China has actively sought cooperation and with the establishment of CNARC it has created a forum with the Nordic countries for numerous projects, another significant step for China to show its presence in the Arctic.

Summary of conclusions

This thesis brought together three major aspects of Arctic shipping. They were the prospects and threats, China's interest and aspirations as a major economic power and one of the biggest shipping nations in the world, and governance. The research question posed as how China views the potentials of Arctic shipping and how it relates to the regulatory framework in place.

Furthermore, a series of questions were proposed, including what research focused on, how realistic the future prospect of the Arctic as a shipping route were, what China's main drivers for Arctic shipping were, how its trade distributed around the world, is China's interest legit and is the current regulatory framework strong enough for future activities of Arctic shipping?

First Arctic shipping was analysed. The thesis demonstrated that the Arctic cannot secure three key elements the shipping industry needs to prosper. They are punctuality, predictability and economy-of-scale. As a result, few shipping companies are actively seeking to use the Arctic for transports. The future of Arctic shipping looks to be destinational, and not trans-Arctic. The need for Arctic shipping at present times is very little for the world shipping industry. There are however many opportunities for transits during the summertime with cargo not needed at a specific time at its destination.

Problems in major chokepoints could signal increased opportunities for the Arctic, but it will not be feasible until more ice has retreated. To many risks and unknowns await. The Suez Canal is struggling to keep up with latest developments in the shipping industry where bigger ships mean bigger savings. As a key element in the trade route between the productive east and the demanding west, it has to remain an attractive option for shipping companies. Raised tolls and threats of pirates do not help. The Malacca Strait has similar problems to Suez. It is congested and has been infested with pirates. The Panama Canal is also too small, demonstrated by a Chinese tycoon planning to dig a canal through Nicaragua to transit bigger ships

between the Pacific Ocean and the Caribbean Sea. If the project succeeds, what will the future of the Panama Canal look like?

Real interest of Arctic shipping, regular transits through the Arctic Ocean, seems little. It has been demonstrated that although some would be interested in such an option, there are too many risks and unknowns for companies to conduct extensive research as of yet. If the Northern Sea Route were a canal, it would be described as too small and too risky for the time being. It has numerous restraints, including the lack of adequate infrastructure, high tariffs and irregular shipping conditions. The Northwest Passage is even more limited to shipping as it still has more ice than the Northern Sea Route. The Central Arctic Ocean route will not be a serious option until mid century and even then numerous challenges await.

Arctic shipping is still a relatively unknown activity and more research has to be conducted before more shipping companies will increase their interest. Arctic shipping will not be feasible in any of the Arctic routes until the ice has retreated more.

Environmental concerns grow in the Arctic with increased activities. Although ships pollute less than other means of transport, the danger of accidents will threaten the fragile Arctic biodiversity and little knowledge and experience from cleanups is worrying.

China does have drivers for diversifying its shipping routes. As a major shipping nation, China is worried about its energy imports and its shipping lanes, notably the Malacca Strait.

China has increased its interest in the Arctic and two years in a row test voyages were transiting the Arctic. Xuelong tried to sail over the North Pole in 2012, it succeeded it would have been a major stunt, showing China's capabilities and Arctic interest. The Yong Sheng was also a test transit in the summer of 2012, and a successful one, although the ship was small.

The Director of the Polar Research Institute of China has said that 5-15% of China's international trade could use an Arctic shipping route by 2020. It is a bold statement and truthfully an unlikely one. The constraints are too severe as of yet. The Chinese shipping companies have also shown little interest in the Arctic, signalling high costs as a reason. They are prepared to wait until the ice retreats even more but are likely to continue to send test transits through the Arctic in the near term to study the Arctic shipping routes.

China's hunt for resources could also lead them to the Arctic, with potentials in shipping.

The lack of an official Arctic policy is a problem, especially for the Arctic states and its governance structure, eager to read more from Chinese scholars and researchers on the Arctic. Guesswork on China's official positions is therefore present although China seems clearly to be working according to a clear Arctic agenda. Increased cooperation is the red thread, with numerous projects started in recent years, including in Canada, Russia, Iceland and Greenland, in addition to CNARC, the China Nordic Arctic Research Center.

UNCLOS and the IMO go hand in hand to govern the Arctic Ocean sufficiently. UNCLOS provides the overarching legal framework and the IMO supplements it with numerous regulations.

The IMO has been concerned for Arctic shipping and has addressed it on several occasions. The forthcoming mandatory regulation of the Polar Code will be an interesting tool which adds to the regulatory framework in place. It signals a strong response from the world governing bodies to increased access and traffic in the Arctic Ocean.

There is little need for a special binding treaty on Arctic shipping, and such a treaty would be almost impossible to build, whoever was granted the task. The countries' interests vary in terms of important aspects, where environmental protection is likely to be in the forefront of discussions.

Both Canada and Russia have established strict regulations on shipping in their waters based on the framework in place, building a structure that suits them. Whilst Russia is selling access in change for icebreaker assistance and ice navigators, Canada seeks to strictly regulate all access by forcing all vessels to get a permit to transit. Ships usually have the right of an innocent passage through coastal states' waters but Canada claims internal waters around its archipelago. Russia has also drawn straight baselines and claimed internal waters but USA is disputing both countries. It has been suggested that USA and Canada could negotiate to come to a resolution as shipping activities increase.

Chinese shipping activities in the Arctic are not threatened at present time with governance. But changes could lead to less interest by the nation which seems most interested in utilizing the Arctic shipping routes, albeit the

interest is considerably small as of yet, as shown in chapter 1. If stricter terms were installed or Russia would raise its tolls, it could push China to seek other means of transport than the Arctic, although as discussed in chapter 2 it seeks to diversify its import routes.

If regulations in the Arctic were too stringent, for example if it was made a special area under IMO, it would most likely hinder shipping access and make Arctic shipping less feasible. Therefore, a balance must be struck in terms of Arctic shipping governance, between international bodies like UNCLOS and the IMO, the Arctic Coastal states, other stakeholders, and the shipping companies themselves. If they were to be hindered access with too strict regulations it would result in less traffic, but if the regulations are too weak it would have severe consequences should disasters happen.

Russia will be keen to inflict strict regulations to secure its own interest, as seen by insurance regulations, but at the same time open for negotiations on tariffs and inviting to shipping companies. Canada will remain a strict governing body and is unlikely to go the same route as Russia, and actively seek more traffic.

Therefore the flexible approach, which is already in play, is the best governance tool and with the addition of the Polar Code creates a feasible environment for shipping companies to traverse the Arctic. Other obstacles are albeit still in their way but the governance structure is not the main hindrance.

China will keep playing its part in world governance, showing interest and keeping watch on Arctic shipping governance, and will be in the forefront of shipping activities and a pioneer. But as it turns out, it might not get much competition after all.

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