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Vijay Sakhuja
Kapil Narula *Editors*

Asia and the Arctic

Narratives, Perspectives and Policies

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Editors

Asia and the Arctic

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Foreword 1

The name ‘Arctic’ is derived from the word ‘Arktos’, which in Greek means ‘bear’ and it is one of the defining characteristics of the Arctic. The Arctic region stretches over 14.5 million square kilometres and includes the northern territories of the Alaska (United States), Canada, Greenland (Denmark), Iceland, Norway, Sweden, Finland, Russia and the Arctic Ocean. Sea ice, permafrost, glaciers and ice sheets are the characteristics of Arctic’s physical terrain. It is a unique area among earth’s ecosystems and the flora and fauna in the Arctic is shaped and defined to varying degrees by the processes of freezing and thawing of ice, which gives the region a distinctive nature. The Arctic supports terrestrial, freshwater and marine ecosystems. Some two to four million people live in the Arctic today, which include Inuit, Saami, Yupik, Aleut, Chukchi, Nenets and others indigenous people who have adapted to the extreme conditions of the region over time. The region holds a significant amount of the planet’s freshwater in the form of polar ice caps, continental ice sheets and glaciers and this ice plays a vital role in the global climate. Apart from the regulatory role in the earth’s climate and in shaping weather patterns, the region is important for preserving the genetic biodiversity of the planet and for supporting native people and societies. It is also important from the strategic perspective of different countries who have competing interests in the region.

Changing Dynamics in the Arctic

The Arctic region is currently going through a change which may well be irreversible and is impacting the entire globe. This region is therefore emerging as a central arena for scientific research, geopolitics and commerce. The main driver of this change is global warming induced climate change which has resulted in the melting of ice in the region. Records show that the average temperatures in the Arctic region are rising twice as fast as they are elsewhere in the world and the Arctic sea ice extent is declining at the rate of 3.4 % per decade, relative to the 1981–2010 average. Scientific observations over the last decade and a half have conclusively established that there has been a thinning of the Arctic sea ice, melting of the Greenland ice sheet, and thawing of the permafrost. This change brings along with it various challenges and opportunities, each having its own inherent

dynamics. Melting ice has also led to the opening of new shipping routes for trade, has increased the feasibility of exploration for mineral resources and offshore extraction of oil and gas, has led to an increase in the fishing season and has opened up a host of tourism related commercial opportunities.

Emerging Opportunities

The insatiable need for energy and mineral resources is fueling *strategic competition* among Arctic littorals for exploiting the resource-rich Arctic. This region, which is expected to contain up to 10–20 % of the world’s oil and nearly 30 % of the world’s unknown natural gas reserves, is therefore a rich repository of resources. Based on the U.S. Geological Survey (USGS) in 2008, it is estimated that the “undiscovered, technically recoverable” reserves of hydrocarbons include 90 billion barrels of oil, 1670 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids. Other potential sources of energy include huge quantities of methane hydrate deposits which are found on continental shelves in the Arctic. Apart from hydrocarbons, the Arctic has large mineral reserves, ranging from zinc, lead, nickel, coal and other precious metals such as gold, diamond and platinum. The Arctic seas contain some of the world’s oldest and richest commercial fishing grounds which have not yet been exploited.

The relatively ice-free summers in the recent past in some parts of the Arctic have also attracted the interest of commercial shipping operators. The opening up of Northern Sea Route (NSR) and the North West Passage (NWP) is a boon for the shipping industry. While the NWP considerably shortens the distance for travel from Scandinavian countries to the west coast of the United States, the NSR has great strategic and commercial importance as it bypasses the choke points in the Indian Ocean. These routes also provide significant commercial opportunities to transport minerals and energy resources from the Arctic and to bring back finished products. Although these sea routes save fuel and time, they are currently niche trading routes as it is ice free only for few months in a year. The NSR has witnessed continued growth in traffic from 2009 to 2013, but this was followed by a steep downturn in 2014 and only 23 vessels undertook the full journey, as against 71 vessels in 2013. This might however be a temporary phenomenon and shipping through the Arctic may recover quickly to emerge as an economically viable alternative to traditional sea routes.

Challenges Confronting the Arctic

While there are significant opportunities, the Arctic also presents a host of challenges which will need to be overcome in the near future. Key amongst these are resolution of overlapping claims and demarcation of EEZ boundaries, the threat of

militarization, Arctic governance, protection of rights of indigenous people, environmental protection and securitization of the Arctic amongst others. Other challenges include the harsh climatic conditions, infrastructure constraints, technology limitations, shortage of qualified personnel and an incomplete understanding of the environmental risks in the Arctic.

Although the land boundaries between the Arctic countries are agreed upon, there are overlapping claims in the oceans. While some of the maritime boundary disputes have been resolved bilaterally, others are in the process of resolution with 'equity' being the guiding principle. However, beyond the 200 mile EEZ limit, five Arctic countries lay a claim to the seabed resources by attempting to prove that the seabed is an extension of their continental shelf. While Russia submitted its claim in 2001, Norway (2007), Canada (2013) and Denmark (2014) too have submitted claims for an extended continental shelf to the United Nations Commission on the Limits of the Continental Shelf (CLCS). The issues of 'Internal Waters' and 'Svalbard' also contribute to the maritime disputes in the Arctic.

While maritime disputes primarily flow from economic interests, they are being resolved in the spirit of cooperation and within an institutional framework under the 1982 UNCLOS. However, the strategic importance of the Arctic extends beyond resources into the security regime and therefore plays an important role in the region. Although the threat of militarization has significantly reduced after the end of the Cold War, each country continues to maintain military presence in the Arctic, in line with its threat perception, while significantly collaborating to enhance stability through confidence-building measures.

Institutions play a vital role in evolving mechanisms for governance. The Arctic Council, which was formed in 1996, is a high-level intergovernmental forum that addresses various issues and makes policy decisions in the Arctic. It currently has 8 full member countries, 12 permanent observers and 6 ad hoc observers. Canada is the current chair of the Arctic Council and has significantly consolidated the process of confidence building apart from demonstrating a leadership role in the protection of environment and support to the rights of the indigenous communities. It completes its term in May 2015 after which the United States is scheduled to take over the chairmanship of the Arctic Council.

Over the next few decades, climate change is expected to accelerate, resulting in major physical, ecological, social and economic changes in the Arctic, many of which have already begun. Due to the sensitive nature of the Arctic, the region is extremely vulnerable and climate change is emerging as the significant stressor on the Arctic biodiversity. Environmental protection therefore would continue to remain one of the main challenges for the Arctic littorals.

In the face of the above challenges, the *Arctic region is experiencing heightened activity and politico-strategic interests are driving diplomatic efforts by various countries to address these issues.* These developments are also bringing the Arctic and Asian security interests together, and in the process is changing Asia's strategic boundaries.

Growing Role of Asian Countries

Five Asian countries—China, India, Japan, Republic of Korea and Singapore—joined the Arctic Council as ‘Permanent Observers’ in 2013. The grant of this status acknowledges the growing significance of these countries and hints at the constructive role of the Asian countries in understanding the Arctic region.

Scientific research is a common area of interest for all Asian countries in the Arctic. Many of these countries including China have set up polar research stations in the Arctic. Japan was the first Asian country to undertake Arctic scientific research and to determine the viability of the Northern Sea Route. Republic of Korea has the advantage of a well-developed ship building industry to provide ships capable of traversing through the ice. Singapore has a technological edge in marine industries, particularly in management of ports, deployment of offshore marine and engineering, and has a keen *interest in the development of international maritime policy*.

India has developed significant expertise in Arctic scientific research, which is underpinned by decades of experience in its Antarctica research programme. In 2007, India established ‘Himadri’ a polar research station at Ny Alesund, Spitsbergen, Norway and initiated projects dealing with atmospheric science, microbiology and glaciology. There are 14 national research institutions that support India’s polar research programme and the Indian government has now approved the acquisition of an ice-class polar research vessel.

It is evident that the Asian countries have a variety of interests in the Arctic, and the grant of Permanent Observer status to these countries is an acknowledgement of their multifaceted capabilities. These countries are keen to make use of the emerging opportunities in the Arctic, *and are thus* formulating appropriate long-term national strategies. The preliminary approach of the Asian observer countries has rightly been to graduate from ‘involvement’ to ‘engagement’ in the Arctic, which seems to have generated significant interest amongst analysts.

Given the above developments, this book brings together Arctic and Asian stakeholders with an aim to understand and evolve a common approach to maximize opportunities in the Arctic while effectively overcoming the challenges the region presents, in a responsible and consultative manner. The book emerges from the perspectives shared in the Annual Maritime Power Conference of the National Maritime Foundation held during February 2015.

The first academic session ‘Evolving Dynamics in the Arctic’ discussed the drivers of change and their impact on the Arctic. The next two sessions ‘Asian Strategies and Policies in the Arctic’ were devoted to understanding the interests, strategies and policies of Asian countries with regard to the Arctic region. The fourth session ‘Arctic Countries’ Perspectives on Asian Approaches’ attempted to understand the perspectives of Arctic littorals on the engagement of Asian countries. It is evident that all stakeholders in the Arctic region, including the Asian countries, have shared interests in the sustainable development of the region. The final academic session was structured in the form of a panel discussion titled

‘Exploring a pan-Asian Approach to the Arctic’ and attempted to evolve a collaborative approach by the Asian countries to the Arctic.

The perspectives of scholars, academics, diplomats, government functionaries and practicing professionals from Arctic and Asian countries make this book unique. The perspectives presented are enriching and informative and lead to some key policy takeaways which would be able to make a valuable contribution to influence the future discourse on the Arctic.

April 2016

Admiral D.K. Joshi
PVSM, AVSM, YSM, NM, VSM (Retd.)
Chairman
National Maritime Foundation

Foreword 2

The Arctic has always remained a centre of interest of the world community even as climate change has provided it a renewed vigour. There have been quite a few valiant sea-explorers who ventured into the unknown Arctic, centuries ago, and charted the way for future generations. The significance of the Arctic also comes from the fact that the United Nations emblem, adopted in 1946, depicted the world map with equidistant projection centred on the North Pole. This focus on the Arctic, thus, may seem prescient in light of the fact that data gathering on the Arctic actually commenced only in 1979.

The extent and thickness of Arctic sea ice has unrelentingly declined by over 40 % in the past three and a half decades, leading to the opening of an increasingly ice-free Arctic. Today, the Arctic region is warming at nearly twice the global average rate, which is unlike anything recorded previously, thereby giving an impression that the world is entering an 'age of the Arctic'. This environmental transformation of the Arctic region is likely to have a profound impact on resource extraction, shipping patterns and trade, and presents a mixed bag of opportunities and challenges. While opportunities abound in the highly 'sought-after' energy resources, and the possibility of time and cost effective navigation for shipping through North West Passage and Northern Sea Route; requirements such as search and rescue mechanisms, communication infrastructure, Polar-class vessels, ice-breakers, and an up-to-date hydrographic survey, pose important navigational challenges, which need to be overcome.

Environmentally, there are potentially profound consequences of ocean warming and Arctic ice melt. The far-reaching effects of shrinking ice cover, on the global weather condition, could lead to new patterns of droughts and famine, changing frequency and intensity of cyclones, rise in sea levels, and consequent human migrations. As resources on land deplete, humankind will inevitably turn to the last bastion, the Arctic Ocean. On the other hand, variables such as the dynamic global oil prices, shale gas findings, and a shift to alternate sources of energy, could result in reducing the current pace of activities in the Arctic. Further, the overlapping claims on the Arctic Continental Shelf bring attention to security and stability

issues. Amidst such a quagmire of variables, the economic future of the Arctic, therefore, lies poised between opportunities and uncertainties.

India's approach to the Arctic is underscored by a quest for cooperation both in pursuing scientific studies and seeking commercial initiatives. Indian scientific research station in the Arctic, Himadri, which was established in 2008, is engaged in multi-sensor ocean atmosphere observation studies. The Indian Navy, too, has valuable experiences of operating in Arctic waters and has documented lessons from its endeavours in polar conditions.

The compilation of papers and presentations in this book, through the collective wisdom of eminent participants of the Annual Maritime Power Conference—2015, organized under the aegis of the National Maritime Foundation, will go a long way in generating meaningful discussions and finding sustainable solutions to emergent issues of the Arctic. I wish the National Maritime Foundation all success in this unique endeavour.

Jai Hind.

April 2016

Admiral R.K. Dhowan
PVSM, AVSM, YSM, ADC
Chief of the Naval Staff

Preface

The melting of the polar sea-ice induced by climate change has lately placed the Arctic region in the forefront of global strategic and academic interest. The discourse involves a number of issues such as claims of the littoral countries to the continental shelves of the region, the management and exploitation of its living and non-living resources, the rights and interests of indigenous communities, and the prospects of new ice-free shipping routes. These issues have given rise to new geopolitical, geoeconomic and geostrategic dynamics amongst the Arctic littorals, and have led to the growing interest of non-Arctic states in the affairs of the Arctic.

The contemporary discourse also suggests that the Arctic region presents challenges and offers opportunities for the international community. The salient challenges arise from the melting of the permafrost leading to the release of greenhouse gases. This can have an adverse impact on the fragile ecosystem of the region, which can affect the livelihood of the local people. Safety of shipping and seafarers navigating across Arctic waters is another major challenge. Further, the competing territorial claims of the littoral states may result in militarization of the Arctic. At another level, several non-littoral states are exploring ways to engage in the evolving politico-economic-strategic dynamics of the Arctic region.

The Arctic region is often referred by some as an extended frontier of the ‘global commons’ that offers new opportunities in the form of vast untapped reserves of hydrocarbon and mineral resources, unexploited marine living resources and shorter shipping routes connecting the Pacific and the Atlantic oceans. It may, therefore, be averred that the future prospects in the Arctic are likely to create new frontiers for commercial and resource extraction activities, providing a fresh impetus to the evolving process of globalization in a manner never witnessed before in the region.

The Arctic Council is a high-level intergovernmental forum of eight founding members (Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States), Permanent Observers comprising a number of non-Arctic states, and the indigenous communities. The council has emerged as an effective international forum for promoting cooperation, coordination and interaction among its members.

Five Asian countries—China, India, Japan, Republic of Korea and Singapore—joined the Arctic Council as Permanent Observers in 2013. China has been the most proactive in exhibiting its interest in the natural resources and sea routes of the Arctic. It is actively pursuing resource diplomacy involving joint ventures in exploration and infrastructure development projects with Russia, Norway and Iceland. India has developed substantial expertise in Arctic scientific research, which is underpinned by decades of experience from its Antarctica research programme. Japan was the first Asian country to undertake Arctic scientific research and to determine the viability of the Northern Sea Route. Republic of Korea has the advantage of a well-developed ship building industry to provide ships capable of traversing through the ice. Singapore has a technological edge in marine industries, particularly in management of ports, deployment of offshore marine and engineering, and has a keen interest in the development of international maritime policy.

It is evident that the Asian countries have a variety of interests in the Arctic, and the grant of permanent observer status to these countries is an acknowledgement of their capabilities. These countries are keen to make use of the emerging opportunities in the Arctic, and are thus formulating appropriate long-term national strategies. The preliminary approach of the Asian Observer countries has rightly been to graduate from ‘involvement’ to ‘engagement’ in the Arctic, which seems to have generated significant interest amongst analysts.

This book is an attempt to understand the approaches of various Arctic and non-Arctic stakeholders, in light of the evolving dynamics in the region. This volume is based on the papers presented in the Annual Maritime Power Conference 2015 organized by the National Maritime Foundation and attempts to answer certain key questions.

The first session set the backdrop for the conference and discussed the evolving dynamics in the Arctic, the drivers of change and their impact. Scientific endeavours to understand climate change is a leading area of research among various countries. Access to resources and opening up of new sea routes is also driving the commercial interest of national governments. Resolving maritime boundaries disputes within the framework of 1982 LoS is a priority. The threat of environmental degradation in the region also needs to be mitigated by proactive governance. The key questions addressed were as follows:

- What are the systemic changes underway in the Arctic that impact on the political, socio-economic, security and legal dynamics?
- What are the likely regional and international ramifications of these systemic changes?

The next two sessions were devoted to understanding the interests, strategies and policies of Asian countries with regard to the Arctic region. The key questions deliberated during this session were as follows:

- How does the Arctic region figure in the Asian countries’ national interests and their broader strategic thought?
- What are their national strategies and policies for the Arctic?

The emerging imperative of climate change is often seen as the driver for engagement by Asian countries in Arctic affairs. Understandably, some Arctic countries have expressed reservations on Asian involvement, attributing it to their agenda of gaining access to the region's natural resources. Session four discussed the perspectives of the Arctic countries on the involvement of the Asian states in the region. The key questions discussed were as follows:

- How do Arctic littorals perceive the engagement of Asian countries in the region, including their prospective contribution to Arctic governance?
- What type of institutional framework will ensure greater engagement by Asian countries in the Arctic?

It is evident that all stakeholders in the Arctic region, including the Asian countries, have shared interests in the sustainable development of the region. As mentioned above, the last academic session explored whether there is a case for Asian countries to present a collective approach on the Arctic. Accordingly, the key questions to be brainstormed during this session were as follows:

- Is a pan-Asian approach to the Arctic feasible?
- What are the potential benefits and limitations of such a collective approach?
- Is it possible to develop a common approach by the Arctic and Asian states to maximize opportunities while effectively overcoming the challenges?

The book provides a comprehensive view of the regional maritime dynamics and its implications for India. We hope that the book throws light on the myriad of issues interwoven into the complex regional interplay between various stakeholders in the region.

New Delhi, India

Vijay Sakhuja
Kapil Narula

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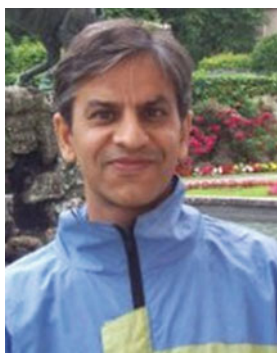
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Part I
Evolving Dynamics in the Arctic

The Dynamics of Arctic Development

Arild Moe

This chapter takes stock of the development in the Arctic with the overarching aim to answer the question: What is the prevailing view of the situation in the Arctic compared with commonly held views a decade or so ago?

The Natural Environment and Climate Change

The Arctic is undergoing change: some changes are abrupt, others more gradual. The most visible and striking change in the Arctic over the past decade has been the shrinking ice cover caused by global warming. Over the past three decades, the ice cover in September—when it is at its smallest—has shrunk by about 30 % [1]. Other dramatic climate-related impacts are increasing runoff from the Greenland ice cap, melting permafrost and extreme weather.

The Arctic undergoes annual seasonal changes more dramatic than found elsewhere [2]. The temperature in some places can vary by 50 °C in the course of the year. The extent of sea ice reduces by approximately 70 % from winter to summer, and the land which is covered by snow in winter experiences rich flora during the summer months. Fauna and flora have adapted to the seasonal variations, but not necessarily to the longer term climate changes. The average temperature in the Arctic is increasing twice as fast as elsewhere in the world. But even if some changes are affecting the whole Arctic, it is important to know that conditions in different parts of the Arctic vary widely. Some would say that there is not one Arctic, but many Arctics. Most of the Norwegian part of the Barents Sea is, for instance, not affected by ice, unlike other parts of the Arctic at the same latitudes.

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In the ocean, the ice-covered area grows and shrinks throughout the year, reaching a maximum in March and a minimum in September. The minimum area has in recent decades been shrinking at the rate of about 10 % per decade, but with large annual variations. The minimum sea ice in 2014 was the sixth smallest in recorded history [3]. If this trend continues, the Arctic Ocean will be nearly ice-free in late summer within the next few decades. Sea ice plays a critical role in the lives of large animals, like polar bears, seals and walruses, as well as for the algae and plankton on which many Arctic birds, whales and fish stocks depend. Numerous ecosystems, on land and in the ocean, are found exclusively in the Arctic.

The Greenland ice sheet is also losing mass over time, since more ice is ‘calving’ from the glaciers, than new ice being formed. Whereas the waters surrounding Greenland are infested with icebergs, other areas of high Arctic activity, such as the Norwegian coast, are not affected.

Both the considerable climate variability and longer term climate trends affect the prospects for economic activity over time. In the ocean, the reduction in sea ice cover facilitates shipping, but higher air temperatures reduce permafrost and threaten to soften the ground, enough to hamper land-based transport and construction. In the atmosphere, the pressure difference between North Atlantic and Arctic air systems can cause severe winter weather in Europe and eastern North America at the same time as the Arctic itself experiences very mild weather. Similar effects are at play in Asia.

Industrial Development

Expectations for economic development grew rapidly in the early 2000s. In 2008, the United States Geological Survey (USGS) estimated that the Arctic might contain 13 % of the world’s undiscovered oil and 30 % of its undiscovered gas [4]. Of these hydrocarbon resources, 84 % were believed to be offshore, mostly in waters less than 500 m deep. The resources are not evenly distributed: the highest concentrations are expected to be in north of Alaska and in the western part of Russia’s Arctic. Russia’s expected hydrocarbon resources in the Arctic are the largest outside of the OPEC countries.

The resources listed in these assessments are undiscovered—a distinction often overlooked. They are geological probabilities based on sometimes relatively weak data, and comparisons with other regions with similar geological structures. Extensive and long-term exploration is required to actually locate and confirm *reserves*. Also, the assessments are based on the criterion that the resources can be extracted with the use of existing technology, but they do not take into account cost factors. As always with assessments of mineral resources—what can actually be produced is dependent on the relationship between the extraction cost and the international price of the commodity. The numbers from USGS continue to be misunderstood and misused, and with the unconventional gas and oil revolution, which to a large extent has happened after 2008, the percentage base in the USGS

assessments becomes almost meaningless since it includes only the world's undiscovered *conventional* resources.

Nonetheless, there is a high potential for large mineral resources in parts of the Arctic, which remains a basic driver for industrial interest in the region. A decade ago, the development of hydrocarbons offshore and new onshore mineral projects was expected to take off. In 2008, Russia's Gazprom, Total of France and Statoil from Norway agreed to jointly develop the giant Shtokman gas condensate field in the Russian part of the Barents Sea. The project was huge in itself, but the companies also saw it as a bridgehead to the development of additional Arctic fields, which were regarded as a major future source of supply for the Atlantic LNG market as well as pipeline gas to the European continent. After spending more than US \$1 billion in preparations, the companies concluded in 2012 that the project would have to be stopped. There were problems along the way, cost increases, and disagreement over technical solutions; but it was the gas market that was the straw that broke the proverbial camel's back. The rapid expansion of shale gas production in the United States took the whole world by surprise. The US went from being the world's largest importer of LNG to becoming a prospective exporter. This also had repercussions for other markets, since producers of LNG who had ramped up their output plans in anticipation of booming US imports now had to look for other outlets; for example in Europe, putting pressure on the price, and not least changing the long-term price outlook, which was vital for Shtokman and other expensive Arctic projects.

Whereas the shale gas revolution with ensuing over-supply and falling prices made much of the Arctic gas unprofitable, Arctic offshore oil was still regarded as commercially attractive. However, increasing costs and technological complications made the oil companies less aggressive than expected and, the speed and force of Arctic offshore oil development have abated in recent years. This is especially true for Alaska, but also in other parts of the Arctic there are concerns over costs—partly caused by stronger attention to environmental protection. Rising costs are a problem for the oil industry everywhere, but particularly painful in areas that already have high cost, and perhaps marginal profits like the Arctic. A prime example of the complications was the repeated delays in Shell's drilling campaign in the Alaskan offshore. With oil prices well under US \$100 per barrel, the speed of development is expected to decrease further. Oil companies maintain that the present low oil price does not affect exploration plans, since that process will take years and if results are positive, commercial production can only be envisaged some 15–20 years into the future. Logically, it is the price at that point and further on, that matters, and not today's prices. Nevertheless, the current low oil price is affecting the financial situation of oil companies and is making them scale back costly exploration projects. Some will also argue that in an emission constrained world, regulations that will affect the profitability of oil production are likely to be in place at the time Arctic fields have come on stream—something that changes the commercial calculations for long-term investments today.

An argument in favor of development of Arctic petroleum has been diversification of supply sources. This is still a valid argument for some countries, but in

general, ample supplies of oil and gas from other regions mean that the Arctic has lost some of its significance in this regard. Big consumers like China and India have a wider choice of suppliers now, and even if interested in more diversification, it seems unlikely that they would pay more for supplies from one particular region, than from others.

There are big differences in the role of the government as well as organization of offshore petroleum activity in the various Arctic coastal states. In the US, Canada and Greenland the initiative is clearly in private hands. In Norway and Russia, the state is more directly involved, through its ownership in dominant companies as well as state development priorities. But in all countries, national policies are important, pushing or holding back development, and each major investment project has its specifics.

In the Alaskan Arctic, security of supply and diversification of supplies used to be important political arguments favoring rapid offshore expansion. They have more or less disappeared now, which means that environmental counter-arguments have, in relative terms, become stronger. Nonetheless, it is the commercial assessment, as mentioned above, that is most important. In Canada, there is no political push for Arctic offshore development. The oil industry in Alberta in southern Canada is booming and there are complications related to the devolution of governance to the territories in the Canadian North which introduces an element of uncertainty in development, even if the offshore resources themselves are under federal jurisdiction. Also in Canada there is resistance on environmental grounds.

The strongest public support for increased activity seems to be in Greenland, as petroleum development is regarded as a prerequisite to establish a self-sustained economy—and on that basis, full independence from Denmark. But in Greenland also, there is a debate on the merits of offshore expansion.

In Norway, where petroleum production is the biggest sector of the economy, a logical argument for Arctic expansion is the need to sustain the oil industry, as production in fields further south is declining. But a strong environmental opposition has led to limiting areas which are to be opened for exploration and an increasingly heated debate related to the environmental consequences of continued reliance on petroleum is taking place.

Russia is highly dependent on petroleum revenues and the Arctic has been proclaimed as the resource base of the twenty-first century. The environmental opposition to Arctic drilling is minimal in Russia. After long hesitation and contradictory policies, a series of agreements were concluded between the state controlled oil company Rosneft and Western oil companies to explore and ultimately develop Arctic's offshore resources. Of these partnerships, the alliance with ExxonMobil was the largest. The sanctions imposed by the US and EU after Russia's annexation of Crimea and support to separatists in Eastern Ukraine have more or less brought the Arctic offshore campaign to a stand-still, after very promising results were received in the first well drilled in the Kara Sea in August 2014. Rosneft maintains that it has alternative partners who can replace the Western majors, but there is much uncertainty of how reliable this claim is. In any case,

Russia must also reconsider its policies in light of the low oil prices as it has onshore alternatives that may be commercially more attractive.

Shipping

The Northern Sea Route (NSR) is the Russian term for the sea area between the Kara Gate in the west and the Bering Strait in the east—out to 200 nautical miles. It overlaps with, but is not the same as the Northeast Passage—the historical term for the sea passage between the Atlantic and the Pacific, north of Russia. Russia has established regulations for shipping in the NSR area based on Article 234 of the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which gives the coastal state special regulatory rights in partly ice-covered areas, as well as on historical rights.

Russia opened the NSR for international traffic in 1991, but little happened because the shipping industry found the environment too harsh and the commercial terms unattractive, despite the obvious lure of the sea route—shorter distance, and reduced sailing time between the Pacific and the Atlantic. Less than 10 years ago there was still no international traffic along the NSR. But climate change and less sea ice had made the shipping industry pay closer attention. Starting 2009, Russia began to give more attractive commercial administrative terms for usage of the route. This led to a rapid increase—in relative terms—of transit traffic on the route [5]. Expansive projections of traffic growth were presented in Russia, who had great expectations for the commercial attractiveness of the route. Non-Arctic states, notably China and Korea, also saw a big potential. However, closer scrutiny of the voyages that have taken place reveals considerable reluctance by the shipping industry to commit to use of the route. Uncertain commercial conditions and better understanding of the natural limitations have led to more sober assessments of the international transit potential. Only a small share of the traffic on the NSR is international transit between ports in the Atlantic and the Pacific; some 15 voyages in 2013 and perhaps only 5 in 2014. Most of the traffic on the NSR takes place within Russia or between ports in Russia and abroad, which is referred to as ‘destination shipping’. The potential for growth in this segment is related to the prospects for raw material projects in the Russian North, particularly hydrocarbon projects. The Yamal LNG project, which is based on regular shipments on the NSR throughout the year, has movement eastwards to the North Pacific in the most benign summer season, and westwards to Europe in the winter. Some onshore oil projects will also be developed with shipment by sea, but the speed of development will depend on the market outlook.

The Northwest Passage (NWP), north of Canada and Alaska may look like an interesting option on the map. This passage is, however, marked by strict depth limitations and more severe ice problems than the NSR. Indeed, ice problems have increased because more drifting ice—caused by climate change—tends to be transported into Canadian waters. The Canadian government does not want to

promote the route—while there is a pending dispute with the US over its status [6]. The sailings taking place are occasional, and regular international transit is not on the horizon.

In the longer term, transit across the Arctic Ocean will be possible. Such sailings would be independent of the Russian administration of NSR, but not without complications. Even if ice-free summers in the Arctic are envisaged a few decades from now, predictions are that there will be annual variations. Some summers may still see much ice. Going through the ice with icebreakers may be possible, but costly, and of course the winter season will still have thick ice. Thus, basing trade on this route may be risky. And sailings that would take place will have a serious safety challenge, due to the distances from shore.

Regulations of Shipping

According to the UNCLOS, all states have the right to establish territorial seas out to 12 nautical miles from their baselines. Within this limit, the coastal state has sovereignty over the sea, seabed and the airspace. However, the Convention, which was concerned about the conditions for international shipping, ensures that ships from all states have the right to innocent passage through the territorial seas. Coastal states may also establish exclusive economic zones (EEZs), to 200 nautical miles from the baselines (UNCLOS Art.57), but they do not affect the passage of ships, except in the case of partly ice-covered areas, as mentioned above. Negotiations on a Polar Code that would specify and harmonize construction, design, equipment, training, search and rescue and environmental protection in partly ice-covered waters began in the early 1990s. The first outcome was a set of non-mandatory Guidelines for Ships Operating in Arctic Ice-covered Waters, approved in 2002. Very important were the standards for classifying ice—and wintering capabilities of vessels (polar classes). A binding Polar Code was adopted by the International Maritime Organization in November 2014 and made mandatory under both the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL), because it contains both safety and environment-related provisions [7]. It is expected to enter into force on 01 January 2017. Even if adoption of the code was a very important step, the code will need further development to cover all relevant aspects of Arctic shipping.

International Cooperation in the Arctic—the Arctic Council

The Arctic cooperative structure—with the Arctic Council in the lead—was established in a period of low tension between Russia and the West. The Council was set up in 1996 as a high level forum to address environmental and indigenous

issues. States with territories above the Arctic Circle became members, whereas organizations representing the indigenous people of the North got the status of Permanent Participants aimed at securing a central role for them in the Council's deliberations [8]. It works by consensus and has no regulatory power. The Netherlands, Germany, the United Kingdom and Poland were admitted as permanent observers on the Council in 1998; later, France and Spain followed.

Until a decade ago, the Arctic was low on the international political agenda, despite growing attention to the energy resources, and the Arctic Council was not active. But interest in the region from outside, particularly by the EU and China, and proposals to establish an international treaty for the Arctic, prompted the Arctic coastal states to reaffirm the basic rules of the game in the region—namely the UNCLOS—in the Ilulissat declaration of 2008.

When after 2008 Asian states, China, Japan, Korea, Singapore and India, along with Italy and the EU requested observer status, the proposal was met with resistance among several member states who did not want to let in more 'outsiders'. The arguments against was that more observers would infringe on national jurisdiction in the Arctic, whereas the supporters of new observers maintained that the Arctic could not be closed and that non-Arctic states would have interests in the region—for instance through shipping—even if most of the Arctic might be under jurisdiction of the coastal state [9]. A temporary solution was found as the new applicants were admitted as observers on an ad hoc basis, but discussions over permanent observer status continued until the Kiruna meeting in 2013, and after the Council had adopted a set of criteria for observers [10].

At the ministerial meeting in Kiruna, the applicants were admitted as observers, with the status of EU pending, because of the conflict with Canada over trade in seal-skin products. Since then, finding a proper role for the observers has been an ongoing discussion. Even if the participation of non-Arctic states in the workings of the Council has not found its final form, it is argued that the 'legitimacy' of non-Arctic participation is now quite widely accepted.

The Arctic Council has also over the last few years seen increased institutionalization, with the establishment of a permanent secretariat. The negotiations of two binding agreements among the member states are also important in this respect. The Agreement on cooperation on Aeronautical and Maritime Search and Rescue in the Arctic was signed by the members in 2011 and the Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic in 2013 [11]. These agreements, adopted by the members, since the Council cannot make binding decisions, also signaled a widening of the thematic scope. There are different opinions on how the Council should be developed further; but it remains the only regional forum which includes all the Arctic states. A question of immediate concern is whether the ongoing conflict over Ukraine will spill over to Arctic cooperation and inhibit development of the Council; so far there is little sign that this is happening.

The Legal Situation on the Continental Shelf

Not long ago, a common perception was that the Arctic was filled with unresolved border conflicts and contested areas. This was not correct, but led to dire predictions of conflict by some observers. The phrase “race for Arctic resources” was widely used. In fact, the UNCLOS codified a legal situation where seabed resource exploitation in the Arctic Ocean is the concern—almost exclusively—of the five littoral states, Russia, Canada, United States, Denmark (Greenland) and Norway. They were given extensive rights to living resources within the EEZs as well. According to the Convention, coastal states automatically have a continental shelf of minimum 200 nm, which may extend to a maximum of 350 nm from baselines, provided the geological connection to the mainland can be established. The deep seabed beyond the national shelves is governed by the International Seabed Authority (ISA) set up by the UNCLOS.

UNCLOS established the Commission on the Limits of the Continental Shelf (CLCS) to review documentation from the coastal states of the outer limit of their continental shelves (outside 200 nm). The submission of applications to the commission have, by some, been termed a race, but the process was in fact set in motion by the requirement of having the documentation submitted within 10 years of the enforcement of the Convention, for the state in question. Particular attention has been given to Russia’s claim. Russia submitted its documentation on 20 December 2001. In effect Russia claimed sovereign rights over resources on the seabed area of some 1.2 million km² outside the 200-mile line. The argument was that ridges on the seabed were geologically linked to the mainland. The commission found the substantiation of the Arctic claim insufficient and asked for more information. Since then, comprehensive research expeditions have been organized to collect data. Interestingly, there have been several instances of data exchange and scientific cooperation with other Arctic states in this effort [12], and Russia has relied on foreign companies to carry out some of the geological work. A new submission was submitted in August 2015 [13]. Norway presented its documentation in 2006 and it was accepted in 2009, thereby being the first Arctic state to get acceptance for an extended Arctic continental shelf [14]. Denmark, with Greenland, made submissions in December 2014 [15].

The Danish claim, as well as the announced future Canadian claim, overlaps with the Russian claim. This has led some observers to predict a potential area of conflict. But dispute does not necessarily mean conflict. First, there is the possibility of several rounds with the commission. That could take decades—and in any case the commission will not decide on conflicting claims; they will have to be settled bilaterally. But even if at the end of the day, it is clear that claims in the Arctic cannot be reconciled or substantiated, all Arctic states may see it in their interest to leave it like that—agree on disagreement, and go on with their business. Apart from a shared interest in preserving the UNCLOS in the Arctic, also a realistic assessment of economic interests should tell that a conflict is not worthwhile. The seabed areas which may be contested are after all very deep. It seems unlikely that

industrial activity there can become profitable in many decades. And the most authoritative and much cited assessment of Arctic mineral resources, from the US Geological Survey, maintains that most resources are likely to be found in relatively shallower waters, within the 200-mile limit. Most of these uncontroversial continental shelves are virtually unexplored and development there should logically happen first.

Military Developments

During the Cold War, the Arctic played an important role in mutual nuclear deterrence between the Soviet Union and the United States. Nuclear submarines with inter-continental missiles were stationed under the ice and hunter-killer submarines were deployed to control the strategic submarines. With the lowering of tensions between East and West, military activity in the Arctic has drastically reduced, even though the deployment of strategic weapons did not end. The emergence of security threats in other parts of the world also helped to turn attention away from the Arctic.

In the early 2000s, relations between Russia and the West, particularly the US, started to deteriorate, and discussions of possible military conflict in the Arctic reappeared. This coincided in time with the discovery of hydrocarbon reserves and economic potential in the region. The Arctic coastal states, as also other states, adopted Arctic strategies or similar documents where they highlighted their interest in the region, also stressing the need for peace and cooperation, but at the same time maintaining that some security measures were warranted to protect their territories and interests [16]. Thus, all Arctic coastal states took steps to enhance military presence in the region. These steps were rather limited though. As concluded in a report from SIPRI: “The overall picture is one of limited modernization and increases or changes in equipment, force levels and force structure”. It is argued that they have nothing to do with power projection. Rather they are measures to patrol and protect national territories against illegal activities. Also, military vessels are used to support civilian research expeditions [17]; and even if military activity has increased compared to 10–15 years ago, it is still low compared to cold war times.

But there has been another significant shift which has graver security implications. The level of trust is quite different from what it was in the 1990s. This means that the ‘interpretation’ of military activity by other states has changed. Rather than accepting statements of the defensive role of military hardware at face value, all military moves are now watched with great suspicion. Developments in the Arctic have elements of a security dilemma—where one state’s actions to become more secure, increases another state’s insecurity. And insecurity about the opponent’s intentions may lead to new military moves escalating the insecurity [18]. Recent years have seen a dramatic rhetoric from several quarters, especially Russia and Canada. Even if it is meant primarily for a domestic audience, it does not improve mutual trust internationally.

It is still difficult to see the basis for military conflict within the Arctic region. However, the question is if a spill over from conflict elsewhere is conceivable. Contacts and communication is vital to prevent escalation of distrust. The Arctic lacks a forum for discussion on security issues as the Arctic Council explicitly excluded hard security issues from its agenda when it was established. The establishment of the informal “Arctic Security Forces Round Table” which included all the eight Arctic states as well as others in 2011 was an attempt to build mutual confidence. But by 2014, Russia was not invited or was unwilling to participate [19].

The Normalization of the Arctic?

As outlined above, changes have been taking place because of developments within the Arctic, but also because of processes outside the region. From being regarded almost like a restricted area, the Arctic has become a global concern. An important role is played by perceptions, and these are closely linked to awareness and knowledge. Over the past 10 years or so there has been a tremendous increase in awareness in the media, in the general public, and knowledge among researchers. Arctic issues are now being discussed with more realism, and business has moved from expecting a bonanza to more sober assessments of the potential. Links between the Arctic and global processes are better understood. Newcomers to the Arctic realize that engagement in concrete activities must be based on bilateral relations with Arctic states. At the same time, it is increasingly recognized that non-Arctic states have legitimate interests and rights in the region. From being seen by many as a hazy, unexplored, distant area, the Arctic has emerged as a region fairly well organized and integrated in world affairs. The Arctic has its peculiarities and specific features and challenges, but is becoming a more normal part of the world.

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Arctic: A Paradox and Antithesis

Uttam Kumar Sinha

Introduction

In an interconnected world with interlinked issues, observing the geophysical changes is critical. The Arctic is witnessing the convergence and interplay of the geophysical, the geoeconomics and the geopolitical in dramatic ways making it a paradox and an antithesis [1]. The changing Arctic landscape owing to global warming is keeping both the littoral and non-littoral countries busy and simultaneously alert through competition and cooperation as well as strategic positioning and posturing.

Three important reasons for enhanced attention in the Arctic region can be explained. First, the Arctic undisputedly remains a large geostrategic tract defined by new resource finds and the emerging transport routes [2]. Second, since the Arctic is a ‘semi-enclosed ocean surrounded by land, and like all high seas, governed by the laws of the sea (UNCLOS)’ [3], consequently understanding and interpreting the legal regimes governing navigation and the demarcation of the continental shelf is important. The third reason is over the question of potential resource discoveries. This will directly concern states’ economic interest. The Arctic holds vast untapped gas reserves and mineral wealth, making it the final frontier for economic and energy development. Resource development and commercial activities in the Arctic region will require massive infrastructural investment but becomes problematic owing to the region’s sensitive ecology—a paradox to contend with.

The three reasons for Arctic attention, as highlighted, suggests that as the Arctic becomes less inaccessible or, in other words, opens up with reduced sea ice, a number of different actors with varied, and not mutually beneficial, interest will simultaneously compete and cooperate in the region. The Arctic region has

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remained largely peaceful and stable. But peace does not mean the absence of conflict and it has to be seen how the world will navigate through the changing geopolitical dynamics and move towards a global knowledge commons that includes scientific understanding and learning, ecological protection and sustainable use of resources—what can be described as an ‘Arctic governance web’.

Science of Climate Change

In March and April 2013, the Intergovernmental Panel on Climate Change (IPCC) released the Working Group 2 and 3. These are described as summary for policy-makers. The WG 2, in no uncertain terms, warned of the increases in frequency of extreme weather events from the impact of climate change [4]. WG3, on the other hand, focused on solutions to curb carbon emissions by assessing mitigation options in different economic sectors [5]. Without additional mitigation efforts, the report says that the world may be headed to a 3.7–4.8 °C temperature increase by the end of the century [6]. Worrying was the fact that in spite of great attention to climate change mitigation policies worldwide, the annual greenhouse gas (GHG) emissions grew on average 1.0 billion tonne of GHG per year from 2000 to 2010 [7].

Some of these impacts captured in the Summary for Policy Makers (SPM) are [8]:

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

Each of the last three decades has been successively warmer at the Earth’s surface than any preceding decade since 1850. In the Northern Hemisphere, 1983–2012 was likely the warmest 30-year period of the last 1400 years.

Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90 % of the energy accumulated between 1971 and 2010.

Over the last two decades, the Greenland and Antarctic ice sheets have been losing mass, glaciers have continued to shrink almost worldwide, and Arctic sea ice and Northern Hemisphere spring snow cover have continued to decrease in extent.

The rate of sea level rise since the mid-nineteenth century has been larger than the mean rate during the previous two millennia (high confidence). Over the period 1901–2010, global mean sea level rose by 0.19 [0.17–0.21] m.

Examining the Arctic Arena

The observed geophysical changes in the Arctic have made the region a destination for scientific research expeditions, monitoring and observation—that can be referred to as an ‘ecosystem’ perspective. Another lens to look at the Arctic—

another paradox—is that because of the meltdown, the Arctic has given way to an extremely active commercial and business space. Global economic trend towards high industrial growth will push demand on raw materials, in particular hydrocarbons. In other words, geoeconomics is quickly aligning with the opportunities that the geophysical changes in the Arctic present. Can this then be interpreted as redrawing the geo-economic map of growth and development in the Arctic? Or is a balanced ecological appreciation required that considers climate risks and vulnerability?

Geopolitical considerations, as observed earlier, are an important lens to examine the Arctic. Regions are fundamentally geographical concept but become dynamic and changeable with the influence of political factors. This is evident in the Arctic. In fact in certain sense it is unique as geographical features and values determine states' position, goal and response. Likewise, states' strategy impacts the Arctic. One of the reasons why the Arctic has remained stable is because issues have either been settled multilaterally or resolved bilaterally.

But the Arctic region is opening to many fronts. The possibilities of conflict of interest and the struggle for the control of values cannot be discarded. Despite the fact that tensions have remained historically low, a new set of political disagreement suggesting control and influence can create considerable disharmony. The race for resources inevitably leads to shove and push, making the Arctic potentially vulnerable to competition [9]. On the other hand, opening of shipping routes are likely to foster new cooperation and stimulate regimes and mechanisms. The region is likely to witness patterns of convergence and divergence among the local, regional and global players.

The Arctic's political temperature may escalate due to various factors. 'The immediate reasons could be the discussion on 'who' shall extract the oil when the ice thins and possibly disappears? 'How' will the new marine delimitation lines be drawn? 'Who' will control the new sea passage? And maybe at some stage a bigger question on 'who' owns the Arctic will be raised?' [10]

Legal consideration draws immediate attention to the Arctic. The Arctic Ocean is a semi-enclosed ocean surrounded by land and like all high seas is governed by the United Nations Convention on the Law of the Sea (UNCLOS) [11]. The Antarctica, a geographical contrast, is a landmass surrounded by an ocean. UNCLOS which was adopted in 1982 and came into force in 1994, did not envisage a special regime for the Arctic—the Arctic Ocean was no different from any other oceans [12]. However, under Article 234 it gave the Arctic coastal states special regulatory and enforcement rights to reduce and control vessel source marine pollution within the limits of the exclusive economic zone (EEZ) [13]. While a wide range of norms and regulations govern the Arctic, differences over the interpretation of the existing regulations can easily dampen the spirit of cooperation and goodwill because of the geophysical changes.

UNCLOS provides universal regime for all matters relating to ocean affairs and the law of the sea. It serves as the basis for the development of regional and national ocean policies, as well as the development of related regional and international instruments [14]. At the AsiArctic meeting at IDSA, New Delhi experts agreed that

to be 'actively involved in the Arctic it is vital to understand what exactly is the legal regime under the Convention and what issues are indeed critical and whether the Convention provides an adequate framework for dealing with those critical issues especially the legal regime that applies for navigation in new shipping routes and those that governs the exploitation of the vast oil and gas resources' [15].

It is interesting to note the US' legal position vis-a-vis the Arctic. Unlike all the Arctic states, the US is not a party to UNCLOS. But like all the Arctic states agrees that the legal regime contained in the UNCLOS applies to the Arctic as well. However, international laws and conventions invariably clash with sovereignty. According to UNCLOS, all coastal states have continental shelf that extends up to 200 nautical miles. This is well settled and has little contestation. But UNCLOS also defines the continental shelf beyond 200 nautical miles as 'extended or outer continental shelf'. Claims and counterclaims towards the 'extended shelf' will occur in the Arctic Region. For example, Canada's effort towards the recognition and acceptance of its extended continental shelf is a foreign policy objective.

Resource finds occupy commercial and economic attention in the Arctic. The Arctic is home to the world's largest remaining untapped gas and oil reserves. Equally important is the vast estimates of strategic minerals particularly the Arctic region of Russia which has deposits of nickel, copper, coal, gold, uranium, tungsten and diamonds. The Arctic is regularly dubbed as the 'final frontier for energy development' [16] and an answer to the world's energy thirst. Much of these potential reserves lie offshore, in the Arctic's shallow shelf. However, these are not easy to extract because of inclement weather conditions and extremely low temperatures. There is also an environmental economics and ecological cost to the oil and gas development.

It goes without saying that oil and gas extraction in the Arctic is inherently dependent on commercial profitability [17]. There are location challenges, weather hazards and unresolved maritime boundary disputes in the Arctic which adds to not only technical difficulties but also to the cost of oil production. Gas field exploration and extraction is comparatively viable than oil, particularly in Russia's Arctic. However, like oil it remains vulnerable to the difficulties of extraction particularly in terms of cost. Recent development in the US domestic energy market with the boom in shale gas production and the resultant low prices have made the natural gas from the High North commercially unfeasible.

Environmental concerns and public response vis-à-vis the development of Arctic resources influence policy decision. The 1989 Exxon Valdez oil spill in Alaska which aroused global concern and the Deepwater Horizon accident in the Gulf of Mexico in 2010 are reminders of the potential hazards and ecological consequences of drilling activities [18]. A number of oil companies have recently abandoned offshore drilling rights in the US part of the Arctic Ocean especially the Chukchi Sea. Royal Dutch Shell took a call to abandon all but one lease saying that it was not worth the costs of drilling in the remote area. Likewise, Cairn Energy's high investments in exploratory wells in Greenland's coast have made no commercial headway [19].

The much hyped Arctic tagline as the ‘new energy province’ is now questionable. Profit is a prime driver for oil and gas companies and clearly the initial euphoria over the hydrocarbons has evaporated because of unsustainable cost of extraction and low profit margin for the companies. Striking a balance between economic interests and lowering environmental risks will be crucial to resource management and governance in the Arctic. Given the current situation it is unlikely that Arctic will emerge as a major contributor to global energy resources.

The fourth attention in the Arctic relates to navigation and the sea routes. With the prevailing physical conditions in the Arctic and the global mitigation efforts to reduce carbon emissions with heavy investment towards renewable, extraction of oil and gas is low key. The Arctic is being seen as an active shipping route rather than an oil and gas production zone. With the Arctic meltdown, new shipping routes will open up. The legal frameworks for various types of passage (innocent, transit, archipelagic or free passage) are already enshrined in UNCLOS [20]. In the light of the sea route development, the Polar Code will need to be updated. The Antarctic Treaty System could serve as a model for the Arctic, particularly on how cooperation and coordination can be effectively put in practice, both for scientific work and logistics of expeditions [21].

Arctic: New Ways of Thinking

Multi-lateral Development Bank

As explained, the Arctic has an array of complex problems. To overcome challenges states have always responded through innovative ways and ingenious solutions. To recall, the Multi-lateral Development Bank (MBD) model was conceived to deal with the daunting task of reconstructing Europe and Asia in the post WWII. Similarly, such institutional approach can be considered to help fund international development in the Arctic. Increasingly, the Arctic will demand a governance structure that would embrace the interest of all developed countries, while respecting the economic sovereignty and environmental regulations and the interests of their northern inhabitants [22]. There are, of course, many unsettled questions regarding the role of MBD in the Arctic but it does merit a dialogue between multilateral financial experts and Arctic specialists regarding the advantages of MDBs and whether it can help meet the Arctic region massive requirement for new public infrastructure and private investment.

With the continued thaw, new polar shipping routes such as the Northern Sea Route and the Northwest Passage are receiving greater attention. Among the most important challenges are the needs for ‘responsible resource development, safe Arctic shipping and sustainable circumpolar communities’ [23]. All these specific areas will require new investments in critical infrastructure like improves road and rail networks, deep water ports, airports and runways. The lack of this infrastructure

inhibits resource development the lack of which has also slowed the growth of sustainable Northern communities.

The MDB are now far more experienced than the days of operation in the post-WWII and have through the decades gained wide experience in working with governments and the private sector, especially in the extractive industries. While, of course resource development in the North is dominated by mining activity but there is great scope in areas such as stronger governance structures and improved monitoring of environmental and social performance.

Developing Sustainable Development Goals in the Arctic

Sustainable development is a priority area for the Arctic Council, which follows closely the 1987 Brundtland Commission definition ‘as development which meets the needs of the present without compromising the ability of future generations to meet their needs’ [24]. Interestingly, Canada, in its role as first chair of the Arctic Council in 1996, defined sustainable development as ‘development which seeks human well-being through an equitable and democratic utilisation of society’s resources, while preserving cultural distinctiveness and the natural environment for future generations’ [25].

There is a tendency to view environmental protection and sustainable development as mutually exclusive. In fact, sustainable development includes strong environmental goals. One of the main outcomes of the Rio + 20 Conference was the agreement by member States to develop a set of Sustainable Development Goals (SDGs) that was practical, achievable and lasting. The idea was to build on the achievements of the Millennium Development Goals (MDG) that was to end in 2015. The agreement stated: ‘inclusive and transparent intergovernmental process open to all stakeholders, with a view to developing global sustainable development goals to be agreed by the General Assembly’ [26].

The Open Working Group (OWG) of the General Assembly, established in January 2013, was tasked to prepare the SDG and integrate it with the UN development agenda beyond 2015 [27]. According to the OWG, the SGD should be:

- (a) Not in conflict with international law but aligned to it
- (b) Incorporating the three dimensions of sustainable development: social, economic and environmental
- (c) Involving all relevant stakeholders.

It must equally be:

- (a) Focused on sustainable development but with coherent action
- (b) Catalyst for mainstreaming of sustainable development in the UN system
- (c) Focused on priority areas for the achieving sustainable development.

Based on the above framework for sustainable development goals, the next step forward for the stakeholder countries in the Arctic Region would be to develop and link the robust environmental protection policies governing the Arctic to the sustainable development goals of the UN. This is not something which the Arctic Council is unfamiliar with. In fact, the Council inherited the 1991 Arctic Environmental Protection Strategy (AEPS) to protect and promote sustainable development in the region. In 1996 when the Council was established it subsumed the five AEPS programmes: Arctic Monitoring and Assessment Programme (AMAP); Conservation of Arctic Flora and Fauna Programme (CAFF); Protection of the Arctic Marine and Environment Working Group (PAME); Emergency Prevention, Preparedness and Response working group (EPPR) and Sustainable Development and Utilization.

Mary Simon, Canada's former Ambassador for Circumpolar Affairs, had remarked that the 'Arctic Council must not make the mistake of seeing environmental protection and sustainable development as distinct, as the AEPS had done, but that sustainable development must have strong environmental goals' [28].

Most of the goals of sustainable development are important for the Arctic region. Oran Young, for example has emphasised that 'sustainable development should be the overarching framework for the Arctic Council as it sets out to chart new developments in international Arctic cooperation. Young has further recommended that subsistence preference, co-management, and the development of environmentally appropriate technologies and practices should be some of the guiding principles for the Council's work' 29.

Arctic and Asia: A Scientific Enterprise

The scientific evidences pointing towards global warming and the accompanying climate risks bring the Arctic and the Himalaya-Tibet in Asia under one lens of investigation in terms of competition for resources and managing the fragile ecosystem. Both the Arctic and the Himalaya-Tibet in terms of geophysical changes and geostrategic significance can be described as the most environmentally strategic locations of the world. In terms of resource use, sustainability and governance, the Arctic and the Himalaya-Tibet converge in remarkable ways. The Arctic is one of the original poles, while Himalaya/Tibet has come to be regarded as the 'Third Pole'. In both these regions, safeguarding the increasingly fragile ecosystem is drawing regional attention. The ecological footprint in the Arctic is heavy, with emissions accounting for up to 45 % of black carbon and 25 % of all mercury [30]. The glaciers of the Himalaya-Tibetan Plateau contain one of the largest reservoirs of snow, water, ice and the permafrost outside the Polar Regions and provide the source for the major Asian rivers including the Mekong and the Brahmaputra. Growing evidences indicating changing profile of the glaciers, reduced permafrost and monsoon variability are a source of livelihood concern for the vast population that is dependent on water for agricultural activities. Long-term estimates point to

reduced run-off from glaciers while short-term calculations suggest that water run-off from glaciers when combined with seasonal rains can result in flood conditions [31].

The Arctic and the Himalaya-Tibet share similar risks and vulnerability over global warming and climate change. The changing dynamics of the Himalaya-Tibetan Plateau glaciers are a combination of earth system changes at the local and regional scale. On the other hand, the melting Arctic ice is likely to result in sea level rise and alter the stable patterns of ocean currents resulting in unpredictable weather cycles. Scientists reason that the Himalaya-Tibetan Plateau is not only a key component of Asian monsoon evolution but that the fluctuations on the Tibetan glaciers have a significant impact on the climate system in the Northern Hemisphere and on the entire earth on various temporal and spatial scales [32]. Studies have also shown a significant co-relationship between the Arctic Oscillation (AO) and the autumn–winter snow depth on the Tibetan Plateau [33].

Scientists believe that the AO is causally related to weather patterns in areas thousands of miles away, including many of the major population centres of Europe and North America. NASA climatologist James Hansen explains the mechanism by which the AO affects weather at points so distant from the Arctic: ‘When the AO index is positive, surface pressure is low in the polar region. This helps the middle latitude jet stream to blow strongly and consistently from west to east, thus keeping cold Arctic air locked in the polar region. When the AO index is negative, there tends to be high pressure in the polar region, and greater movement of frigid polar air into middle latitudes’ [34].

Before the late 1970s when the AO was in its interdecadal negative phase, the snow depth over the Tibetan Plateau increased in autumn and then decreased in the following winter. Now the AO has been in a positive phase since the early 1980s, and consequently snow depth has decreased. Furthermore, sediments taken from the bottom of Kiang Lake on the Tibetan Plateau suggest that changes in wind patterns, which are clearly caused by global warming, are making the area dustier [35]. According to the American Geophysical Union, this trend could accelerate the melting of crucial glaciers in the Himalayas and affect already imperilled water supplies.

The increase in dust particles in the Tibetan plateau was at one time attributed to overgrazing and increased activity by local people. Scientific observation has now revealed that dusty periods coincide with the AO being in a ‘positive phase’. As a result of this positive phase, the Tibetan plateau is exposed to stronger winds in the summer. The link between dust levels and the AO, while not exact, does indicate that a dustier atmosphere can accelerate the melting of the glaciers in the Himalayas. Common science tells us that as dusts settle on white ice, it makes it darker thus absorbing radiation and accelerating melting. Dust also warms the air above, enhancing monsoon circulation patterns which could affect rain and alter rainfall patterns.

As the Arctic melt raises the sea level, the Tibetan glacier melt will increase the flow to many rivers, from the Yangtze, which irrigates more than half of China’s arable land, to the Indus river system, which is critical to the agricultural heartlands

of India and Pakistan [36]. Ongoing studies suggest that 40 % of the plateau's glaciers could disappear by 2050. Studies also indicate that full-scale glacier shrinkage is inevitable and will lead to ecological catastrophe [37].

The impact of warming on the Tibetan glaciers and its direct relation to river flows creates an opportunity for downriver countries in South and Southeast Asia to raise common concerns and draw China into a regional dialogue and joint study on the climate change impact on the glaciers and precipitation patterns. In the Arctic Council, China and India as key observers can exchange knowledge on the snow, water, ice and permafrost of the two regions. The findings of such studies will help both the countries to prepare preventive policies in the region. Downriver countries dependent on the rivers from Tibet should also advocate the establishment of a Himalayan Council on similar lines of the Arctic Council for the protection of the Himalaya-Tibetan ecosystem.

Normative issues like whether the oil and gas resources of the Arctic can be regarded as 'global commons' [38] or as the 'common heritage of mankind' [39] can have resonance to the glacial-fed rivers that originate from Tibet. But one, of course should be cautious of drawing parallels. Many states would contest the principle of 'global commons' or 'common heritage' based on sovereignty and territorial jurisdiction. However, it is an interesting thought process in an age of global governance and preventive policies.

Conclusion

The Arctic today expresses an 'antithetical situation' [40] with economic and commercial interest on one end and a need for mitigating climate risks and resource governance at the other. No longer the far and away region, Arctic's geophysical changes have global impact. The increasingly reduced Arctic Ocean ice has opened up new shipping routes and increased navigation. Warmer Arctic water is changing the migration patterns of fish population. The melting Greenland ice cap is directly influencing the planetary climate system in several ways, among these being rising sea levels. Climate change is influencing the state and society in the Arctic in both positive and negative ways. The evident geophysical changes accompanied by development opportunities have turned the Arctic into an important geostrategic space.

The Arctic affairs are not long distance for some Asian countries. Except for India, and to some extent Singapore, the other Asian countries' like China, Japan and South Korea interests are tied with the immediate economic developments in the Arctic region and in particularly the opening of the Northern Sea Route, which presents shorter and cheaper trade opportunities. Of all the Asian states, China's interest in Arctic makes economic sense. As the world's second largest economy and the biggest trader, China looks positively towards commercial ventures in the Arctic and is keen to partner with Arctic states to develop infrastructure, navigation facilities and services.

While in the short run economic opportunities are attractive, in the long run the rapid melting of the Arctic ice cannot be viewed as a positive development. The

Arctic is a bellwether, reminding that the earth is warming faster and ice melting faster. With this as an instructive backdrop, Asian countries as observers to the Arctic Council should actively participate in the six working groups of the Council and coordinate in mitigating the likely adverse impact of climate change. The Arctic is not just a regional concern for the littoral states but requires a global response.

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Balancing Development and Environmental Concerns in the Arctic

Shailesh Nayak

The Arctic covers more than a sixth of the Earth's total landmass. The Arctic Council, which is an intergovernmental body, formulates the policy for this region. India, along with China, Japan, Singapore and South Korea, were admitted as 'Permanent Observers' to the Arctic Council in May 2013. India's main interest is to understand Arctic's role in modulating global climate, and specifically to India. In this context, it is worthwhile to remember late Prof. Mahendra Nath Bose who set his foot on the Arctic in 1962 to collect plant fossils and study paleoclimate of this region. That was the beginning of India's scientific engagement with the Arctic.

The Arctic region is receiving an increasing attention from global community due to large-scale changes in sea and land-ice conditions in the Arctic brought about by the changing climate. These changes have increased the economic potential and geopolitical significance of the region. It has been observed that the warming in the Arctic is occurring at a faster rate than any other region. Due to this warming, sea ice has been shrinking and affecting the albedo. The melting of the Greenland's ice sheet and other Arctic ice caps is likely to contribute to global sea level rise in coming years. These changes have local, regional and global implications on weather and climate and have thus attracted global attention as well as action. India's interest in the Arctic is primarily to understand these changes and their likely impact on India.

The melting of ice in the Arctic has posed new challenges but also offered exciting opportunities. First, these changes are already exerting additional pressure on the natural environment and ecosystem of the Arctic. Second, fish productivity as well as their distribution is likely to be affected, which is an important economic activity for the region. At the same time, the warming of sea can also lead to development of new fishing grounds. The new opportunities include exploration for large reserves of oil, gas and critical minerals, viz. Niobium, Platinum group of

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minerals, Tantalum, Molybdenum, Vanadium, etc., and rare earth elements. The possibility of opening new shipping routes is another great opportunity. These new routes are shorter and hence can reduce time and cost, as well as contribute towards reduced CO₂ emissions to the atmosphere.

In the current scenario, the Arctic has provided an opportunity to the global scientific community to build strategic knowledge on climate change in the Arctic and its consequences. The various scientific studies undertaken by the Arctic countries as a consequence of extended continental shelf program have already provided additional knowledge about plate tectonics, paleoclimatology, physical oceanography and ecosystems of the Arctic.

Such knowledge is expected to facilitate global, regional and local adaptation.

One of the major issues is the melt water contribution from the shrinking Greenland ice sheet. It has been estimated that net loss of ice is about 227 Gt/year [1]. This loss of ice is likely to be main contributor to the rise in global sea level over the next hundred years. Further, these changes in ice sheet mass balance will affect ocean circulation in the North Atlantic and will affect global ocean circulation and climate, in future.

The retreat of sea ice in the Arctic Ocean has been reducing Earth's albedo or reflectivity. It has been concluded based on data from Clouds and Earth Radiant Energy System (CERES) on Tropical Rain Measurement Mission (TRMM) satellite as well as Terra, Aqua and NASA-NOAA's Suomi National Polar Orbiting Partnership (NPP) satellites, that the overall albedo fell from 52 to 48 % between 1979 and 2011 [2]. The surface albedo is a crucial component in the energy budget, and hence an important source of variability in future ice loss projections in coupled climate models [3]. The diminishing albedo will also contribute to an increased warming of the Arctic Sea.

The Arctic is characterised by its harsh climate. The ecosystem and species that live in the Arctic had to adapt to these extreme conditions and high natural variability from year to year, as well as within a year. A long-term monitoring of the functioning of the Arctic region and its relationship with environment will provide knowledge about variability and change. Sea ice loss has emerged as an important driver of marine and terrestrial ecological dynamics, influencing productivity, species interaction, population mixing, gene flow, and pathogen and disease transmission [4].

A link between cold episodes in the North Atlantic and weakened monsoon during last glacial period as well as during Holocene has been established based on paleoclimatic records. The Arctic affects the Indian monsoon and vice versa. In recent years, the South Asian summer monsoon has experienced many extreme rainfall events over North–West of India and Pakistan. It has also contributed to more local intense anticyclonic outflows from this region. Krishnamurthy and coworkers have concluded that the western lobes of these high pressure areas carry outflow of large heat fluxes from monsoon belt towards Central Asia and eventually to the Canadian Arctic, and result in increased melting of ice. In view of these findings a new multi-institutional national initiative focusing on the link between

the climate variability and changes in the Arctic and the Indian summer monsoon for various time scales has been planned.

In view of the impact of Arctic melting on India's weather and climate, the long-term monitoring of ice sheet and glaciers in the Arctic is necessary. India has set up a station, 'Himadri' in Nye-Alesund, Svalbard to measure atmospheric properties and for monitoring of the Kongsfjord glacier. Recently, the Indian scientists also successfully deployed the country's first multi-sensor subsurface Arctic observation system in one of the fjords fringing Ny-Ålesund. A polar remotely operable vehicle, indigenously built, will be deployed in the Arctic this year. India is also in the process of acquiring polar research vessel to conduct research in Arctic. The following activities are being planned:

- (a) A network of automatic weather stations on ice sheets and glaciers.
- (b) Measurements of ice height and thickness, and mass balance studies.
- (c) Mapping of ice flow from satellite data.
- (d) Continuous measurement of glacier flow rate.
- (e) Monitoring of the smaller ice caps and glacier mass loss.
- (f) Creation of database, of above.

The economic impacts of warming of the Arctic need to be accounted for. Most economic discussions are based on the assumption that opening of the region will be beneficial. The Arctic has 30 and 13 % the world's undiscovered gas and oil resource, respectively, and new polar shipping routes will increase trade [5]. The investment in Arctic could reach US \$100 billion within ten years [6]. The cost of environmental damage also needs to be recognised, such as hazards of oil spill, methane release, ecosystem loss, etc.

The cost of melting ice is likely to be huge, as the Arctic is vital to the functioning of the Earth system as a whole. Global research has indicated that the thawing of ice would release methane, which in turn will further warm the planet. The East Siberian Arctic Shelf is currently venting at least 17 million tons of methane into atmosphere per year [7]. The release of methane from thawing permafrost, off Northern Russia, alone could cost \$60 trillion [8]. All nations will be affected and hence should be concerned about this change in the Arctic. However, the impact of climate change in the Arctic on the developing countries will severe as they will face extreme weather, floods, droughts, lower agricultural production, etc. It is therefore essential that economic models are developed considering vulnerability of different regions to such changes.

The natural Arctic environment must be managed based on best scientific knowledge and standards for conservation and protection of the environment. Vibrant international cooperation is required to address this issue. An effective collaborative action by the Asian countries towards building strategic knowledge is the need of the hour. The governance of the Arctic remains with the Arctic Council, unlike Antarctica, which is governed by the Antarctica treaty. Asian countries may have limited role in Arctic governance, but we can influence the development in the Arctic through active participation in other international organisations, such as The

United Nations on the Law of the Sea, the International Maritime Organisation, United Nations Environmental Program, Intergovernmental Oceanographic Commission of UNESCO, etc. Asian countries have to build consensus on their engagement with the Arctic Council through collaborative research projects and actions.

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Part II
Asian Countries' Perspectives

Challenges in the Arctic Exploitation and Their Impacts on China's Arctic Position

Ping Su

Arctic is portrayed as one of the biggest unexplored regions in the world and the shortest new sea route from East Asia to Northern Europe. But with the oil prices dipping below \$50 a barrel, the number of ships sailing through Northern Sea Route (NSR) decreasing to 53 and political tension related with Ukrain crisis, it is a region gradually exposed many uncertainties.

The most frequently quoted figures in the Arctic are from U.S. Geological Survey (USGS) Circum-Arctic Resource Appraisal (2008) [1]. It is estimated that there are 90 billion barrels of oil, 1699 trillion cubic feet of natural gas (approximately 30 % of the world's undiscovered conventional gas reserves) and 44 billion barrels of natural gas liquids in the Arctic region. In addition, it is also expected that the new sea route will be 40 % shorter than the route from Suez Canal and a trip from Shanghai to Rotterdam is estimated to be about seven days and 2750 miles shorter.

The figures of USGS and new sea routes are very popular to serve the evidence of potential Arctic competition, conflict and major power's ambition in the Arctic, but the challenges of Arctic exploration are often ignored. This chapter will attempt to analyse China's Arctic position.

Uncertainties of Arctic Exploitation

The main challenges of Arctic exploitation include risks from exploration of natural resource such as oil and gas and from shipping. Some of these risks can be mitigated by high level of technology and confirming to stringent operational standards but other challenges such as the financial risks will face severe tests in the forth-

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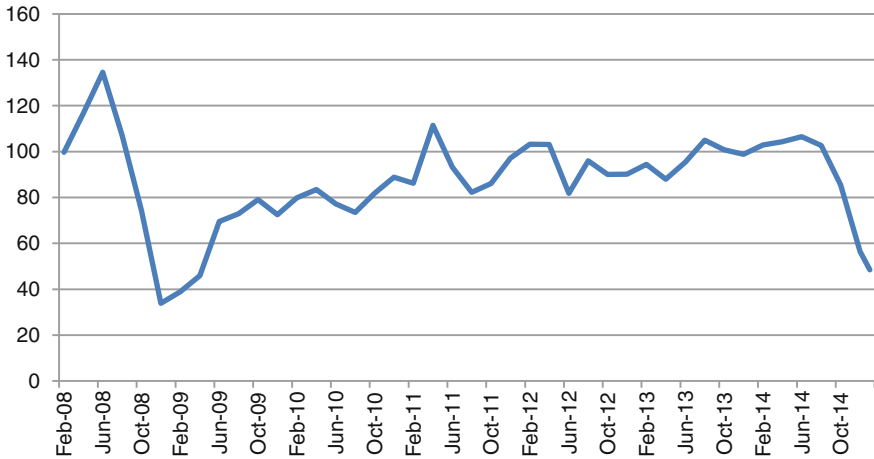


Fig. 1 Crude oil prices (US \$/barrel). *Source* International energy agency (international energy agency. Oil market report. 2015 January. Available at <https://www.iea.org/oilmarketreport/>)

coming decades. Firstly, the prevailing prices of oil and gas in the world energy market impacts oil and gas exploration in the high north as the continued decline in oil prices have resulted in lowering of anticipated profits from oil produced from the Arctic. The Arctic oil would be profitable for companies at US \$100 per barrel but the global oil prices have been falling from peak (US \$150 in 2008, US \$120 in 2012, US \$100 in September 2014) to US \$48 in 2015 (Fig. 1). On the contrary, the Middle East and African oil would be relatively cheaper and easy to extract and the shale gas market at US \$41.4 billion is expected to grow to US \$104 billion by 2020. Therefore the drilling in cold and harsh Arctic environment has become less attractive and will not gain traction unless the price of oil rebounds to three digits.

Secondly, shipping in the Arctic faces the challenges of poor infrastructure, difficult search and rescue, high insurance fee, short sailing period and harsh weather compared to other sea routes. The news from the NSR for 2014 is not very encouraging; after a positive trend in the number of ships sailing through the NSR (2 vessels in 2007; 3 vessels in 2008; 5 vessels in 2009; 10 vessels in 2010; 34 vessels in 2011; 46 vessels in 2012 and 71 vessels in 2013, the transits have reduced significantly in 2014) (Fig. 2). According to the Russian NSR Information Office, only 53 vessels transited along the NSR, in which 31 vessels transited through the entire route and 22 vessels either departed from or arrived at ports inside the NSR.

According to the analysis of Polar Risks Group, the reasons for this decrease are as follows.

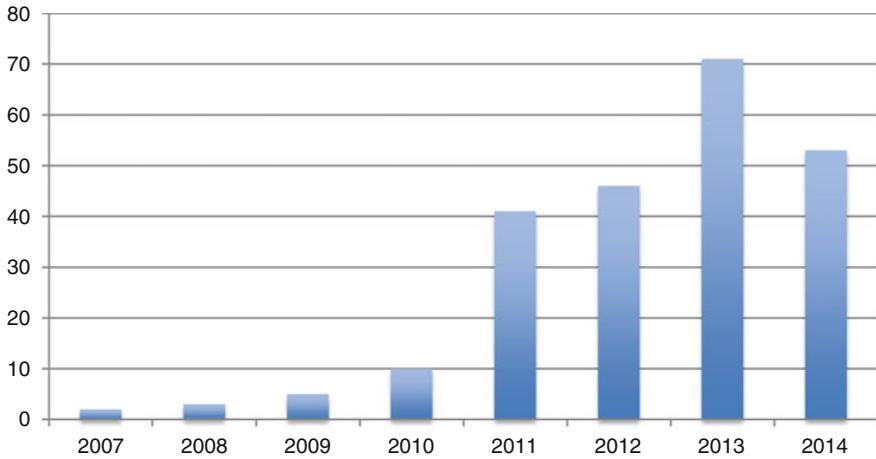


Fig. 2 Vessels sailing through the NSR. *Source* Northern sea route information office (2009–2010 from Sergey Balmasov, Northern sea route information office, 2011–2014 from Northern sea route information office, transit statistics, at www.arctic-lho.com/nsr_transits, viewed 5 Jan 2015)

- (a) The NSR choke points experienced too much sea ice.
- (b) Many ship-owners were discouraged after the 2013 NSR season due to the fact that the extent of 2013 sea ice minimum did not beat the all-time record low of 2012.
- (c) Novatek stopped shipping out gas condensate to Asia from the Vitino oil terminal.
- (d) Kovdor Mining didn't agree on shipping prices—contributing to more than 20 % of decrease in cargo from 2013.

Geopolitical risk with the Ukraine and Russian sanctions also played a role, but a relatively minor one. Some ship-owners feared that Russia would stop offering support or dramatically raise NSR tariffs—but that did not happen [2].

Thirdly, the cost of Arctic development like infrastructure, equipment, insurance and labor forces are more expensive than other areas. The poor infrastructure in the Arctic region require modernising such as building of transportation corridors, roads, rails, airports, ports, communication infrastructure, pipelines and icebreakers. But development in Arctic is not easy: the large distances from production to consumption centers increases transportation time and costs; distance from manufacturing hubs requires that companies maintain equipment redundancies and a large inventory of spares for unforeseen breakdowns; harsh weather requires specially designed equipment that can withstand the frigid temperatures; and higher wages are needed to bring support personnel in the remote areas. Additionally, poor soil conditions may require additional site preparation for onshore facilities to

prevent equipment from sinking; softening tundra from thawing permafrost can limit exploration during warm months; offshore production facilities can be damaged by ice floes and severe storms; and unpredictable weather can hinder shipments of equipment and personnel [3].

Fourth, the environmental impacts of commercial activity on biodiversity and local communities are high especially for the indigenous groups. Greenpeace, one of the most active environmental organizations in the world is on the forefront of demonstration against Arctic drilling. As a result, on one hand, the rig owner and operator have to be very careful and the strong opposition of environmental organizations and indigenous people will add to the cost of Arctic exploitation.

Fifth, Arctic is an area which is affected by geopolitics amongst major powers such as U.S., European Union and Russia. The ongoing Ukraine crisis has deteriorated Russia and NATO, European Union and U.S. relations. The military buildup in Arctic adds to the potential areas of conflict. The withdrawal of Western energy and shipping companies from Russia influenced the financing of projects and development of new oil fields. The sanctions have had a negative impact on the search and rescue cooperation in the Arctic and there is a possibility that Russia may react to the sanctions by not providing adequate safety and support services which add the risks of vessels sailing through the NSR.

The location of military bases in and near the Arctic circle is shown in Fig. 3 and the details are shown in Table 1.

Concerns of China's Arctic Policy

According to Linda Jacobson's opinion, the Chinese Government has paid increasing attention to the Arctic and has taken steps to protect what it perceives as its key interests in the region over the past five years. These are, first, to strengthen its capacity to prepare appropriate responses to the effects that climatic change in the Arctic will have on food production and extreme weather in China; second, to secure access at reasonable cost to Arctic shipping routes; and third, to strengthen China's ability as a non-Arctic state to access resources and fishing waters [4].

In order to understand the main concerns of China's Arctic policy, papers on the Arctic were accessed from China National Knowledge Infrastructure (CNKI) database, the most authoritative journals and newspapers database in China. The search results show that China's Arctic policy is characterized with seven themes. Arctic exploitation and cooperation gets the top rank and is followed by law and governance. Security and geopolitics are important aspects as well, but Arctic risk is the least important issue (Fig. 4). These statistics reveal that China's Arctic policy focuses on Arctic exploitation and cooperation with Arctic states. Law and Arctic governance are a good way for China's involvement in Arctic affairs. But it's a pity that Arctic risk does not get sufficient attention.



Fig. 3 Military base map in and near Arctic circle (Geopolitics and security in the Arctic, Regional dynamics in a global world, edited by Rolf Tamnes and Kristine Offerdal. 2014, p. 156.)

It is commonly believed that Arctic is China’s priority, but as seen from the funding provided by National Social Science Funding of China (NSSFC) (Table 2) that Arctic is not a priority of China’s foreign policy. It is evident that as Chinese government fund social science projects 4000–5000 every year, but Arctic projects only cover three to five.

Apart from this, China’s New Silk Road project that would connect China to Europe is a priority instead of the Arctic NSR. In addition, Arctic resources can be easily replaced by the new suppliers in Australia, Latin America and Africa, at a lower cost and risks.

Table 1 Military bases in and near Arctic circle (Geopolitics and security in the Arctic, Regional dynamics in a global world, edited by Rolf Tamnes and Kristine Offerdal. 2014, p. 156)

No.	Place/base	Main unit/purpose
1	Clear air force base	US air national guard 213th space warning squadron
2	Fort Greely	Ground-base midcourse defense (GMD) interceptor site
3	Fort wainwright	US army, 1st brigade/25th infantry division
4	Eielson air force base	US air force 354th fighter wing
5	Yellowknife	Canada command, joint task force north
6	Resolute Bay, Nunavut	Canadian forces arctic training centre
7	Thule air force base	US air force 12th space warning squadron
8	Nuuk	(Danish) Arctic command
9	Bodo air force base	Norwegian air force, 331 and 332 fighter squadrons
10	Reitan	(Norwegian) Joint operational headquarters
11	Andoya air force base	Norwegian air force, 333 maritime patrol squadron
12	Trondenes naval station	Norwegian coastal rangers
13	Ramsund naval station	Norwegian navy special forces
14	Skjold garrison	Norwegian army, 2nd battalion, brigade north
15	Setermoen garrison	Norwegian army, armored battalion, brigade north
16	Bardufoss base	Nor. army, support battalions, 339 helicopter squadron
17	Sorreisa	Norwegian air force control and reporting centre
18	Porsanger garrison	Norwegian home guard base
19	Sor-Varanger garrison	Norwegian army border guards
20	Arvidsjaur garrison	Swedish army ranger battalion
21	Boden garrison	Swedish army norrbottnens regiment, I 19
22	Lulea air force base	Swedish air force, norrbottnens fighter wing
23	Sodankyla	Finnish army ranger brigade
24	Rovanemi	Finnish AF lapland air command, 11th fighter squadron
25	Pechenga/Sputnik bases	200th independent motor-rifle brigade (future arctic brigade); 61th naval infantry brigade
26	Zapanaya Lista naval bases	Northern Fleet, bolshaya lopatka and nerpichya submarine bases
27	Ara bay naval base	Northern fleet, attack submarine bases
28	Gadzhievvo naval base	Northern fleet, main base for strategic submarines
29	Olenya bay naval base	Northern fleet base
30	Severomorsk naval base; Severomorsk 1 naval air base	Northern fleet main naval and air bases
31	Severomorsk 3 naval air base	Northern flee air base
32	Olenegorsk air force base	Northern flee air base
33	Oleneogorskradar station	Dnepr/Daugava early warning radar

(continued)

Table 1 (continued)

No.	Place/base	Main unit/purpose
34	Pechora radar station	Daryal early warning radar
35	Vorkuta Sovjetsky	Forward staging base
36	Tiksi	Forward staging base, probably disused
37	Ugolny/Anadyr	Forward staging base

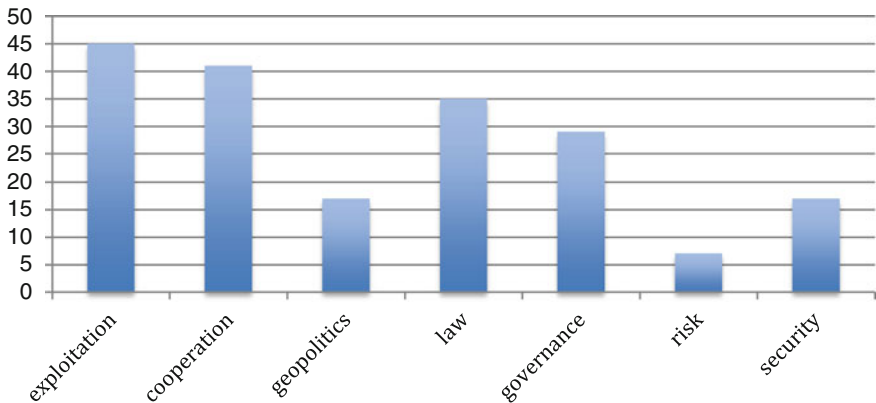


Fig. 4 Main themes of China's Arctic policy. *Source* China national knowledge infrastructure database (China national knowledge infrastructure database. 2014 June. Main themes of China's arctic strategy. 2015 January 18. Available at <http://www.cnki.net/>)

Table 2 Funding to social science projects in China

Year	Social science projects	Arctic projects funded by NSSFC
2014	4633	5
2013	5126	5
2012	4828	3
2011	4258	0
2010	3387	0
2009	2388	0
2008	2152	2

Source National funding of social science of China (National funding of social science of China, 2014 December. Data base of national funding of social science of China. 2015 January. Available at <http://fz.people.com.cn/skygb/sk/>)

Countermeasures of China's Arctic Position

From CNKI and NFSSC database statistics, China's Arctic decision makers and scholars do not get a comprehensive assessment on Arctic risks and are concerned about being left out of either raw material exploration in the region or in the use of

Arctic trade routes. But from my interview on Chinese scholars and government officials, there is some recognition on the new trend in the Arctic.

Firstly, a prudent assessment of Arctic exploration is important although government official and scholars are very optimistic on the resources in the Arctic. ‘Project Guidance’ of National Funding of Social Science of China in 2014 and 2015 reveals that Chinese government and academics gradually turn to the challenges as the research on the theory and practice on China’s involvement in Polar exploitation shows [5]. Author’s interviews of Chinese government officials also show their rationale attitude on commercial shipping. Although China has successfully tried the pilot shipping but they insist that commercial shipping is different as it requires much larger data and knowledge such as the extent of ice melting and weather forecasts. Further commercial Chinese companies are prudent on investment especially on gas and oil exploitation and shipping. Rich reserves of resources therefore do not mean successful exploitation.

Secondly, further involvement in Arctic governance is an important step. China is trying to understand regimes, regulations and standards related with Arctic and follow these norms. Shanghai Institute for International Studies (SIIS), one of the most important research institutions on China’s Arctic policy, published two books on Arctic governance at the end of 2014 and NSSFC funded two research projects on Arctic governance in the same year. As seen from Table 3, this topic has not been funded earlier.

Thirdly, China is targeting to enhance its cooperation with the Arctic states. With respect to bilateral relations, China has made substantial progresses with Nordic states especially Iceland. A Chinese-Icelandic free trade agreement was signed in 2013 and an Aurora observatory was established in Akureyri. The main multilateral framework of China Nordic cooperation is on the basis of China and Iceland cooperation and promoted by Polar Research Institute of China and Rannis Center of Iceland.

Russia and China both see the Arctic as a resource-rich region. Russia wants to strengthen its economy through Arctic resources, the low price of oil is hindering development of exploration activities in the Russian Arctic. Russia is wary about China’s involvement in Arctic affairs at the beginning but two sides currently have some agreements related to energy such as Yamal LNG project.

With respect to multilateral relations, China has been the observer of Arctic Council, and has established China Nordic Arctic Research Center (CNARC) including nearly ten Chinese and Nordic universities and research institutes on

Table 3 Arctic projects funded by NSSFC

	International law	Arctic shipping	Arctic exploitation	Arctic governance
2008	1	1		
2012	2		1	
2013	2	3		
2014	1	1	1	2

Source National funding of social science of China (National funding of social science of China, 2014 December. Data base of national funding of social science of China. 2015 January. Available at <http://fz.people.com.cn/skygb/sk/>)

polar affairs. The cooperation framework with Nordic states will not be affected by the Arctic economic challenges, as Arctic is still a long-term potential sea route and resource region. The Nordic member institutes at the center of the Arctic discussion are Fritjof Nansen Institute (Norway), Norwegian Polar Institute, Arctic Center in Rovaniemi (Finland), Swedish Polar Research Secretariat, Icelandic Center for Research and the Nordic Institute of Asian Studies in Denmark. The Chinese member institutions are Center for Polar and Oceanic Studies at the Tongji University, Research Institute of Polar Law and Politics at the Ocean University of China, Shanghai Institutes of International Studies and the Strategic Studies Division at the Polar Research Institute of China.

Conclusion

It has been argued that the Arctic development will be delayed by low global oil prices, decreasing vessels transiting through the NSR, high exploitation cost and environmental sensitivity. The Arctic region is therefore less significant economically to China than many expect in short and midterm. With the increasing recognition on Arctic risks and uncertainties, China will have more prudent and comprehensive assessment on Arctic development.

But for the long term, the potential Arctic resources and shipping are still alternative option for diversification of sea routes and resources for China. Therefore, China will relocate its existence in the Arctic region and will focus more on scientific innovation, Arctic governance, sustainable development and regional cooperation.

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India's Scientific Endeavours in the Arctic

S. Rajan and K.P. Krishnan

Introduction

The Arctic Ocean and the surrounding regions are one of the important areas of the globe that not only govern the earth's climate but also record its past climatic history. The region is also an excellent harbinger of future change, because the signals or clues that signify climate change are so much stronger in the Arctic than elsewhere. The thermohaline circulation of the oceanic water masses at high latitudes of the Arctic has been invoked as a potential cause of abrupt climate change on all timescales. However, the fundamental aspects of the circulation remain poorly understood. The Arctic region is also of special significance to the Indian subcontinent as several studies indicate an apparent connection between the polar atmospheric processes and the Indian monsoon intensity. The forcing functions of this connection are however, a matter of academic debate. A comprehensive understanding of the Arctic is therefore of special importance for a monsoon-dependent agrarian economy like India.

India has been a lead player in Antarctica since 1981. Therefore it is only natural that the scientific and logistics expertise developed by the Ministry of Earth Sciences and its Research & Development Wing, the Goa-based National Centre for Antarctic and Ocean Research (NCAOR) should be called to lead the scientific studies in the Northern Polar Region as well. Ny-Ålesund, located on the west coast

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of Spitsbergen, the largest island in the Svalbard Archipelago of the Arctic, was chosen for India's scientific endeavours in the Arctic. This choice was dictated by three considerations:

- (a) As one of the original signatories of the Svalbard Treaty of February 1920, India gets the right to use the Arctic archipelago of Svalbard for scientific activities.
- (b) Ny-Ålesund is the location of the International Arctic Research Facilities, which hosts 15 permanent research stations run by institutions from ten countries, in addition to scientists from other nations.
- (c) Availability of a well-developed infrastructure in terms of facilities, laboratories, access, and communication.

A former coal-mining colony, Ny-Ålesund (at 78°55' N, 11°56' E) is a research outpost of 30–40 people about 2100 km north of Oslo, which grows to over 180 researchers when scientists from several nations arrive for their scientific pursuit during its short summer. India, under the aegis of the Ministry of Earth Sciences launched its scientific endeavours in the Arctic in 2007 and soon thereafter took on lease a station building at Ny-Ålesund, which has living facilities and workspace for a total of eight scientists. On this station christened as "Himadri", Indian scientists have initiated several innovative programmes in varied disciplines as glaciology, atmospheric sciences and biological sciences. To date, over 125 researchers from nearly two-dozen national research institutions and universities have visited Ny-Ålesund for scientific data collection and the results have been published in over 60 peer-reviewed journals.

India's Plans for Ny-Ålesund

The Arctic Ocean once believed to be remote as well as pristine, is now one of the fastest warming regions of the world with the pace/magnitude of environmental change being greater than at any other location on Earth. Moreover, the ocean and sea ice in the Arctic are a crucial part of the global climate, influencing atmospheric and oceanographic processes, and biogeochemical cycles beyond the Arctic region. Over the past few decades, numerous scientific programmes have been launched in the Arctic as international collaborative ventures. Nonetheless, there still exist critical knowledge gaps that need to be addressed on priority, considering the fast pace of events happening in the High North. The scientific agenda in the Arctic by Indian scientists is primarily aimed at addressing these research gaps. In addition, the science plan has drawn its strength from the expertise available in the country, and the national aspirations vis-à-vis international developments in polar science and data collection. Three broad themes can be considered as embracing the bulk of India's sustained scientific activities at Ny-Ålesund: Biogeochemical studies centred on the fjords of Spitsbergen, aimed at understanding the response of these

fjords to short- and long-term climate variability; atmospheric sciences with special emphasis on the polar precipitation and study of aerosols; and cryosphere studies focusing on the mass balance of glaciers and chemical characterization of snow. The studies are briefly described below:

(a) ***Biogeochemical studies***

Fjords with free access to the oceanic waters have long been recognised as the critical gateways through which ocean waters can impact on the stability of glaciers. Fjords are also ideal locations to study the ice-influenced physical, biological, and geochemical processes. Kongsfjorden, an Arctic fjord in the North-West coast of Spitsbergen is an established reference site for Arctic marine studies. Kongsfjorden has been listed among the European flagship sites of biodiversity, signifying the need for, and importance of monitoring the biodiversity of these waters. The fjord undergoes regular seasonal shifts from being an Atlantic fjord to an Arctic one and back, resulting in pronounced hydrographical and biotic changes. Of late, this fjord has received a lot of attention as an ideal site for exploring the impacts of possible climate changes, with the Atlantic water influx and melting of the tidewater glaciers both linked to climate variability. Some of the important knowledge gaps in the study of Kongsfjorden include, an understanding of the transport of water into and out of the interior part of the fjord, the water mass exchanges on the shelf and the deep sea, the spring/fall bloom dynamics, a lack of quantitative data on production, abundance of key prey species, and the role of advection on the biological communities in the fjord.

(b) ***Atmospheric sciences***

Precipitation in the form of snow and rain is an important part of the global hydrological system that modulates the energy and water cycle as well as the ecosystem. Though caused primarily by regional processes, knowledge of precipitation and its underlying processes as well as its high temporal and spatial variation, can provide important leads to global energy- and water-cycle studies. The fresh water input through precipitation on the glaciers and ice caps and its impact on the glacier mass balance is an important issue to be addressed. Unlike the rest of the globe, polar precipitation is shallow and of low intensity and is mostly dominated by solid precipitation. Small changes in the atmospheric parameters can thus significantly influence the polar precipitation process. Furthermore, under a perceived scenario of rapid and significant impact of global warming on the Polar Regions, quantification of changes in the precipitation rate and its underlying processes, as well as the precipitation characteristics are some of the important issues that need to be addressed for a better and more accurate prediction of the climate.

Atmospheric aerosols also influence regional and global climate through direct and indirect processes. While polluted continental locations are more prone to drastic changes in anthropogenic activities, the remote Arctic, Antarctic and high-altitude Himalayas are also not free from the dramatic influence of these suspended particulates, primarily through long-range transportation from source

regions. The transport of aerosols from low-latitude regions to the Arctic atmosphere and subsequent deposition in Arctic snow/glaciers and ice sheets has been a major scientific concern in the recent years. In addition, the Arctic is considered as net sink for black carbon, where deposition exceeds emission.

(c) *Cryosphere studies*

Snow and ice are pervasive elements of high-latitude environmental systems and have an active role in the global and regional climate systems. The Arctic glaciers and ice caps are irregularly distributed in space and are located in different climatic regimes. General circulation model predictions suggest that the ongoing global and regional warming is likely to affect the Arctic first. Considering that the huge ice mass stored in the Arctic can have a significant role in modulating future changes in the global environment including contribution to sea level rise, there is an imperative need to develop our knowledge in the field of Arctic glaciology. Svalbard archipelago in the high Arctic is a home to several large bodies of mountain and tidewater glaciers. These glaciers respond significantly to the atmospheric processes and the changing climate in general. They also impact the local hydrological cycle and fjord ecosystems.

Substantive chemical changes occur in the Arctic atmospheric boundary layer as a result of photochemical reactions in the atmosphere and heterogeneous reactions of gases with aerosols, snow in the atmosphere and snow on the ground. Recent experiments have demonstrated that surface snow in Polar Regions can act as a photochemical reactor influencing concentrations of a wide variety of important tropospheric trace gases like ozone and nitrogen-containing compounds in the atmospheric boundary layer over snow-covered regions. Reactive halogens have an important role in the troposphere processes and the sources of reactive halogens could be from sea-salt in surface snow, aerosols, frost flowers and photodegradable halogenated carbons of biological or anthropogenic origin. These aspects make an integrated study of the coupled cryosphere–atmosphere processes an important element of the polar climate system.

Major Indian Scientific Accomplishments

(a) *Monitoring of Kongsfjorden*

Indian scientists have been continuously monitoring the Kongsfjorden since 2010 for understanding the possible response of this fjord to climate variability at different time scales. The temperature and salinity profiles of the fjord, water column nutrients and diversity of biota are being monitored at close spatio-temporal scales throughout the spring, summer, fall seasons. One of the major constraints in such a study has been the difficulty in reaching the location during the harsh Arctic winter and obtaining near-surface data. A major milestone in India's scientific endeavours

in the Arctic region was achieved on the 23 July, 2014 when a team of scientists successfully deployed IndARC, the country's first multi-sensor moored observatory in the Kongsfjorden. IndARC is programmed to collect sea-truth data at close temporal scales even during the harsh Arctic winter.

(b) *Gruvebadet Atmospheric Observatory*

Measurements of atmospheric aerosols and black carbon have been an integral part of India's atmospheric science studies since 2007. However, paucity of proper laboratory space at Himadri has been a major obstacle in augmenting the instrumentation facilities for atmospheric data collection. This difficulty has been overcome of late with the establishment of a dedicated atmospheric observatory at Gruvebadet in Ny-Ålesund. Instruments such as nephelometer and aethalometer have been installed which have been streaming in data at very high temporal resolution. Microrain radar has also been installed to obtain precipitation characteristics at every one minute interval. The Gruvebadet observatory also serves as an excellent platform for instruments like quartz crystal microbalance, photo acoustic soot spectrometer, transmissometer, micro aethalometer, high volume sampler, optical particle counter, etc.

(c) *Mass balance of Arctic glaciers*

The objective of the Arctic Glaciological Programme is to understand the dynamics and mass budget of Arctic glaciers in the context of climate change. The focus of the study has been on monitoring the mass budget, snout and dynamics of Vestre Broggerbreen glacier at Ny-Ålesund. Another aspect of the measurements is the measurement of glacier velocity and ice thickness thereby computing ice flux. Snout position is also being monitored using differential GPS. Indian researchers have also recently embarked on a mission to target larger glaciers such as Feiringbreen in Svalbard facilitating comparative studies with the glaciers of the Himalayan region.

India's Scientific Engagement in the Arctic: What Next?

The initial footsteps by India in the Arctic have been spectacular, to say the least. The encouraging results of the studies carried out to date have prompted the Indian scientists to look even beyond Ny-Ålesund and initiate research programmes in some of the frontier areas of polar sciences. A new multi-institutional national initiative focusing on the link between the climate variability and change in the Arctic and the Indian summer monsoon at various time scales is also being planned under the Belmont Forum. Some of the key questions that are sought to be addressed in the coming years include:

- Do the Polar Regions drive/modulate/have a say in the global climate? (Did they in the past or will they in the future?) If so, what have been or what are the forcing functions?
- What is the likelihood of abrupt or critical climate and/ or earth system changes resulting from processes in the polar cryosphere?
- What will be the nature of changes in sea-ice distribution and mass balance in response to climate change and variability?
- What will be the impact of changes in the polar cryosphere on the atmospheric and oceanic circulation?
- Why the growth and decay of sea ice around Antarctica and the Arctic behave differently?
- Can the seasonal to annual variations in the hydrochemistry and biota in the Arctic fjords be reflective of the response of the fjords to short-term climatic variability?

Conclusion

The postulated effects of climate change such as rising temperatures, loss of sea ice and melting of ice sheets are said to be felt first and fastest in the Arctic. Any change in the Arctic region can also affect the global climate, sea level, biodiversity, etc. India has dovetailed the country's scientific agenda in the Antarctic region with some major long-term scientific initiatives in the Svalbard area of the Arctic in order to study the trans-hemispheric changes focusing on climate variability and change. Over the years, many long-term scientific programmes in the frontier areas of climate change, glaciology, terrestrial and aquatic ecology and atmospheric sciences have been initiated by the Indian scientists which have been contributing substantially to the international flagship programmes at Ny-Ålesund. Though there have been many accomplishments by the Indian scientists working in the region, much more remains to be done and India is confident of addressing the gaps in scientific research in the forthcoming years.

Acknowledgments The scientific initiative by India in the Arctic realm owes its success to, and derives its sustenance from scientists of several national institutions, organisations and universities. We would like to express our sincere thanks to all of them. In particular, we would like to express our gratitude to Dr. Shailesh Nayak, Secretary, Ministry of Earth Sciences for his abiding interest in the Indian Polar Programme, and to two of our colleagues at NCAOR—Dr. Thamban Meloth and Dr. K. Satheesan for their contributions to this paper.

A Cooperative Maritime Capacity-Sharing Strategy for the Arctic Region: The South Korean Perspective

Sukjoon Yoon

Introduction

This chapter presents a South Korean perspective on the Arctic region [1], and discusses strategies for cooperative maritime capacity-sharing which have been addressed by various governmental, quasi-governmental and non-governmental organizations (NGOs). South Korea's interests in the Arctic region include the maintenance of peace and good order, the development of energy reserves, and the opening of new sea lanes of Communication (SLOC) in the High North.

The Arctic region is being dramatically impacted by climate change, which has led many maritime pundits in South Korea to propose that an "Arctic Bonanza" [2] will materialize, and that this will provide a welcome stimulus to the South Korean economy, which some see is in the danger of stagnating. There are high expectations from this Arctic Bonanza: it will boost Korea's flourishing shipbuilding industry, supply plenty of cheap energy and rare mineral resources, and most importantly, it will create jobs for the new generation of young South Koreans.

South Korea has been a keen supporter of organisations which seek to monitor and manage the ongoing changes in the Arctic region, especially the Arctic Council. This body is the primary intergovernmental organization concerned with the Arctic; its eight member states all have territory within the Arctic region, and there are also 12 non-Arctic nations with observer status, including South Korea.

The policy approach taken by South Korea has explicitly promoted a cooperative strategy of maritime capacity-sharing, seeking to mitigate the adverse effects of climate change and share the benefits of the positive consequences such as the

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opening-up of hitherto impassable shipping routes and the prospect of offshore resource exploitation. South Korea is also committed to safeguarding freedom of navigation in the Arctic Ocean, and maintaining the peace and security of the Arctic region.

Factors Underlying the Changing Maritime Situation in the Arctic Ocean

South Korea is an avid observer of the strategic and economic shifts resulting from the thawing sea ice in the Arctic region. Compared to other maritime areas, the Arctic Ocean remains largely undeveloped and poorly understood. At 5.4 million square miles, it is the smallest of the oceans of the world. Geographically, South Korea is rather remote, but it perceives the Arctic Ocean as an essential frontier which is fast becoming the center of regional and global attention. Thus, for South Korea, the symbolic importance of the anticipated geographical refocusing is scarcely less significant than the expected strategic or economic developments. However, before discussing South Korea's specific interests, it is important to review the context of why the Arctic region has become so important.

The first factor is the relevance of the United Nations Convention on the Law of the Sea (UNCLOS) to the Arctic Ocean. The Arctic region is remarkable in that no one owns the North Pole, and the waters and airspace of the Arctic are unambiguously part of the global commons [3], but when UNCLOS came into force in 1994, the Arctic Ocean became a much more complex and competitive arena [4]. Since 1996, the members of the Arctic Council have made claims of their maritime boundaries; based either upon an Exclusive Economic Zone (EEZ) or upon the Continental Shelf (CS). Under the UNCLOS regime, a state may make an extended claim based upon its CS, which may cover resources on and under the seabed up to 350 nautical miles (nm) offshore or 100 nm from the point where the water depth exceeds 2500 m, whichever is greater [5]. In 2007, a titanium Russian flag was planted on the seabed at the North Pole by the Russian Arctic researcher and member of the Russian State Duma, Artur Chilingarov; this led other members of the Arctic Council to submit documents on their territorial claims to the UN Commission on the Limits of the Continental Shelf (CLCS) [6].

The second factor to be considered is the effect of global warming on shipping. The Arctic sea ice is melting extensively and for longer periods during each successive summer [7]. More areas of the Arctic region are open to navigation than have been for perhaps thousands of years, and it is anticipated that new sea routes will become available which present attractive alternatives to the traditional sea routes and provide considerable cost savings. For instance, the Northern Sea Route (NSR) offers a shorter transit distance than the current sea routes through the Suez Canal and Panama Canals [8]. The distance from Northeast Asian seas to the North Sea via the NSR is 7600 nm and the voyage takes 26 days; by comparison, the

existing single SLOC route through the Suez Canal normally covers 11,300 nm with a transit time of 36 days [9]. There are also security implications, since new routes through the Arctic Ocean offer at least a partial solution to the “Malacca Problem” by providing the energy-hungry East Asian nations with a source of oil and gas from the Barents Sea, a supply which cannot be readily interrupted, unlike that obtained from the Persian Gulf [10].

A third factor drawing global attention to the Arctic is the prospect of global warming allowing substantial reserves of oil and gas to be exploited. South Korea is particularly eager to be involved in the exploration and development of these resources, through a cooperative maritime strategy for the Arctic region, despite the commercial and geographic difficulties [11]. The US geological survey has estimated that approximately 90 billion barrels of technically recoverable oil and 1670 trillion cubic feet of natural gas exist within the Arctic Circle [12]. Alongside the desire to utilize these oil and gas reserves, access to fisheries resources is also an important driver for nations to claim maritime jurisdictional rights in the Arctic Ocean beyond their EEZs.

The fourth factor, which complicates all the others, is the general lack of international coordination on the Arctic region. Compared with other seas, including the Asia-Pacific and Indian Ocean, the Arctic region remains largely undeveloped and scarcely commercialized [13]. Although the Arctic Council has made some progress in fostering cooperation in a few discrete areas, such as search and rescue, and oil-pollution preparedness and response, there is much more to be done; discussions continue on proposals for international collaboration to protect the Arctic marine environment and its resources while allowing some degree of managed development; these plans for Arctic Ocean governance are intended to provide economic benefits in a shared and controlled fashion, whilst stabilizing maritime security in the region.

South Korean Interests and Concerns

It is obvious that South Korea has essential interests and concerns about the changes occurring in the Arctic. With rising tensions between nations which are taking a close interest in the no longer frozen North, South Korea’s most immediate worry are the potential disputes, arising from disagreements between the members of the Arctic Council, on how the regime of UNCLOS should be applied to the Arctic Ocean.

South Korea has consistently sought an active and influential presence in Arctic affairs as part of a reliable and responsible leadership [14]. South Korea is one of the observers at the Arctic Council, and this position is well supported by its research achievements. There are various Korean scientific research institutes contributing to the knowledge and management of the Arctic, including the Korea Polar Research Institute (KOPRI), the Korea Maritime Institute (KMI), the Korea Institute of Ocean Science and Technology (KIOST) and the Korea Institute for

Maritime Strategy (KIMS). These bodies are engaged in formulating long-term plans for the Arctic, and in devising related policies on issues such as Arctic security. Korean scientists have conducted many wide-ranging scientific research studies at Dasan station in the Arctic; this is an international research community located at Ny-Alesund on the high Arctic island of Spitsbergen, part of Norway's Svalbard Archipelago, and is the northern-most permanently inhabited place on the planet. South Korea has also been a member of the International Arctic Science Committee (IASC) since 2002, and has been operating a scientific research ice-breaker, the RV *Araon* since 2010.

The KMI is one of the leading research institutes concerned with formulating South Korea's long-term policies on the Arctic and for articulating its principal interests in Arctic affairs; this entails academic research and the formulation of associated policies on Arctic planning, Arctic governance, resource development, capacity building, and for development of transportation and other logistic arrangements throughout the Arctic Ocean [15]. South Korea regards itself as a pioneer in exploring this new Arctic frontier, and is committed to promoting its maritime capacity-sharing strategy by cooperating with the eight members of the Arctic Council.

There are, however, several issues relating to the Arctic which require closer attention. The first of these issues concerns the significant uncertainties which are impeding cooperative progress in the region. South Korea regards the general approach which governments have so far taken toward the transformational changes in the Arctic region as being rather too optimistic and too adhoc. Conjectured collaborations are all very well, but the real world requires much more work to be done to deal with the possibility of maritime conflicts in the Arctic Ocean, and with each new summer such conflicts become increasingly likely. In order to establish a framework for resolving such disagreements, the Arctic nations must agree on an Arctic regime or system of norms to maintain the peace and stability of the Arctic. There is a lot of optimism about diminishing sea ice, warming seas, and increased maritime traffic, but unless and until a formal cooperative framework is developed to allow the Arctic nations to work together as partners in sharing the opportunities and resources of the region, these prospects cannot be realized [16].

The second issue concerns safety in the Arctic region. With Arctic sea ice continuing to diminish in the foreseeable future, there is the prospect of ever-increasing shipping passing through the Arctic, with the concomitant risks of accidents. South Korea recognizes the importance of a clear code which needs to be established for Arctic navigation to provide safety and security for all vessels using the new Arctic routes. The Arctic Council responded on this issue in 2009 with its Arctic Marine Shipping Assessment, and again in 2011 with the most comprehensive analysis ever undertaken of trends relating through the Arctic region [17]. Thereafter, in November 2014, the International Maritime Organization (IMO) formally adopted the International Code for Ships Operating in Polar Waters (the Polar Code), which is now mandatory for ships operating in Polar regions [18].

The third issue is the worrying possibility of the Arctic region becoming militarized [19]. As activity heats up in the High North, the Arctic Five are seeking to

monopolize maritime rights and interests in the region, and are promoting terms for the implementation of UNCLOS which blatantly undermine the spirit of the regime in three areas: freedom of navigation; the protection of Arctic resources; and the safeguarding of the SLOC. They are also seeking to reinforce their naval strength which would effectively result in the militarization of the Arctic region. Many of the Arctic nations have recently announced national strategies for the Arctic which seek to ensure their independent interests in defense of Arctic territories, several proposing sole maritime jurisdiction and even sovereign rights. The increasing failure to distinguish between maintaining Arctic security and the militarization of the region represents a serious problem for South Korea, which has expressed its growing concern about the presence of some kinds of naval forces in the High North that are demonstrably ill-suited for conducting maritime security operations. Most disturbingly, the Arctic Council has clearly neglected the discussion of Arctic peace and stability which is specified in its mandate, largely to avoid the potentially contentious issues of Arctic military deployments. Such a lack of discussion is further encouraging the competitive militarization of the Arctic region, and this regrettable evasion of the Arctic Council's responsibilities makes it obvious that the cooperative contribution which South Korea is seeking to bring to the table is not only in one country's individual interest: in fact such an approach is beneficial to all parties, since they share a mutual interest in ensuring the security of the Arctic within a wider international cooperative architecture.

Fourthly, it seems only a matter of common-sense that competing Arctic maritime jurisdictional rights and territorial claims should be arbitrated cooperatively through negotiation to establish constructive governance of the Arctic Ocean under the auspices of the Arctic Council. However, some Arctic nations, in particular Russia, seem determined to declare their own EEZ and CS boundaries in such a way as to maximize territorial ambitions in the Arctic. Russia is also building up its ice-breaking naval assets including airfields. At the biennial meeting of the Arctic Council, held on 15 May 2013 in Kiruna, Sweden, geopolitical maneuvering of this kind exposed the Arctic Council's failure to preserve the Arctic region as a global commons. The struggle to promote competing claims of national sovereignty, and to undercut the activities of erstwhile enemies and current rivals in the region, has resulted in a growing military footprint in the Arctic [20].

Thus, there are several issues which represent a threat to South Korean hopes of lucrative potential benefits from the Arctic, whether from using the new sea routes or from exploiting the region's energy and other resources. South Koreans would therefore be well advised to tone down their ambitious expectations to conform to the practical realities of the situation. Furthermore, the protection of the Arctic environment cannot be considered as a single issue, but rather requires multilateral solutions to preserve, secure and take advantage of the Arctic commons. South Korea continues to argue that the interests of all parties are best served by compromising on individual interests to safeguard the peace and stability of the Arctic Ocean, and remain committed to this common-sense approach by seeking out whatever constructive allies or functions can be identified.

When the US announced its new National Strategy for the Arctic Region, the most immediate question was whether the US vision for the future of the Arctic represented any kind of maritime capacity-sharing [21]. Although physical conflict in the Arctic is generally agreed to be remarkably unlikely, it is essential to establish a framework of cooperative governance for the Arctic Ocean so that disputes can be resolved through diplomatic principles, and the region can be anchored in peace and stability [22]. The current situation is serious, but has not yet got out of hand. Without explicit support from the non-Arctic nations, it seems unlikely that the Arctic Council, including the US, would move toward a flagrant power grab. Moreover, some of the other stakeholders, especially the Northeast Asian nations, who are all observers, have launched a variety of scientific and technological programs with state-of-the-art approaches to dealing with the difficult environment, and these may provide some major breakthroughs to accelerate the development in the Arctic Ocean. The significant financial investments made by the non-Arctic nations, and the increasingly diverse multilateral Arctic activities which they are now pursuing cannot be ignored by the members of the Arctic Council. It becomes even more obvious that there is a need for sound Arctic Ocean governance, which can only happen if the Arctic nations cooperate with the non-Arctic nations to pool their knowledge to make reasonable, effective and practical decisions.

The most intractable issues and challenges of the Arctic Ocean appear to be interconnected, and there is considerable support for the principle that no single problem can be addressed independently; rather, they should be dealt with through a holistic and comprehensive approach. Indeed, applying the principles of pursuing sustainable development and preserving the local culture and traditions of the High North, the Arctic Ocean should be used for the universal benefit of humanity.

South Korea's Long-Term Approach to the Arctic

As mentioned earlier, there are several reasons why South Korea's maritime interests in the Arctic region are interconnected with practical matters of national security, and the South Korean approach to the Arctic is therefore focused on long-term concerns. First, the scientific and technical research institutes in South Korea which study maritime issues provide policy recommendations for the South Korean government are major drivers of practical long-term strategies for managing the Arctic Ocean region. South Korean President Park Geun-hye recently articulated an ambitious program, "creative national science development strategy", which will support a world-class program of scientific research and survey activities, and will provide opportunities for young scientists to address key issues of global or fundamental importance which require access to the Arctic [23]. Many of these research studies and programs are cooperative endeavors involving members of the Arctic Council.

Second, South Korea is making significant progress in reducing its reliance on imported energy resources, the routes through which these resources are transported

depend upon a single SLOC which is narrow and congested, passing through international straits such as the Malacca Strait and the Suez Canal. South Korea considers the Arctic as a domain of strategic significance, offering the possibility of acquiring the rights to mine rare earth minerals in the region, and by building a larger icebreaker fleet, it will be possible to diversify the strategically critical transportation routes. In support of these aims, South Korea is also developing large-scale Arctic research programs as well as bilateral commercial and economic relations with smaller Arctic states such as Iceland and Denmark. South Korea is investing in joint energy, mineral exploitation and navigation projects, and is promoting the development of bilateral trade in the Arctic region, such as the Yamal project [24].

Third, as an observer to the Arctic Council, South Korea enjoys a particularly advantageous position, being an established maritime power with a significant contribution through cooperative maritime capacity-sharing strategy. South Korea is the only non-Arctic nation with a capacity for designing and building icebreakers and other technical facilities required for the development of the Arctic energy and shipping. It is also one of the handful of non-Arctic nations present at the Arctic science and environmental research base at Svalbard in Norway. South Korea is currently planning to build a new icebreaker, and also to expand the scale and functions of its research on Svalbard [25].

Fourth, South Korea is demonstrating its long-term commitment to the Arctic by investing in the anticipated changes in the Arctic climate and by reducing its dependence upon fossil fuels. In 2005, the South Korean Ministry of Oceans and Fisheries Affairs (MOFA) articulated the long-term principles of its Arctic Strategy for 2020 and beyond, which encompasses sustainable development as well as security issues [26]. In 2013, the South Korean government released a “Master Plan for Arctic Issues” (MPAI) which defines the scope of polar science and engineering research in the Arctic and Antarctic, including issues of energy and food security. The MPAI includes eight policy items on international cooperation, eleven on scientific research projects, ten on business areas related to the Arctic region, and two on legal issues [27].

South Korea’s Arctic Strategy

These plans encapsulate South Korea’s constructive attitude and gives details of its efforts to achieve the three goals of its Arctic Strategy, which are:

- (a) Building partnership with members of the Arctic Council;
- (b) Stepping up global environmental science and engineering research in the Arctic; and
- (c) Creating new business opportunities in the Arctic and developing bilateral economic relationships with Arctic nations to secure stable energy supplies [28].

It is hoped that South Korea's contribution-based strategy would allow it to play a major role in the development of Arctic energy, both as an industrial partner and as an 'investor in and buyer of' energy.

Regarding the NSR, South Korea can be expected to encourage designing and building icebreakers which can enable safe commercial passage through the NSR. Major South Korean shipbuilders are involved in contributing to the exploitation of new sea routes and for sustainable energy development. For example, Daewoo Shipbuilding & Marine Engineering (DSME) recently won a contract for up to 16 ARC-7 ice-class tankers for shipment of LNG from Russia's Yamal Project [29]. However, there are reports that under the sanctions from European Union including United States, financial problems are affecting the payments to DSME [30].

The South Korean government, together with a commercial shipping company, Hyundai Glovis, planned and conducted a pilot navigation through the NSR from September 16 to October 21, 2013. This was made by the ice-class Norwegian carrier "Stena Polaris" which took 35 days to cover a distance of 15,500 km, carrying 37,000 tons of naphtha from the Russian port of Ust-Luga to Kyungyang in South Korea. This was a clear indication that the South Korean government and the national shipping companies intend to use the NSR for regular shipping [31].

The South Korean government also has to consider its long-term plan for energy security, transitioning from its current interim policy, which is likely to make use of both the traditional suppliers and some emerging ones, including Russia. Renewable energy is expected to provide a greater contribution, and perhaps also shale gas from the US; but there will also be new energy from Arctic oil and gas, which needs to be included in the government's plans, including cooperation with domestic energy companies, such as the Korea National Oil Corporation (KNOC) and the Korea Gas Corporation (KOGAS). These companies are pursuing overseas exploration and development encouraged by Lee Myeongbak's "Energy Diplomacy" [32]. Thus, in 2011, KOGAS acquired a 20 % share in the Umiak Gas Field in the Mackenzie River Delta from a Canadian company, MGM Energy, which is the first South Korean investment in a polar energy project [33].

South Korea's provincial governments are also hoping to benefit from the Arctic Bonanza, and are pressurizing the government to provide support for an Arctic business network [34]. Under this catchphrase, the provinces adjoining the East Sea of the Korean Peninsula are seeking investment to expand and update older ports, and to refurbish industrial facilities and boost economic growth, justifying plans by taking into account the anticipated benefits from the opening of Arctic sea route including growth in container traffic and the import of cheap energy. Donghae, Ulsan and Pohang on Korea's east coast are trying to set themselves up as plausible competitors with Pyeongtaek and Incheon, which are on the Yellow Sea and close to China. There are many new initiatives to establish enhanced transportation links with China, such as ferries which carry trains [35], and the east coast ports would like to get into the act. Even Busan, South Korea's largest port-city, is talking of "Arctic Bonanza", and promoting itself as the natural focus for maritime-related institutions and universities, fisheries industries and shipping companies [36].

A particularly significant policy is President Park Geun-hye's "Eurasia Initiative", which is an ambitious plan to build energy and logistics links with Eurasian markets, connecting the Korean Peninsula with China and Russia, and beyond to Europe [37]. The Eurasian landmass contains vast undeveloped energy resources, and South Korea has particular interest in securing supplies from Russia's Sakhalin Island gas fields through North Korea [38]. Such a scheme is seemingly more feasible since Choi Yeon-hye, the president and CEO of the Korea Railroad Corp. led a South Korean delegation to the Organization for Co-operation between Railways meeting held April 24–28, 2014, where Russian rail officials were also present [39]. Such access to an Arctic energy source would represent a new energy strategy for South Korea, diversifying away from Middle East sources and Southeast Asian SLOC. In the wake of Russia's clash with the US and the EU over Ukraine, and the precipitous fall in international oil prices, it is likely that Russia will be keen to sign a deal to supply South Korea.

In essence, the fundamentals of South Korea's Arctic strategy are based on maritime cooperation and capacity-sharing, and through liaison with the Arctic Council, South Korea hopes that different parties will take varied roles and functions in the management and development of High North, according to different circumstances. South Korea can provide maritime resources, shipbuilding capacity, and the education and training required to develop qualified human resources, and can help build a cooperative approach to utilize and benefit from the Arctic's geostrategic value. The prospect for such a win-win outcome is very much in line with South Korean President Park Geun-hye's active "middle-power-oriented diplomacy" formula in the National Security Strategy published May 2014 [40].

Domestic Arguments About South Korea's Arctic Bonanza

South Korea's long-term strategic vision for the Arctic and the proposed activities has resulted in a heated debate within the country. Is it worth investing substantial amounts of time and effort and money to try to take advantage of this putative Arctic Bonanza, or are these plans overambitious and the anticipated benefits greatly exaggerated? The debate has encompassed all South Korean maritime institutes and organizations, including governmental bodies, and provincial governments looking for economic development which they expect from the so-called "East Sea Rim Community". Many organizations are involved in projects to study and develop the Arctic, including some prestigious independent non-profit institutions. KORDI is operating the icebreaker ARAON, the first to be built in Korea, and there are also KMI, KIOST, KIMS, and other academic institutes in South Korean Universities pursuing maritime research, such as the Korean National Maritime University in Busan. KIMS has its own private funds for research projects, but the others are competing against each other for government funding, which has lately been growing.

Many pundits are describing the future dividends from South Korea's Arctic strategy as a bonanza which will rival the achievements of the "Miracle on the Han River", the unprecedented economic growth which South Korea enjoyed between the 1960s and the 1980s [41]. South Korea's economy is currently highly dependent upon a single SLOC through the narrow and crowded Malacca Strait in Southeast Asia, especially for access to mineral and hydrocarbon resources. South Korea is also poor in energy resources, and it imports energy from outside the region. Being remote from the available energy resources, South Korea incurs an "East Asian premium" on energy prices. Thus, the prospect of securing timely and cost-effective supplies of Arctic oil and gas has significant ramifications for the energy security of the nation and its economy [42]. Arctic energy could be carried from the High North by land or by sea. Although Russia still maintains relationship with North Korea, the possibility of opening up the land route remains doubtful and hence South Korea would have to prioritize the sea route.

Some Caveats

There are many challenges which need to be overcome before ships operate routinely in the NSR under conditions of thawing sea ice such as, ship design and engineering standards. New equipment and operations will be required, with unusual demands on the highly trained workforce, including the need for a qualified ice navigator. Moreover, any South Korean investment in Russian Arctic oil and gas would face the opaqueness and the threat of government meddling, which is so characteristic of the Russian federation, which leads to significantly higher financial risks in the future [43].

As and when the NSR becomes a seasonal alternative to the existing single-path SLOC through the Malacca strait and the Suez Canal, the Arctic Ocean will remain a uniquely hazardous region for ships to operate in, even with the adoption of the new polar code. South Korean shipbuilders have been very proactive in building advanced ice-class ships capable of Arctic navigation, as well as offshore oil and gas rig platforms intended for Arctic use. These innovations allow South Korea to develop capabilities which are complementary to other members of the Arctic Council, and this maritime capacity-sharing strategy will contribute significantly to making navigation in the Arctic a safe activity in the near future.

Currently, Arctic routes do not offer an attractive alternative to the more traditional maritime routes and they are unlikely to do so for some time. Further, Chinese labor is growing increasingly expensive, and the recently proposed "Twenty-first Century Maritime Silk Road" of Chinese President Xi Jinping, is pushing Chinese manufacturing to be outsourced to Southeast Asia where costs are lower, and Arctic routes offer little advantage [44]. There is also a shift toward near-shoring, i.e. moving manufacturing closer to markets. Although a direct transit across the Arctic is shorter, the Arctic route is not appropriate where it is necessary to service a number of intermediate ports, or to call at a major transshipment hub

such as Singapore. Finally, when the NSR is considered actively by commercial shipping companies, it becomes clear that it may not compete on cost. Thus, Hyundai Glovis has not repeated its pilot navigation through the NSR after 2013 [45]. A study by a US scholar confirms this; taking into account the total cost for each twenty-foot equivalent container unit, the NSR does not constitute a cheaper transit option once the containership's capacity is considered, this being constrained by the beam restrictions necessary to provide adequate visibility with ice and other hazards [46].

South Korea's Constructive Role

There is no question that the Arctic is becoming ever more accessible, and may be even ice-free by 2050 and there would be increasing commercial presence in the Arctic. However, ensuring that the appropriate Arctic policy choices are made requires an understanding of the types of the Arctic maritime activity, and a realistic assessment of Arctic trading volumes. South Korea's proposed commitments under the maritime capacity-sharing strategy of its long-term Arctic policies have been articulated by MOFA in 2013:

- (a) South Korea will respect international law and expects other countries to do likewise: the Arctic does not belong to any particular party, and Arctic security is an international issue.
- (b) South Korea is a keen supporter of the prevailing international maritime policies on the Arctic, and is actively working to maintain the current stable and conflict-free status of the Arctic region.
- (c) South Korea anticipates a future in which this situation continues, and therefore believes in prioritizing approaches which minimize its Arctic risks in this increasingly important region around the North Pole.
- (d) South Korea will continue to make a useful contribution, through its maritime capacity-sharing measures, as part of a regional commitment to Arctic security.
- (e) By expanding its active bilateral cooperation with the Arctic Council members, South Korea will make every effort to resolve outstanding practical problems.

It is clear from these policies that South Korea is committed to responsible stewardship of the Arctic region; and since achieving permanent observer status of the Arctic Council in May 2013, South Korea has made every effort to encourage all other Arctic stakeholders to adopt a similar strategy of maritime capacity-sharing. Only through such a cooperative approach will it be possible to mitigate the adverse effects of climate change and share the benefits of the positive consequences such as the opening-up of new shipping routes and the prospect of maritime resource exploitation.

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Singapore and the Arctic: Tropical Country, Polar Interests

Ian Storey

At first blush, Singapore is not an obvious contender for a country that has interests in the Arctic, much less a role to play in the Arctic Council, the region's premier intergovernmental forum. Singapore's latitude is 1 degree north—65 degrees south of the Arctic Circle. The equator is only 85 miles (137 km) south of Singapore, while the North Pole lies 6127 miles (9869 kilometres) to the north. The climate is tropical: daily temperatures typically range from 25 to 30 °C; the lowest minimum temperature ever recorded in Singapore was a balmy 19.4 °C on 31 January 1934 [1]. Conversely, winter temperatures can drop below minus 50 °C over large parts of the Arctic. Unlike China, Japan, India and South Korea, Singapore is not a signatory to the Svalbard Treaty and has no history of polar scientific research. To many, Singapore might appear as the consummate Arctic outsider.

And yet, on 15 May 2013, Singapore, together with its Asian neighbours China, Japan, South Korea and India, was granted observer status to the Arctic Council. Since then Singaporean officials have attended nearly every meeting, actively participated in several of the working groups and task forces, and delivered speeches at important annual Arctic conferences that bring together scientists, policy makers, security practitioners, businesspeople and academics. Quietly and modestly, Singapore is building its Arctic credentials, and people are noticing.

This chapter explores Singapore's interests in the High North and the contributions it hopes it can make in the management of regional problems and Arctic governance. It begins by identifying three major interests. First, global governance issues, especially climate change which could pose a serious threat to the low-lying

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island in the coming decades. Second, how longer navigational seasons on the Northern Sea Route (NSR) might impact Singapore's position as one of the world's busiest shipping hubs. Third, the potential commercial opportunities open to Singapore's offshore oil and gas industries. The chapter goes on to outline Singapore's successful diplomatic campaign to become an observer to the Arctic Council, and its contributions to the organization since May 2013. It concludes by discussing whether pan-Asian cooperation in the Arctic is desirable, or even possible.

Singapore's Interests in the High North

As mentioned above, Singapore has three broad interests in the Arctic: engaging with issues pertaining to global governance; Arctic shipping lanes; and commercial maritime opportunities. Before going on to examine each of these issues in detail, we should mention two important areas in which Singapore has not evinced a direct interest: geopolitical and strategic interests; and hydrocarbons and minerals.

The eight countries that make up the Arctic Council—Canada, Denmark (via Greenland and the Faroe Islands), Finland, Iceland, Norway, Russia, Sweden and the United States—all have vital strategic interests in the High North. Canada, Denmark, Norway, Russia and the United States have Arctic coastlines, while Finland, Iceland and Sweden have territories in the Arctic. With the exception of Iceland—which only has a coast guard—each of these states station armed forces in their Arctic territories, including in the air and at sea. During the Cold War, the Arctic was a major theatre of strategic rivalry between the United States and the Soviet Union, with nuclear ballistic submarines lurking beneath the ice. Following the end of the Cold War, the strategic value of the High North declined. Since the mid-2000s, however, there has been a modest increase in military activities in the region, particularly by Russia, Canada and Norway, though predictions of armed conflict in the Arctic have been widely exaggerated. Nevertheless, as political tensions between Russia and the West have intensified over the annexation of the Crimea in March 2014 and the on-going crisis in the eastern Ukraine, there has been a worrying increase in incidents involving Russian military aircraft and those from Norway, Sweden, Denmark and Finland. Thus far, however, rising tensions have not yet impacted political cooperation at the Arctic Council, though this situation may change over time [2]. As a small state located far from the region, and with very limited power projection capabilities, Singapore does not have a direct strategic interest in the Arctic, though events in one part of the world can affect the global city's economic fortunes. Singapore's strategic interests remain firmly located in maritime Southeast Asia, especially on the Malay Peninsula, the Straits of Singapore and Malacca, and in the South China Sea.

Melting ice has raised the prospect of easier access to energy and mineral resources in the Arctic region. Indeed the resources factor has been a key driver of heightened international interest in the High North since the turn of the new century. In 2010, the United States Geological Survey estimated the Arctic could

contain 90 billion barrels of oil and 1669 trillion cubic square feet of gas—13 and 30 % of estimated total global undiscovered oil and gas respectively—though the methodology used to make those estimates has been challenged [3]. Nevertheless, whatever the true extent of Arctic hydrocarbon resources, and their commercial viability, Singapore does not have a direct interest in exploiting them because its energy needs are not as large as the economic powerhouses of Northeast Asia, i.e. China, Japan and South Korea, and in any case its requirements are adequately fulfilled by the global energy market.

Global Governance and Climate Change

Since independence in 1965, Singapore has worked assiduously to position itself as an international financial, shipping and aviation hub. By the late twentieth century, Singapore had successfully transformed itself into a global hub for a variety of commercial activities, and it would not be an exaggeration to say that the city-state had become the poster child for globalization. In becoming a global city, Singapore adopted a proactive approach to joining global governance forums and institutions so that it could help shape positive outcomes in areas that affected the city-state's core interests, such as ocean management, international shipping and maritime legal regimes.

One of the most serious global governance challenges is climate change. According to the most recent report by the United Nation's Intergovernmental Panel on Climate Change (IPPC), the effects of global warming are likely to be increasingly "severe, pervasive and irreversible" [4]. The impact of global warming on weather patterns in Asia is readily apparent. According to the Asian Disaster Reduction Centre, Asia is the most natural disaster prone area in the world [5], and the frequency and intensity of weather-related catastrophes such as floods and typhoons is increasing. Singapore is not immune from these changes. The city-state is predicted to become hotter and wetter, and this will exacerbate existing problems such as flooding, water scarcity and the spread of tropical diseases such as dengue [6]. Of particular concern to the government is rising sea levels, caused in part by the melting of Greenland's ice sheet. Singapore is located only 15 metres above sea level and coastal erosion is a serious concern. Post-independence, Singapore's leaders and officials have tended to take a Hobbesian view of the world, and it is one of the very few countries that periodically expresses concern about its "survival". In the past, existential threats were seen as largely geopolitical in nature, but this now extends to climate change. As Singapore's Senior Arctic Official Simon Wong wrote in 2014, "Global warming and rising sea levels will have a profound and direct impact on our *survival*" (emphasis added) [7]. In anticipation of this threat, the government issued new rules in 2011 to raise the height of reclamation projects from 1.25 to 2.35 m [8]. As sea levels continue to rise, much more will have to be done in the coming decades to meet this challenge.

Singapore needs to better understand how the climate is changing in order to implement further mitigation and adaptation measures. In 2013 the government established the Centre for Climate Research Singapore (CCRS) under the Meteorological Service. The aim of CCRS is to increase research on global warming and improve climate predictions for Southeast Asia as a whole [9]. However, unlike the other four Asian countries that became observers to the Arctic Council, Singapore does not have a track record of polar scientific research, nor are there any plans to establish a research station at Svalbard or other locations in the Arctic. Nevertheless, through its participation in Council meetings and in the working groups, Singapore hopes to learn more about environmental changes in the High North, where temperatures are rising twice as fast as in other parts of the world.

The Pros and Cons of Arctic Shipping Routes [10]

Sea ice retreat in the Arctic, caused by global warming, has opened the prospect of longer navigational seasons on maritime trade routes between Europe and Asia, and between North America and Asia. Sea-borne trade is Singapore's life-blood. The city-state has the highest trade to GDP ratio in the world at around 400 % [11]. After Shanghai, the port of Singapore is the second busiest in the world: in 2014 it handled 580.79 million tonnes of cargo, including 33.87 million twenty-foot equivalent units (TEUs) of containers [12]. Given the country's dependence on maritime trade it is hardly surprising that the opening of Arctic sea routes has aroused interest in Singapore.

There are three main Arctic maritime trade routes that connect the Atlantic and Pacific Oceans and provide a shortcut between Europe and Asia, and North America and Asia. The Trans-Polar Route, across the North Pole, is the shortest passage but is not currently commercially viable due to the year-round presence of thick ice. This situation is not expected to change until the second half of this century. The Northwest Passage, which passes through the Canadian Arctic, is also unlikely to become a major trans-Arctic trade route for the foreseeable future due to complex geography and the presence of multiyear ice [13]. It is the NSR, which stretches from Murmansk in northern Russia, across the top of Siberia and down through the Bering Straits, which Singapore is paying the most attention to.

The NSR offers reduced sailing times of 30–50 % for ships travelling between Europe and Asia. For example, between London and Yokohama, the distance on the NSR is 7474 nautical miles compared to 11,447 nautical miles on the Suez-Malacca route or 12,581 nautical miles via the Panama Canal [14]. Due to the development of energy and mineral resources in the Barents Sea, and longer navigational seasons in the summer, traffic on the NSR underwent a growth spurt between 2010 and 2013. According to the Northern Sea Route Information Office (NSRIO), 71 vessels used the NSR in 2013, an increase from 46 and 41 in 2012 and 2011 respectively, and just four vessels in 2010 [15]. In 2014, however, the number

of vessels which transited the NSR, either or in whole or in part, fell to 53, a 25 % reduction. Moreover, while in 2013, 20 ships made the journey from Europe to Asia (or vice versa), according to the statistics provided by NSRIO, not a single vessel sailed between a European and Asian port: every single transit was between ports in Russia. Cargo volume also dropped by almost 80 % on the previous year—from 1,355,897 tonnes to 274,000 tonnes—a far cry from the peak of 7 million tonnes in 1987 during Soviet times [16]. Lower traffic seems to have been the result of the presence of dangerous ice floes, while Western sanctions on Russia may have affected destination shipping. At any rate, the 2014 transit figures demonstrate that shipping traffic along the NSR will not experience linear growth. Besides, when compared to other maritime passages, the number of ships using the NSR is singularly unimpressive: in 2013, 16,596 ships sailed through the Suez Canal while 77,972 transited through the Straits of Malacca (over 100,000 when local traffic is included) [17].

While traffic volume on the NSR is expected to increase over the next few decades, for a number of reasons, few observers expect that it will grow to rival established maritime trade routes.

First, upgrading the NSR's physical infrastructure (which atrophied after the dissolution of the Soviet Union in 1991) and improving navigational, meteorological and Search And Rescue (SAR) services will require massive investment. Russia does not possess the financial wherewithal to do it alone. Instead it has looked to Asian investors, but so far they have yet to step up to the financial plate. Even China, Russia's closest partner in Asia, seems to have lost its enthusiasm for the NSR, and instead is actively promoting its multi-billion dollar twenty-first century Maritime Silk Road (MSR), an initiative to strengthen infrastructure along existing shipping routes in Southeast and South Asia.

Second, the Arctic is rich in natural resources, but their scale and commercial viability remains open to question. Developing Arctic resources will be technically challenging and very expensive; exploiting energy and mineral resources in other parts of the world such as the Middle East, Africa and South America, is much cheaper—especially since the price of oil has plunged to less than \$50 per barrel—which renders a distinct advantage to the existing shipping lanes that pass through Southeast to Northeast Asia.

Third, and perhaps most importantly from the perspective of Singapore, a major transshipment hub, the economics of conducting shipping on the NSR is suboptimal. To improve economies of scale, and hence profit margins, shipping lines are investing in ever larger vessels; the new generation of container ships has a cargo capacity of 18,000-plus TEUs. But due to draft and beam restrictions imposed by shallow waters and narrow straits on sections of the NSR, the largest container ships that can use the route have a maximum capacity of around 4000 TEUs [18]. Thus, while it may be faster for a container ship to use the NSR than the Suez-Malacca route, the cost per container could actually be much higher due to limitations on the size of the ship. In addition, harsh and unpredictable weather conditions on the NSR—such as the kind witnessed in 2014—affect scheduled delivery, on which profitable container shipping depends, while the absence of major ports reduces

opportunities to trade along the way. Shipping companies must also factor in the costs of Arctic proofing vessels, providing special training for crew members, compulsory icebreaker escort fees, and elevated insurance rates due to severe weather conditions and the lack of SAR facilities.

As sea ice continues to retreat, the volume of traffic on the NSR will undoubtedly grow. However, for the reasons identified above, the NSR is unlikely to rival high-traffic maritime routes such as the Suez-Malacca passage for decades—if ever. An increase in trans-Arctic shipping along the NSR will benefit ports in Northeast Asia and therefore may result in the diversion of some traffic from Singapore. But the precise impact on Singapore's bottom line is impossible to estimate at this time due to a host of uncertain variables such as future world trade patterns, advances in technology and global energy demand. What can be said with certainty, however, is that Singapore is much more concerned with the immediate challenge posed by the development of ports—and container terminals in particular—in neighbouring Southeast Asian countries, such as Malaysia, Indonesia and Vietnam, than the threat posed by sea-borne traffic on Arctic shipping lanes.

Opportunities for Singapore's Offshore Industries

As noted earlier, Singapore has neither the capabilities nor interest in developing Arctic energy resources. Yet Singaporean companies are keen to market shipping and offshore technologies to the energy firms working to explore Arctic oil and gas fields. However, given the dramatic decreases in oil prices in 2014–2015, together with Western sanctions triggered by the Ukraine Crisis, the High North is unlikely to be a cash cow for Singapore firms any time soon.

Singapore's maritime industry is a key component of the island state's economy. According to the Association of Singapore Marine Industries, in 2012 the sector employed 100,000 workers and generated nearly US\$12 billion in revenue [19]. Singapore's offshore engineering industry is world class, and has captured nearly 70 % of the global market for self-elevating mobile drilling platforms—also known as jack-up oil rigs—and floating production, storage and off-loading (FPSO) units used in the production and processing of hydrocarbons [20]. In 2013, Keppel Fels, a unit of Keppel Offshore and Marine, entered the Guinness Book of Records as the world's largest offshore rig builder, delivering 21 jack-up rigs [21]. Keppel and other companies have designed and constructed ice-capable vessels for use in Arctic conditions and in 2008, Keppel delivered seven ice-class vessels—including two small icebreakers—to the Russian energy company Lukoil [22].

Nevertheless, for the moment, Arctic-proof vessels remain a niche market. Keppel currently has only four ice-class vessels on its order books [23]. Singapore offshore firms face stiff competition from rivals in other parts of the world, especially Chinese shipbuilders which can provide cheaper, though technologically less sophisticated, vessels [24]. Moreover, the rapid fall in oil prices—from \$115 to under \$50 per barrel—in 2014–2015 due to increased supply and falling demand,

has also dampened demand for offshore technologies. As a result, shares in Singapore's two major offshore engineering companies, Keppel and Sembcorp Marine, fell 20 and 27 % respectively in the second half of 2014 [25]. And while Singapore has not followed the United States and European Union (EU) in applying sanctions on Russia's Arctic energy projects, the slowdown in those and other projects in the High North will limit Singapore companies' ambitions to provide offshore technologies to develop Arctic resources for the foreseeable future.

Singapore and the Arctic Council

Motivated by global governance issues, potential commercial opportunities and challenges posed by rapid sea ice retreat in the High North, in December 2011, Singapore submitted its application for observer status to the Arctic Council. Two and half years later that application was successful, and the city-state became one of five Asian countries to become accredited to the Council, and the only one from Southeast Asia [26].

The opportunity for Singapore to lodge an application arose in May 2011 when the organization issued criteria for accreditation and the role observers would play. Canada and Russia in particular had privately expressed reservations about allowing Asian states to participate in the workings of the Council because of fears that the influence of Arctic states would be diluted and that their sovereignty would be challenged [27]. To assuage these concerns, the Arctic Council issued seven criteria that potential observers had to adhere to: to accept and support the objectives of the Arctic Council; recognize the Arctic states' sovereignty and jurisdiction in the Arctic; recognize that existing legal frameworks, notably the United Nations Convention on the Law of the Sea (UNCLOS), apply to the management of the Arctic Ocean; respect the values, rights and cultures of Arctic indigenous peoples; demonstrate a willingness and financial ability to contribute to the work of the Permanent Participant organizations that represent the indigenous populations of the Arctic; demonstrate expertise relevant to the Arctic Council; and show a willingness to bring Arctic issues to global decision-making bodies [28]. Once accredited, observers were to be invited to attend meetings, engage with the six working groups and could propose projects through an Arctic state or a Permanent Participant [29].

Singapore unequivocally accepted the new criteria, and quickly launched a diplomatic campaign to secure observer status. The effort was led by veteran diplomat Ambassador Kemal Siddique, who was appointed Special Envoy for Arctic Affairs in January 2012. Over the next year and a half, Siddique and his team conducted an energetic campaign designed to persuade the Arctic Council members that Singapore had legitimate interests in the High North and could make a meaningful contribution to regional management and governance.

As with Southeast Asia, the Arctic is quintessentially a maritime domain, and Singapore could point to a long and successful engagement in maritime affairs.

Singapore had played an active role in the nine years of discussions that led to the adoption of UNCLOS in 1982. Indeed it was under Singapore law professor Tommy Koh's presidency of the Third United Nations Convention on the Law of the Sea from 1980 to 1982 that consensus was finally reached. Singapore has also been a proactive member of the United Nation's International Maritime Organization (IMO). The city-state joined the IMO a year after independence and since 1993 has been re-elected every two years to the organization's Council which supervises the work of the IMO [30]. Singapore was an advocate of the IMO's mandatory Polar Code which was adopted in November 2014, to improve shipping safety and environmental protection in the Arctic and Antarctica, and which is expected to enter into force in 2017 [31].

Singapore was also able to offer specific expertise to three of the Council's working groups: the Conservation of Arctic Flora and Fauna (CAFF); Protection of the Marine Environment (PAME); and Emergency Prevention, Preparedness and Response (EPPR). With regards to CAFF, Singapore is situated on the major flight path for Arctic migratory birds known as the East Asian-Australasian Flyway (EAAF). As Arctic migratory birds spend time at Singapore's Sungei Buloh Wetlands Reserve and other areas during winter in the northern hemisphere, Singapore could point to important Arctic conservation work. Singaporean officials were able to offer considerable expertise in oil-spill response (most recently, for instance, in January 2015 when a tanker spilled 4500 tonnes of crude oil off the country's northeast coast) [32] as well as SAR activities to EPPR and PAME. During the lobbying process, Singapore was also attentive to the interests of the Permanent Participants. In June 2012, it hosted a study visit by members of indigenous Arctic communities, who learned about Singapore's successful urban management initiatives [33]. Additionally, Singapore offered to partner with Arctic Council members to develop training programmes for indigenous Arctic communities through its Third Country Training Programme [34].

As noted earlier, Canada and Russia were not enthusiastic about the applications of Asian states, though the Nordic members were generally supportive, as was the United States when the final decision was made. And while Singapore could offer substantial maritime expertise, its lack of polar scientific experience was seen by some member states as a glaring omission in the city-state's Arctic resume [35]. Nevertheless, at the 8th Ministerial Meeting in Kiruna, Sweden, Singapore's application was accepted, along with those from China, India, Japan, South Korea and Italy (though EU accreditation was deferred).

Since gaining observer status, Singapore has regularly attended Arctic Council meetings and engaged with CAFF, PAME and EPPR, as well as the Arctic Marine Oil Pollution Prevention Task Force. The Maritime Port Authority has shared its experiences with the working groups on oil-spill clean ups, and Singapore is working with Norway on unmanned aerial vehicles (UAVs) to monitor oil spills and other incidents [36]. In November 2014, the city-state hosted a second study visit by representatives from the Permanent Participants [37]. Singaporean officials have also been enthusiastic attendees of the major annual Arctic conferences,

including ‘Arctic Frontiers’ in Tromsø, Norway and the Arctic Circle Assembly in Reykjavik, Iceland. Minister of State in the Prime Minister’s Office, Mr. Sam Tan Chin Siong, delivered well-received speeches at the Arctic Circle Assembly in 2013 and 2014, and the Arctic Frontiers conference in 2015. In November 2015, in conjunction with the World Ocean Council’s Third Sustainable Oceans Summit, Singapore hosted a one-day conference of the Arctic Circle Assembly. Through such activities, Singapore is quickly establishing credibility in Arctic issues.

Pan-Asian Cooperation at the Arctic?

Should Singapore, China, Japan, South Korea and India increase collaboration and even coordination at the Arctic Council? Or should cooperative initiatives in the High North be pursued through bilateral or multilateral agreements outside of the framework of the organization?

At one level there is a clear logic for pan-Asian cooperation over Arctic issues. The Arctic interests of the five Asian countries overlap significantly. All five have a long track record in participating in regional and international forums that address global governance issues. And it is not uncommon for like-minded states with shared interests to form caucuses within those forums, such as the Forum of Small States at the UN which was established by Singapore in 1992 [38]. Climate change is adversely affecting weather patterns across the continent and the impact of global warming is a shared concern. Energy-hungry and resource-poor China, Japan and South Korea are enthusiastic about the potential for Arctic hydrocarbons—though this enthusiasm has yet to be translated into significant investments in oil and gas development projects in the High North—and for both energy and mineral resources to be shipped to Northeast Asia along the NSR.

There are, however, impediments to greater cooperation among the five Asian states when it comes to Arctic issues. The first concerns how a pan-Asian approach might be perceived by certain members of the Arctic Council. As mentioned earlier, both Canada and Russia had reservations about approving Asian countries’ applications for observer status, and to take account of these concerns the admission criteria were designed to constrict the roles of observer states. A pan-Asian approach at the Arctic Council might feed into fears that Asian states are seeking greater influence within the organization. Singapore seems to be acutely conscious of these concerns. In discussions with the author, Singaporean diplomats stressed that the country’s application to become an observer was based purely on the city-state’s national interests, and that it did not consult, let alone coordinate with, the other Asian countries that were also applying for accreditation [39]. Instead, Singapore seems to have chosen Norway as its ‘partner of choice’ on the Arctic Council, perhaps due to similar population sizes and shared maritime interests.

The second impediment is the current state of bilateral relations between several of the Asian observers, especially China, Japan and South Korea. Since 2012,

Sino-Japanese relations have plunged to their lowest levels since the end of the Second World War, due to a combination of historical animosity over Japan's invasion of China in the 1930s, geopolitical rivalry which has been exacerbated as China has eclipsed Japan in both economic and military power, and rising tensions over the disputed Senkaku/Diaoyu Islands in the East China Sea. Since the government of Prime Minister Shinzo Abe took office in December 2012, Tokyo's relations with Seoul have also plummeted over perceptions within South Korea that the Abe government is 'revisionist' and that it seeks to downplay Japan's wartime aggression. Japan and South Korea also dispute ownership of the Dokdo/Takeshima islets. Relations between China and India are increasingly marked by geopolitical competition, and this trend looks set to continue under Prime Minister Narendra Modi who assumed office in May 2014. Whether Beijing, Tokyo, Seoul and New Delhi can prevent their geopolitical rivalries and territorial disputes from hindering cooperation in the Arctic is open to question. At a meeting in Yokohama in August 2014, officials from China, Japan and South Korea reportedly agreed to cooperate on safety of shipping in the Arctic Ocean, and perhaps this was a positive harbinger of things to come [40]. Moreover, polar scientific collaboration among China, Japan and South Korea is active and on-going, though this tends to take place within the context of international cooperation rather than bilateral or trilateral settings.

Only Singapore maintains excellent bilateral relations with Beijing (despite the South China Sea dispute, of which Singapore is not a party, but which nevertheless has caused the city-state some angst), Tokyo, Seoul and New Delhi. But whether Singapore is prepared to assume the role of a facilitator among the five Asian states, and whether such a role is acceptable to them, remains to be seen.

Conclusion

Singapore is new to the Arctic region. But it has legitimate interests in the High North and it can make a meaningful contribution to the work of the Arctic Council due to its wealth of experience and expertise in shipping, safety of navigation, accident response and maritime law. The city-state lacks polar scientific credentials and needs to improve in this area. Nevertheless, through its engagement with the Arctic Council working groups, regular attendance at meetings and high-profile speeches at the major annual conferences, Singapore is gradually building up its Arctic credibility, and is being taken seriously by the major players. Thus far, however, Singapore has disassociated itself from the notion that it is part of an 'Asian caucus' at the Council for fear that this might feed into the narrative that Asian countries—and especially China—have ulterior motives or hidden agendas. In any case, bilateral tensions between China and Japan, Japan and South Korea and India and China may stymie efforts to increase cooperation and collaboration among Asian observer states.

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Part III
Arctic Countries' Perspectives on Asian
Approaches

Arctic: A US Perspective

Brett Fullerton and Chuan Napolitano

Introduction

The drivers of climate change have been the subject of much debate—whether man made or natural, permanent or reversible. But what cannot be disputed is that the world is becoming warmer. Of particular interest is the fact that the Arctic is warming faster than the rest of the globe. Over the past century, Arctic temperatures have increased at approximately twice the average global rate, and this warming trend has impacted the thickness of Arctic ice and its extent. Arctic sea ice fluctuates according to a seasonal cycle, building in the winter and melting in the summer when it reaches its minimum extent, usually in September. The U.S. National Snow and Ice Data Center meticulously tracks Arctic ice extent using satellite-based microwave imagers which revealed that, in 2012, ice extent was roughly half that of the historical average. It is predicted that loss of sea ice further accelerates climate change. As permafrost bogs thaw, it releases methane of the order of billions of tons. This greenhouse gas is assessed to have a 20 times greater effect on global warming than carbon dioxide. Additionally, melting ice sheets in Greenland (656,000 square miles) reduce the earth's surface reflectivity of sunlight, commonly known as albedo effect. As albedo decreases, more sunlight is absorbed by the earth. These changes have led to the expectation in the scientific community that the Arctic will be seasonally ice-free during the summer months by the late 2030s [1].

One truly global consequence of the Arctic ice melt is sea level rise. There is mounting evidence that sea level rise is accelerating in the last few decades after several thousand years of stable levels. Current observations using satellite data show an average global sea level rise of approximately 3 mm annually, almost twice that estimated for the twentieth century. Aside from the Arctic and Antarctic

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ice melt contributions, thermal expansion of water (due to increase in temperature) also leads to rising sea levels. The Intergovernmental Panel on Climate Change (IPCC) has analyzed sea level rise using several climate models. One of their primary scenarios predicts the projections for sea level rise which range from a low of 220 mm (8.66 in.)–440 mm (17.32 in.) by 2100 [2]. This has enormous consequences for a planet where half the world's population lives within 60 km of the sea, and three-quarters of all large cities are located on the coast [3]. Another demographic study [4] which examined satellite data and census figures from 224 countries concluded that approximately 634 million people live in low-elevation areas (areas less than 30 ft above sea level). The study estimated that one in every ten persons in the world lives in these areas located in China, India, Bangladesh, Vietnam, Indonesia, Japan, Egypt, the United States, Thailand, and the Philippines. Sea level rise is likely to impact the earth over the next century by displacing populations from both dense coastal cities and small island states, eroding important protective geological features such as barrier islands, mangroves, wetlands, and flooding low-lying arable land.

The Arctic's Vast Potential

The Arctic is predicted to contain vast amounts of energy resources. The U.S. Geological Survey estimates 90 billion barrels of oil, 1700 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids are yet to be discovered in the Arctic. To put this in perspective, the Arctic may hold more oil than Russia's proven oil reserves which are estimated at 80 billion barrels [5]. Similarly for natural gas, the prediction of Arctic reserves nearly matches that of Russian reserves. Supply is only one part of the story, however, as its energy demand that shapes production and the pace and intensity of tapping into new resource streams. According to the Asian Development Bank (ADB), energy demand is projected to nearly double in the Asia-Pacific by 2030. This increase in energy demand will lead to enhanced efforts for sourcing energy supplies from the Arctic.

Greenland's lifting of a ban on the mining of uranium and rare earth minerals in 2013 is an evidence of promising mineral exploration and development in the Arctic region. Greenland Minerals and Energy estimated that its flagship project could yield over 20 % of global rare earth element supply. The company predicts that it could mine approximately 350 million pounds of triuranium octoxide (U₃O₈) [6], better known as yellowcake, commonly used in nuclear enrichment processes [7]. The British mineral company London Mining, meanwhile, has been trying to attract investors from around the globe in order to build a US \$2.2 billion iron ore mine just outside the Arctic Circle [8]. With a mandatory delegation toward social responsibility in the region, the company released a social impact report that concluded "The key risks and negative impacts are on a more social and health level such as social conflicts, vulnerable groups, risk of accidents and access to natural areas during the construction phase. Furthermore, there will be a pressure on

the development plans and public services [9].” The tradeoff between extracting lucrative rare earth elements, which have a strategic value, and the health and well-being of indigenous populations and the environment must be carefully considered before commencing large-scale extraction of minerals.

Over the next two decades, the Arctic is expected to be increasingly free of seasonal ice, making the Northern Sea Route (NSR) over Russia and the Northwestern Passage (NWP) across Canada increasingly being used as commercial shipping routes. The NSR is already being used, albeit in low numbers (53 ships in 2014), but it could become an attractive alternate passage between Asia and Europe. The route cuts 4000 nautical miles off the traditional 12,700 nautical mile route between Ulsan, Korea and Rotterdam, Netherlands—equivalent to trimming 11 days at 15 knots. A shorter transit reduces the operating costs of trips between these markets, while also circumventing Suez Canal fees (US \$300,000–400,000) and costs associated with piracy protection in the Gulf of Aden and surrounding waters (up to US\$ 60,000 for security teams, and US \$10,000–20,000 for shipping insurance premiums). China’s icebreaker ‘Xuelong’ sailed this route to Iceland and back in 2012, and a year later China sent its 19,000-ton vessel ‘Yong Sheng’ from Dalian to Rotterdam which was the first ever container ship to sail the route. ‘Yong Sheng’s’ operator, China Ocean Shipping Company (COSCO), the sixth largest container ship operator in the world, has indicated that Asian goods could be transported through the Northern Sea Route in significant volumes in only a few years’ time.

The Arctic has provided fertile fishing grounds for thousands of years, supporting many indigenous populations to this day. Numerous commercial fisheries exist in the Arctic, although they are primarily concentrated in the North Atlantic, ranging from northeast Canada to northern Europe. The decline of certain fish stocks, like cod, has led to a greater awareness of sustainable fishing and the importance of adhering to laid down regulations. While Arctic fish stocks may be rich in the waters north and west of Alaska, the U.S. has taken legal measures to prevent commercial fishing in its Arctic waters until its impact on the habitat of fishes and other species has been fully examined and understood.

Impacts on the Indigenous Population

There are approximately 400,000 indigenous people among the 4 million inhabitants in the Arctic region, spanning across three continents that comprise the area. For the indigenous populations that have had their roots in the north for millennia, their cultures have been delicately intertwined with the landscape and environment. Economic development across the globe has enticed nations to seek many resources and opportunities in the Arctic, threatening the environment and ecosystems that harbor local wildlife. Greater land and maritime traffic and increased infrastructure have the potential to affect migration and displacement of native species. Oilfield pollution and mine tailings can inflict damage on soil, plants, and water—greatly affecting both terrestrial and marine wildlife. Subsistence hunting, trapping, and

fishing are especially critical for the survival of indigenous peoples and their cultures. Accordingly, all nations must take a cautious approach while opening up the area for natural resource extraction. The 2004 Arctic Human Development Report acknowledged the reconciliation of land and resource rights of indigenous populations with those of modern nation states as a major issue [10]. In the United States, the federal government established policy and legal relationships with tribal governments requiring collaboration in developing regulations that have an impact on tribes. Internationally, six Indigenous Peoples Organizations [11], in concert with the Indigenous Peoples Secretariat, enjoy Permanent Participant status within the Arctic Council to debate on environmental, social, economic, and legal concerns, among others.

Cooperation to Address Challenges

The current slide in oil prices has oil-producing countries scrambling for revenue. In June 2014, crude oil prices were at US \$115 per barrel and 7 months later they have fallen 59 % to US \$47. The consequences are particularly dire for countries where oil revenues underwrite their budgets. Russia's oil and gas revenues account for over half of its federal budget revenues, and oil and gas make up over 70 % of total exports [12]. An interesting international relation observation is that economic prospects usually have the ability to transcend traditionally fragile relationships. Take for example the joint venture in the Arctic between ExxonMobil and Russian state oil giant, Rosneft. The two oil companies announced a 100-million ton (approximately 733 million barrel) crude oil find in the Kara Sea in September 2014. Russian president Vladimir Putin weighed in on the cooperative effort, stating "This [operation] has become possible thanks to the joint efforts of Rosneft and Exxon Mobil. Our experiences show that it is practically impossible, or at least very difficult, to develop these kind of projects alone [13]." President Putin's observations were confirmed in the wake of the 2014 sanctions against his country as the US \$600 million project, ground to a halt. ExxonMobil crews departed with the drilling platform under the U.S. Treasury Department's sanction that prohibits "the export of goods, services or technology in support of exploration or production for Russian deepwater, Arctic offshore, or shale projects that have the potential to produce oil [14]." Rosneft sources indicate that the company will be unable to drill in 2015 without ExxonMobil's assistance as the drilling site was prepared for the ExxonMobil platform, resulting in a delay of commercial production beyond 2020 [15]. The harsh economic, geopolitical, and Arctic environments have collided in the Kara Sea, to the disappointment of Russia and ExxonMobile.

One positive example of international cooperation in the Arctic was the 2012 refueling operation of Nome, Alaska [16]. The harsh environment and concern for Nome's residents compelled cooperation between U.S. and Russian sailors beyond sheer economic interest. Shipping and weather delays prevented Nome from receiving a fuel shipment required for the community's winter fuel reserves, leaving

the 3,600 members of the population iced-in from the sea without enough fuel and heating oil. The situation required a carefully orchestrated operation involving the U.S. Coast Guard's sole operational polar icebreaker [17], the USCG Cutter Healy, and a Russian ice-hardened tanker, the Renda. The journey took both ships through 300 miles of sea ice and posed a grueling challenge to their endurance amongst a scenario of high risk. The Healy was on its way home after a 7-month deployment—its crew looking forward to the holidays and scheduled maintenance prior to this assignment. Renda's crew would toil for 9 months in this endeavor, sailing on a round trip from Vladivostok. In the end, the mission was successful, providing necessary fuel to the residents of Nome, and valuable lessons learned for both the Russian and American crews.

The 2012 Nome expedition highlighted a gap for the U.S. in the form of ice-breaking capability. The U.S. has only two icebreakers, the recently refurbished USCG Cutter Polar Star, and the aforementioned Cutter Healy. As the sole heavy icebreaker, the Polar Star is seasonally dispatched to resupply the McMurdo Research Station in Antarctica. The Healy, designated a medium icebreaker, was designed and is primarily used as an Arctic research platform for the National Science Foundation. The third icebreaker, the Cutter Polar Sea, has remained in 'layup' since 2010, and is sidelined awaiting final decisions for funding its overhaul. Put another way, the U.S. currently has only one more icebreaker than China or Japan, and pales in comparison to Russia's 38 operational icebreakers. This is a significant concern for the U.S. Coast Guard, as it has identified several key missions in the Arctic including defending U.S. sovereignty with sustained presence in the region; defending economic interests in the U.S. Exclusive Economic Zone (EEZ); monitoring sea traffic (especially ships bound for the U.S.); Search and Rescue (SAR); law enforcement; and protection of marine resources. To outline its requirements to Congress, the USCG conducted a 2010 "High Latitude Study" which concluded that it would require four heavy and two medium icebreakers to meet its statutory obligations as multiyear sea ice recedes and thins. The return of Polar Star in 2013 after a service life extension is part of the Coast Guard's near-term bridging strategy, as it goes through the initial stages of acquiring a new heavy polar icebreaker. Other Arctic capability gaps identified were in communications, forward operating locations (maintenance and service sites for ships and aircraft), and oil spill response in ice-covered waters (equipment and procedures).

These concerns have shaped several U.S. strategies, notably the 2013 Coast Guard Arctic Strategy [18] and the U.S. Navy's Arctic Roadmap [19]. Within its plan, the Coast Guard has specified three strategic objectives over the next 10 years: improving awareness, modernizing governance, and broadening partnerships. The USCG plan to improve both awareness and governance is crosscut by its strategic effort to broaden partnerships both at home and abroad. Domestically, it will require collaboration with public and private institutions and industry, from shaping policy and regulation, to solving technical challenges in responding to environmental accidents, logistics, and communications. Internationally, it will seek partners in areas of mutual interest to learn and exchange information in order to share the burden of this challenging environment.

The U.S. Navy's Arctic Roadmap incorporates an implementation plan that covers ten areas of effort: Strategy, Policy, Mission, and Plans; Operations and Training; Science and Technology; Environmental Observation and Prediction; Safe Navigation; Command and Control; Installation and Facilities; Platforms, Weapons, Support Equipment, and Sensors; Maritime Domain Awareness; and Building Trust and Confidence with Partners. The Roadmap assigns actions to offices of primary responsibility, with timelines and oversight from the Chief of Naval Operations. In addition, the Roadmap acknowledges practical ways and means across three time horizons: near-term (present to 2020), mid-term (2020–2030), and far-term (beyond 2030). In the near-term, the U.S. Navy will provide capability and presence primarily through undersea and air assets as it addresses the necessary policy, doctrine, and training requirements for increased operations. During the mid-term, the Navy plans to transition from a periodic presence capability to the ability to operate for sustained duration (the far-term objective).

Shortfalls in current Arctic region capabilities have been somewhat mitigated by international cooperation via the Arctic Council and the binding accords between its members. The Council's two binding agreements, the 2011 Arctic Search and Rescue Agreement and the 2013 Agreement on Cooperation on Marine Oil Pollution Preparedness and Response promotes sharing of information, address collaboration in gaining knowledge and training, and real-world contingency response. The U.S. will take the chairmanship of the Council in 2015, under the title "One Arctic: Shared Opportunities, Challenges and Responsibilities." During the last plenary meeting of Senior Arctic Officials, the U.S. proposed three thematic areas: addressing the impacts of climate change in the Arctic; stewardship of the Arctic Ocean; and improving economic and living conditions. Although the Council is primarily engaged on issues involving sustainable development and environmental protection, its role in international cooperation should not be underestimated. A particular advantage this Council might enjoy is its ability to exercise intergovernmental interaction without the distraction of politics and security concerns.

Territorial Disputes and Global Stability

There are several territorial disputes in the Arctic which have the potential for escalation: the extent of each coastal nation's continental shelf; the NWP; and demarcation of boundaries that separates territorial seas and EEZs of nations. The continental shelf claims are motivated specifically by the energy prospects under the sea floor, resulting in protracted efforts by several countries to identify the limits of each continental shelf. Russia, Canada, and Denmark currently have overlapping continental shelf claims and the U.S., as the sole Arctic nation which is not party to the 1982 United Nations Convention on the Law of the Sea (UNCLOS), would submit its continental shelf claim, should it join the Convention [20]. Despite many mutually shared interests, the U.S. and Canada have conflicting views on the

disposition of the NWP. The U.S. and other nations believe it to be an international strait subject to transit passage, while Canada sees the passage falling under its sovereignty as internal waters, requiring adherence to the more prescriptive innocent passage regime in UNCLOS. Other disputes include Canada and Denmark's competing claims over Hans Island, located between Canada's Ellesmere Island and Greenland, and the maritime boundary dispute between the U.S. and Canada in the Beaufort Sea, north of Alaska. Thus far, each nation has attempted to resolve their conflicting claims peacefully, either bilaterally, or using the international mechanisms outlined in Part XV of UNCLOS. But as can be observed in other parts of the world, maritime territorial disputes, over what one country may claim as territorial waters, while others characterize the same area as global commons, have led to less diplomatic, and sometimes aggressive actions.

Since the age of oars and sail, the world has become increasingly interconnected as modes of transportation and communication have become mechanized and automated. Globalization has exponentially increased connectivity, virtually connecting individuals and groups across countries. The underway Arctic Subsea Fiber Optic Cable Project exemplifies the current level at which the globe measures connectivity—the 9300 miles of cable between London and Tokyo [21] will have a capacity of 24 terabits per second, reducing current latency between the two markets by 60 ms. Those 0.06 s are worth \$650 million—the base project cost—of private investment. In such a globalized world, political, military, economic, and even environmental incidents have the ability to impose significant second- and third-order effects. It is for these reasons that the international community should have a collective interest in Arctic operations, as the opportunities in the region have so much economic potential that there is bound to be friction. It is at this intersection of national resource requirements, sea lines of communication, and global concern for stability which triggers the need for commonly accepted rule-based law and international norms.

The need for international adherence to the UNCLOS and the 1972 International Regulations for Preventing Collisions at Sea cannot be understated. Although the U.S. is not a party to the Convention, it will continue to support and observe the principles of established customary law contained in the Convention. Without compliance, there exists great risk of misunderstanding and potential miscalculation. Therefore, it is every nation's responsibility to uphold and adhere to international norms and customary law worldwide. When disputes occur, all nations must support a peaceful resolution process and should refrain from using aggression or coercion. The Convention provides four means of resolving disputes, specified in Part XV: the International Tribunal for the Law of the Sea; the International Court of Justice in the Hague; ad hoc arbitration, historically facilitated by the Permanent Court of Arbitration; and special arbitration using experts for specific categories of disputes. The Convention also addresses the ability of the disputing parties to seek resolution by any peaceful means of their own choice, i.e., exclusive of UNCLOS mechanisms.

The U.S. vision for the Arctic is a region that is peaceful, stable, and free of conflict. Within its National Strategy for the Arctic Region [22], its first and foremost guiding principle is to

Safeguard peace and stability by working to maintain and preserve the Arctic region as an area free of conflict, acting in concert with allies, partners, and other interested parties. This principle will include United States action, and the actions of other interested countries, in supporting and preserving international legal principles of freedom of navigation and overflight and other uses of the sea related to these freedoms, unimpeded lawful commerce, and the peaceful resolution of disputes. The United States will rely on existing international law, which provides a comprehensive set of rules governing the rights, freedoms, and uses of the world's oceans and airspace, including the Arctic.

The U.S. seeks to strengthen international collaboration and cooperation, but is also prepared to preserve the freedom of the seas and airspace in the Arctic and elsewhere, unilaterally, if necessary. It will continue to challenge excessive maritime claims without discrimination through its Freedom of Navigation program. These actions may lead to concerns that the Arctic is being militarized, but it must be emphasized that without the capability to challenge those who break international law and norms, there is no enforcement mechanism to protect international interests. The U.S. Department of Defense's Arctic Strategy acknowledges the potential for misperceptions and mistrust, and mitigates this with a concerted effort to be transparent on the intent of military activities in the Arctic, and in the pursuit of bilateral and multilateral engagements and exercises in the region.

Conclusion

The opening of the Arctic has great potential for economic development—but its opening is also fraught with significant risks to regional stability, the environment, and indigenous peoples. The tapping of fossil fuels from the Arctic region could allow nations to be less reliant on Middle East sources, potentially reducing volatility of oil prices in world markets and role of geopolitics. Mining of minerals and rare earth elements could help supply developing nations' industrial bases, while enabling modern nations to improve current infrastructure and to pursue innovation and developments in the field of energy, medicine, and communications. New shipping routes bring the promise of strengthening trade and cooperation between major markets, as well as creating greater opportunities in the northern latitudes. Indigenous populations could benefit from improved food and energy security, and greater access to medical care, education, and employment opportunities.

There is much to be excited about the potential of the Arctic, but there is an alternative possibility as well. Access to fossil fuel has incited conflicts across the globe, some in the form of conflicting territorial, EEZ, and continental shelf claims, and others in the form of internal political battles over profit or production sharing rights—while a few have developed into open conflict. Arctic-sourced uranium

could help countries develop non-fossil fuel energy capability that could offset carbon emissions, but could also lead to programs for uranium enrichment and subsequent development of fissile material for weapons. Throughout history, sea lines of communication and navigable straits have elicited security concerns from both littoral nations and transit shipping—Arctic maritime passages will be no different. During the twentieth century, indigenous populations have experienced improvements in infant mortality rates and life expectancy on the whole [23], leading to an increased human security. Globalization has undoubtedly played a large role in helping indigenous populations survive in a harsh and challenging environment, but it also threatens to dilute these cultures as population and industry continue to relocate northward. With the negative ramifications of the opening of the Arctic in mind, it is essential to acknowledge, discuss, and plan for the competing dynamics in this last untapped frontier. It will most certainly take significant international cooperation, commitment, and foresight to ensure regional stability, safe and secure operations, protection of the environment, and preservation of the Arctic’s indigenous people and their cultures.

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Finnish Perspectives on the Arctic and Asia

Lassi Heininen

It is politically relevant and scientifically interesting to find the former marginalized geopolitical periphery on the top of the world, and on the upper edge of the Mercator map, to raise interest and become attractive both within the Arctic states and in the world. The Arctic region has generated global interest and what happens in the region affects the world. For political sciences, as well as for political scientists, many of the reasons for this are material-based and hegemony-oriented, i.e., (new) realism and the resource models of (classical) geopolitics. The current position of the Arctic is therefore one of the paradoxes of international politics and international relations. The northernmost region with its small population, which was colonized and marginalized for centuries, has today become attractive in the global economy and has worldwide implications.

Another paradox is of the natural resources of the Arctic region, particularly hydrocarbons, which are overemphasized and overestimated. This is particularly true of the potential oil and natural gas reserves estimated by the US Geological Survey [1]. However, in spite of the impact of climate change, which makes the access to hydrocarbon reserves easier, the extraction technically feasible will be expensive. Furthermore, offshore oil and gas drilling in cold and icy waters has, and will always have, associated environmental risks which has led to the stakeholders questioning the ultimate price of development, and if it is truly affordable, considering the environmental damage they may cause in case of a disaster. Finally, human capital in the entire North including traditional (environmental) knowledge of indigenous people (on climate change) and innovations in political and legal

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arrangements (such as the Home Rule Government of Greenland), and their importance, are underestimated. Finland is a small nation in the Northernmost Europe and one of the Arctic states with relevant and strong Arctic expertise, though that interest has not always been so obvious [2]. Correspondingly, India is a major power in South Asia and one of the new Arctic Council's observer countries with emerging scientific, environmental and economic interests in the Arctic. Both states are interested in the growing global importance of the Arctic region. There are fundamental asymmetry between Finland and India in size of demography, geopolitical position, as well as in history, societies and economy. At the same time there are common interests between the two countries when it comes to science and research, economy and international cooperation. This is clearly seen in the Arctic and international Arctic cooperation.

The aim of this chapter is to present the perspectives of Finland on Asian approach in the Arctic region. First, the chapter defines the state of Arctic (geo) politics and IR, and who are among Arctic stakeholders. Second, it describes and discusses Finland as an Arctic stakeholder. Third, it briefly discusses Finland and India in the Arctic context. Finally, the chapter discusses the 'Global' Arctic, as a new geopolitical context, with growing interests of both regional stakeholders, such as Finland, and those from outside the region, such as India.

State of Arctic Geopolitics and Arctic Stakeholders

In the past 25 years, the Arctic states and indigenous peoples' organizations have transformed the confrontational politics of the Cold War into meaningful cooperation and stability by adopting environmental protection as the main platform for functional cooperation, manifested in the Arctic Environmental Protection Strategy (AEPS), signed in 1991 in Rovaniemi, Finland [3]. Following on new knowledge of long-range and regional pollution in the region, the Arctic states have called for robust international treaties concerning the environment, signed agreements on pollution prevention, and better industrial management to minimize environmental risks. The result of this transformation is illustrated by two powerful trends in the post-Cold War Arctic: first, the increasing circumpolar cooperation among indigenous peoples, sub-national governments, and northern universities and research institutions; and second, region building by nation states as the Arctic Council. The best-established circumpolar forum clearly shows an emerging trend of a new kind of relationship between the Arctic and the rest of the world [4]. Importantly, the Arctic region has high political stability and is without military conflicts.

These trends and the region's high stability, as well as human capital of the entire North, have played, as well as have potential to play, an important role making the Arctic region on the one hand, vital, resilient, and a stable cooperative region—in the 1990s the region was even redefined as a distinctive region in public

policy discussions (e.g., [5])—and on the other hand, increasingly important and attractive in world politics and the global economy (e.g., [6, 7]).

Indeed, in the current decade, the Arctic plays a key role in the global ecosystem and bio-geophysical processes that are heavily impacted by climate change and other global changes. These are closely integrated with global economics and related energy security dynamics, as they relate to world politics. Over the past several years, there has been an increase in proposed activities in energy and mineral resource development in the Arctic region. At the same time, there is an increasing global attention and scrutiny over such activities and its potential impact on global climate change, habitat degradation, community health, and welfare. In spite of the internal competition (within the region), the national strategies of the Arctic states seemingly tried to make their position stronger, and more influential in the region, against ‘outsiders’—big Asian powers and the EU—before they agreed to allow them to join the Arctic Council. In the Kiruna ministerial meeting in May 2013, the Arctic states accepted six new observers of the Council, five from Asia, included India [8].

It is in this context that Finland, one of the eight Arctic states, adopted its first Arctic strategy, and India, one of the five Asian states, has become involved in Arctic affairs as an observer country of the Arctic Council.

All the Arctic states had adopted a national strategy or state policy on the Arctic region by 2011, and several of them, including Finland as well as Kingdom of Denmark, Norway, Russia, and the USA, updated their strategies [7]. The first non-Arctic states and the Arctic Council observer countries, i.e., Germany and UK, have adopted and published national policies on Arctic affairs. The strategies and policies of the Arctic states include major fields of activity and sectors in Arctic affairs, such as state sovereignty, environmental security, economic activities, transport, environmental protection, indigenous people, and science and research. They are either listed as sectors, emphasized as highlights, or as priority areas. The national strategies of the Arctic states clearly prefer to increase political stability and institutional cooperation within the Arctic region due to impacts of globalization and growing global interest toward the Arctic. Most of them mention the environment and climate change and environmental protection which was the main driver for the current international Arctic cooperation, and is officially the primary activity of the Arctic Council [9].

These emphasize economic development, and many of them place state sovereignty as the major national priority ahead of environmental protection. This shift mirrors the ‘boom’ of regional and international interest of the Arctic states and observer countries of the Council, as well as their state-owned enterprises (SOEs), in trying to benefit from better access to energy resources for improving energy security [10]. Indeed, more and more countries, among them India, would like to become involved in the Arctic and its governance and also in its development. This has led to emergence of different scales, i.e., local, national, (sub-) regional, international, and global, among which the ‘local-global’ interrelation matters. These are much discussed, (re-) defined, and even challenged (e.g., [11]).

In the twenty-first century, a country's brand and image play an important role in international relations and world politics. This is equally true for the old western democracies and the emerging economies, which have not only focused on economic growth but have also tried to build stable political systems. For example, China has invested time and efforts to build its national image as a "big developing country," and "responsible developing country" in international negotiations on climate (e.g., [12]), and take pride for having hosted the 2008 Beijing Olympic Games. Correspondingly, it has been important for India to be able to show the world that its democracy is functioning, and at the same time it is one of the fastest growing economies of the world. This 'country-image building' also plays an important role in the Arctic, where both the Arctic states and states from outside the region become involved in Arctic politics and governance, as active stakeholders, and (re)defined themselves as Arctic nations or neighbouring countries. This was the case with Finland a few years ago and might be the case with India today.

Finland—An Arctic Country

Finland is a small state, and was an insular nation. Despite the mobility and growing immigration, she is still culturally a homogeneous, protestant nation, where rare ethnic privileges are based on history. Finland is a modern, democratic welfare state with a strong civil society and belief in education. The nation would like to see itself as a pragmatist problem solver in technology, politics, economics, as well as in climate politics by reducing its GHGs emission. It is currently in (economic and political) stagnation since 2010, but with its small and well-educated population, it is (almost) a former industrial country having a post-modern service-economy society.

Finland's political weight is rather light; however, it has been an initiator, even a forerunner, in international politics for decades: there are a few success stories in the foreign policy of Finland such as the hosting of the European Security and Cooperation Summit in 1975, the Arctic Environmental Protection Strategy in 1989, and that of the EU's Northern Dimension in 1997. As a European Union member state, Finland is politically and economically aligned, but militarily it is, so far, non-aligned with her own conscription army.

Finland is located between the East/eastern culture and the West/western culture. She is also one of the Nordic countries and an Arctic nation. Finland is one of the original parties of the Svalbard Treaty—the only international treaty concerning the territory in the Arctic—as well as, a party to the United Nations' Convention on the Law of the Seas, UNCLOS—the most meaningful, and referred legally binding agreement concerning the Arctic Ocean. Finland does not, however, belong to the Arctic 'Five,' since it is not a coastal state of the Arctic Ocean. As the initiator of the AEPS, Finland is an "active Arctic nation" and Arctic Council member state, as

well as a member of the International Arctic Science Council (IASC). Indeed, the Arctic legacy of Finland is based on the Finnish initiative for international cooperation on environmental, as well as scientific cooperation on the environment and climate change [2].

In the 1990s (just before and after Finland joined the EU), the government stated that Finland is a European country, next to Germany (in the North). Within the EU—the closest political and economic alliance—Finland has worked hard, and was mostly successful, to have the Northern Dimension as one of the major external policies of the Union, as well as to transfer the Union as a (global) Arctic stakeholder [13, 14]. Ironically, the intergovernmental forum, the establishment of which Finland promoted—the Arctic Council—was for long underestimated by the Finnish political and economic elites and was interpreted to be marginal for Finland. At this forum, Finland is, or in principle could be influential and has the full right, as well as a vote, to be involved in the decision-making. Further, there is no risk of losing any campaign (to become a member of an important decision-making body), unlike the failure of Finland’s campaign to become a member of the UN Security Council in the beginning of the 2010s.

The Finnish Arctic strategy document states that Finland is one of the northernmost nations of the globe, and an Arctic country [14]. The four substantial chapters of the first Finnish strategy, ‘*Strategy for the Arctic Region*,’ adopted by Government in 2010, are “Fragile Arctic Nature,” “Economic Activities and Know-How,” “Transport and Infrastructure,” and “Indigenous Peoples” and these define Finland’s political objectives. They are followed by a chapter on “Arctic Policy Tools,” which includes policy activities at global and regional levels, bilateral cooperation, and funding. The strategy has a specific focus on external relations, as the chapter “The EU and the Arctic Region” clearly indicates by listing Finland’s policy objectives on the EU activities in the Arctic. The updated version of the strategy was adopted through a government resolution in August 2013 [15]. It is based on the 2012 vision of the (Arctic) Finland and consists of four pillars of policy outlined by the government in October 2012, i.e., Finland as an Arctic country which complies with the principles of sustainable development and promotes international cooperation in the Arctic. In addition, the updated strategy includes objectives and the detailed actions to attain them.

In the strategy Finland states that the Arctic region is a stable and peaceful area, and adds that significant changes are taking place in the region, including climate change and increased transportation. As global interest toward the region grows, so does its global significance. Finland states that it respects the principles of sustainability, although the environment is not necessarily Finland’s first priority. Finland supports on one hand, international regional cooperation in the Arctic, particularly for environmental cooperation, and on the other hand, she supports the Arctic Council as the main international/intergovernmental body and platform dealing with the Arctic region. Finland is also among the member states who would like to develop the Council and broaden its mandate.

Deeper analysis [2] shows that Finland's Arctic strategy covers most of the features of a modern strategy document by adopting a holistic approach, and all major indicators of a national strategy can be found. The strategy can also be seen as reflecting and responding to the recent significant and multifunctional environmental and geopolitical change(s) in the Arctic and in the worldwide approach to the region. Critically reviewed, Finland's Arctic strategy has, however, neither clear priorities nor priority areas, though there is an apparent preference for economic activities including transport, infrastructure, and know-how and, in contrast, general objectives for international cooperation on Arctic issues based on international treaties.

Interestingly, the strategy has with a clear worldwide perspective. Finland has also shown interest toward a global perspective in the Arctic, and has accordingly supported new observer states from Asia—including India—and has lobbied for an observer status for the EU. As a supporter of a global perspective and an expert on sustainable development, Finland could do better and by 2017, when starting her chairmanship of the Arctic Council, it could again become a forerunner of environmental protection in the Arctic region.

Finland and India in the Arctic Context

When discussing geographical, geopolitical, cultural, and identity features of Finland and India, it is no surprise that there is little which is common between the two countries: Geographically, India is a South Asian state, and Finland is located in the northernmost part of Europe. Thus, the two states are located on the two edges of Eurasia. Both are coastal states, but in the case of India it is an ocean, the Indian Ocean, unlike in the case of Finland where it is a (almost) closed sea, the Baltic Sea. Finland is almost an 'island'—when looking at a map, which is surprising, though, it is not a real island state. Hence, there are several differences between Finland and India in their size, scale, and geopolitical situation, as well as their history, status, power, capabilities, demography, and society. Thus, it is easy to conclude that there is asymmetry between these two countries.

On the other hand, in the twenty-first century world, this kind of simplified picture, which the mainstream media uses to draw up, is old-fashioned and is increasingly becoming irrelevant. Furthermore, in the age of globalization, and in the world of interdependence, there are many other issues apart from geographical, geopolitical, and strategic position of a country which may define and determine national, economic, and foreign policy interests. Therefore, some of the issues can be (re)defined to become foundations for common interests in the future. The common things between the two countries include similar political system and democracy, political stability, market economy, and focus on economic growth. This is not, however, surprising, since political stability is the main paradigm of the post-Cold War world and economic growth was, and still is, a faith both in

capitalism and communism. Further, as coastal states, the trade of both the countries, particularly export, is heavily depending on the sea. Besides, ‘mobility’ has become strategically, as well as economically, important, which indicates a transfer from classical geopolitics toward critical geopolitics.

Followed from this, both countries are Arctic stakeholders; Finland, with an obvious sense of a “northern” identity and self-identified status of an “Arctic nation” (first time) in 2010, while India is a newcomer in the Arctic as an observer country of the Arctic Council in 2013.

In general, the main task of an observer, as is the case of the Arctic Council, is to observe the work of the Council and its working groups. The Arctic Council observer countries, such as India, also have their own interests in the region, such as environmental and climate studies, and to undertake research on regional and global impacts of the rapid climate change in the Arctic. There is a strong polar connection between India and the Arctic—the Indian monsoon link, which is very important for India and its agriculture [16]. In a cyclic manner, the smog in Indian cities and industrial areas matters to the Northern Hemisphere including the Arctic region. Other potential interests of India in the Arctic region could be polar research including international cooperation on science and technology, where Arctic research supports research in the Antarctic; the implementation of the Law of the Seas in the Arctic Ocean and maritime regionalism (of the Indian Ocean vis-à-vis the Arctic Ocean); and final, to have a global voice in Arctic governance in the future.

As India has not adopted any official national strategy or policy on the Arctic affairs, it is not possible to have a comparative study between Finland and India on the issue. It would, however, be interesting to discuss on the globalized Arctic as the current geopolitical context, where the two states are present as relevant stakeholders.

New Geopolitical Context: The ‘Global’ Arctic

Much triggered by rapid climate change in the early twenty-first century [17], the Arctic region is seen as new global resource area, even the ‘global pivot.’ The new observer countries of the Arctic Council have a global perspective on the region and its resources, and (therefore) support international cooperation. Followed from this, one of the Asian approaches in Arctic affairs and governance is the discourse on the (global) commons, or “an object of global concern,” which has also been discussed earlier (e.g., [18]). Its main argument is that the Arctic region, particularly the Arctic Ocean, should be shared by humankind, and not let the five littoral states of the Arctic Ocean monopolize the Arctic governance.

There are also voices both in the Arctic region and outside, that in Arctic governance and management, there are paradoxes for example, between resource exploitation and ecological protection, and between the sovereignty rights of the Arctic states and common inheritance of mankind, and therefore, the participation

in Arctic governance should include ethic values [19, 20]. At the same time, many non-Arctic states, such as China, try to be cautious to advocate its Arctic policy due to fear of causing too much alarm within the Arctic states, and the entire Arctic region [21].

Globalization is, however, nothing new in the Arctic region due to impacts of several aspects of globalization, such as whaling, fur trade, polar exploration, militarization, and long-range pollution [22]. Current understanding of the Arctic in the context of globalization is, however, incomplete and contradictory among the Arctic states, as well as among the Arctic Council observer countries—where some have emphasized new opportunities, while others see new threats and bigger risks [23]. Furthermore, this global view is also mirrored in the Arctic Council’s Vision paper at the ministerial meeting in May 2013 in Kiruna, Sweden [24].

Due to this and the growing global interest toward the Arctic region and its (energy) resources, as well as the rapid climate change and the consequent Arctic paradox, the geo-strategic and geo-economic importance of the Arctic has increased and is probably still increasing in world politics, and the global economy (e.g., [25]). Scientifically more interesting context here is the globalized or ‘global’ Arctic, particularly because there is not, yet, much discussion on what happens in the globalized Arctic which has significant and multi-dimensional implications worldwide [26].

This is seen, at least, in two different and controversial ways: First, there have been, and partly still are, media-sexy titles on the utilization of Arctic resources and Arctic governance in general—due to the rapid climate change but also after the Russian expedition to the North Pole in August 2007—or in general predicting a military or other conflict within the Arctic region. At the same time, the Arctic has been stable and peaceful over the post-Cold War period, and there are serious political discussions and scientific studies on how to strengthen and deepen stability and cooperation. Even more urgent, in the case of recent regional crises and conflicts, such as the Ukrainian, the achieved stability has been managed so as to maintain peace as the Valdai Discussion Club’s report [27] puts it [28].

Also the biggest geopolitical change, the self-governing status of Greenland (in 2009) was very calm and peaceful, and done in full agreement by the Danish Government in Copenhagen and the Greenlandic Home Government in Nuuk. This clearly shows, even manifests, the high value of political stability, as well as the importance of the Nordic devolution and self-determination which started after the World War II.

The Arctic Council has published a number of valuable assessments, including the AMAP, ACIA, and AMSA reports and has adopted the first legally binding agreements and the Kiruna Vision paper for long-range planning in addition of normal declarations. However, a comprehensive research program examining the impacts by mass-scale economic activities, as well as linkages between industry, society, environment, and the impact of global geopolitical shifts, is still lacking.

More attention by the Arctic states has been paid to natural and social scientists surrounding extractive industrial development, transportation, and other economic activities in the Arctic. This new state of resource geopolitics demonstrates a shift in the Arctic Council's focus, as well as that in the policies of these states, from environment protection to 'economic development.'

All this indicates that the Arctic is becoming an important part of the global resources debate. It is naïve to think that neither the Arctic states, including Finland, nor the AC observer states, including India, would know and have realized the new situation and its potentially serious consequences and the increasing risks of the current resource development. However, the question is of an ultimate price—which will be accepted to be paid for further resource development in the Arctic, and for whom will the price be the highest for. Indeed, there is 'political inability' to have strict environmental regulations in the mass-scale utilization of (offshore) Arctic resources. This stands in stark contrast to the two aims of the Arctic Council: environmental protection and sustainable development, which partly caused the 'Arctic Paradox' as an indicator of the 'Anthropocene' [29].

Furthermore, the Paradox challenges the unique Arctic ecosystem, human security of people, even traditionally defined state sovereignty, as well as the implementation of sustainable development. The Arctic states together with fast-growing economies and big producers of global carbon emission, such as France, Germany and UK (in Europe), and China, India, and Japan (in Asia), could do it better and support environmental protection of the Arctic ecosystem by starting mitigation at home which is one of the main points of the globalized Arctic. By decreasing GHGs at home, the outsiders will make the biggest contribution for environmental protection in/of the Arctic.

Conclusions

This chapter considers that in the second decade of the twenty-first century, the Arctic region has become part and parcel of global political, economic, technological, social, and environmental change, and is seen as an area of tapping new resources for the global economy. What happens in the Arctic has significant implications worldwide, which makes the Arctic a potentially interesting and a strategically important region globally and in world politics.

Finland is one of the eight Arctic states, who have recently identified itself as an "active Arctic nation" and an "Arctic expert," who "complies with the principles of sustainable development." India is a new Arctic Council's observer country with emerging scientific, environmental and economic interests in the Arctic, as well as globally due to significant worldwide implications of the globalized Arctic.

There is a fundamental asymmetry between Finland and India in size, scale, geographical location, and geopolitical position, as well as in history, status, power, demography, and societies. At the same time, there are a few common interests between the two countries when it comes to science, research, and education,

particularly research on climate change, and international cooperation including that in the Arctic.

Among the main scenarios for the future of the Arctic region are that the current stable situation based on international cooperation continues, or that the Arctic paradox will play out due to the rapid climate change and the political inability, or that the region will be transformed from the high stability to environmental protection and sustainable development. Despite these scenarios, rapid climate change in the Arctic affects the region and the world, which makes it a grand challenge to be solved jointly by the Arctic states, such as Finland, and the AC observer countries, such as India.

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The Road to the East Goes via the North-Asian Partnerships in Danish Arctic Policy

Jon Rahbek-Clemmensen

Arctic specialists have long been aware that the Asian countries have their eye on the High North. However, the world outside the halls of government and academia only discovered this interest when China, India, Japan, Singapore, and South Korea became observer states in the Arctic Council in the spring of 2013. The Arctic countries (Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden, and the United States) have had to come to terms with the fact that the Asian states will play a role in the polar region. Similarly, the Asian states have had to think about how they fit within the existing institutional order. How can the Asian states cooperate with the Arctic states and what can they get out of their Arctic engagement? Will there be room for them at the Arctic table or is the new observer status just a symbolic gesture with little real value? Would it be better to challenge the current institutional order and work to establish rival institutions?

This chapter aims to develop some overall guidelines for the Asian states' approach to the Arctic. It does so through an in-depth case-study of how one of the Arctic states—Denmark—approaches the Asian states in the High North. Why and how does Denmark establish Arctic partnerships with the Asian countries and how might this policy develop in the future? Cooperating with the Asian countries is a secondary activity for Copenhagen that allows Danish policymakers to improve Danish-Greenlandic relations, gain influence in Asia, and strengthen Arctic cooperation. Denmark will build partnerships with the Asian states as long as it does not clash with its more fundamental interests in the Arctic: maintain Danish sovereignty over Greenland and nurture the relationship with the EU, the US, and Greenland. These primary interests may block for some cooperation with the Asian states, especially with China. The main challenge for Danish diplomats is to find concrete policy areas where potential Asian partners can contribute and Denmark's main

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regional partners—China, Japan, and South Korea—are the Asian states that have formulated concrete strategic visions for the region.

The chapter is the first in-depth take on Copenhagen’s thinking about Arctic partnerships with the Asian states and one of the first attempts to develop concrete strategic guidelines for the Asian states. Though a relatively recent phenomenon, several articles have already analyzed the role of the Asian countries in the region [50]. A 2014 article in *Asia Policy* focused on how the Nordic countries embrace the new Asian partners, but it grouped these states into one coherent category and consequently it did not capture the nuances that separate Denmark’s approach from that of Finland, Iceland, Norway, and Sweden [51]. For instance, the complex constitutional arrangement that makes Greenland an autonomous nation within the Commonwealth of Denmark leads to challenges that diplomats in, say, Oslo, Reykjavik, Ottawa, or Stockholm do not face. An Arctic country is not just an Arctic country, so to speak. This chapter provides a more comprehensive guide for academics and policymakers who want to understand how Denmark views the Asian countries in the Arctic. Furthermore, by investigating how one specific state approaches the Asian states in the High North, the chapter is able to develop concrete guidelines for further strategic considerations.

Denmark’s approach to the Asian states in the Arctic is colored by its overall regional interests. The chapter consequently begins by presenting Denmark’s broad interests in the High North in the first section. The second section analyzes how Arctic partnerships with the Asian states further Denmark’s polar interests. The last section examines how Denmark goes about establishing Arctic partnerships with the Asian countries. The chapter concludes with three recommendations for the Asian states in the Arctic. First, it argues that the Asian states should develop strategic approaches to the region that defines what they aim to achieve and how they want to achieve these goals. When doing so, they should keep in mind that Arctic governance is mainly about ‘low-politics’ issues. Second, the Asian states should work within the current institutional order and engage in the on-going dialogue with the Arctic states about the future role of the observers. Finally, the Asian states should remember that the Arctic states are different and should develop specific plans for their cooperation with each of the Arctic nations.

Denmark’s Arctic Policy [52]

The Commonwealth of Denmark (the *Rigsfællesskab*, sometimes referred to as the Kingdom of Denmark) consists of three nations—Denmark proper, the Faeroe Islands, and Greenland—united in one constitutional unit. Although the Faeroe Islands and Greenland have extensive autonomy, Copenhagen still controls the foreign and security policy of the realm [53]. The Commonwealth thus ties Greenland, a polar nation of some 55,000 inhabitants, and Denmark together and gives the latter status as an Arctic coastal state and a key member of the Arctic Council. Typically thought of as a small, and arguably unimportant, state in

Northern Europe, Denmark consequently has a relatively large influence over Arctic decision-making.

Denmark wants to maintain a presence in Greenland for political, but not for economic, reasons. Greenland has not been profitable in modern times, if ever, and Denmark subsidizes Nuuk with an annual DKK 4.4 billion (USD 800 million) bursary that roughly generates 40 percent of Greenland's GDP. The 2009 Self Rule Agreement ensures that Denmark will not turn a profit even if bountiful resources are found in Greenland [54].

Instead, Denmark uses its Arctic presence to strengthen its relationship with the United States and the EU. Denmark's grand strategy aims to tie the US to Europe, maintain NATO as the central pillar of the Western security architecture, and preserve the EU. Copenhagen goes out of its way to show Washington that it gets something out of its presence in Europe. The Danish public is surprisingly tolerant of casualties and accepts—if not applauds—the deployment and active involvement of troops in missions abroad [55]. Denmark has consequently been one of the first European countries to sign up for American-led missions abroad, be it in Iraq, Libya, or Afghanistan [56]. Denmark had one of the highest casualties per capita in Afghanistan and was among the countries with most attack sorties in Libya [57]. Greenland offers another venue for tying Denmark and the US closer together. The US wants to ensure that rival great powers cannot operate militarily in Greenland. The American Air Base at Thule in Northern Greenland sits at a geo-strategically important position between Northern Russia and North America and it is a central node in the American missile warning system. Denmark thus serves as the middle man that helps Washington maintain a presence in Greenland without having to deal directly with the local population [58].

Denmark simultaneously tries to further the EU's Arctic interests. Although Greenland left the European Community in 1985, it remains an EU Overseas Country and Territory, which means that it continues to receive EU funds and that Greenlandic citizens are EU citizens. Denmark is the only EU member state that is also an Arctic littoral state and Copenhagen pursues the Union's High North interests whenever possible. For instance, Denmark works to gain observer status for the EU in the Arctic Council, despite resistance from other Arctic states [59]. The EU's Arctic interests are few, however, and Denmark consequently primarily focuses on furthering American interests.

Denmark also works to convince Greenland to stay within the Commonwealth. Independence is a significant identity marker within the Greenlandic populace and it links other discursive nodal points, including the importance of hunting and the relationship to Arctic environment, democracy, and the welfare state. As Ulrik Pram Gad puts it, “the national principle is what ties aboriginality and modernity together: Greenland *ought to be* an independent state to allow Greenlandic culture to flourish within a welfare society” [60]. The language of independence thus frames Greenlandic political discourse and it is well-nigh impossible for political actors to articulate alternative visions, should they want to do so. Consequently, all parties in the *Inatsisartut*—Greenland's parliament—are pro-independence, though they disagree about the pace and route that lead to the goal. Denmark's liberal

political culture makes it difficult to prevent independence and Copenhagen would not stand in its way if Greenland were to leave the Commonwealth. Instead, Danish policymakers hope to show the Greenlanders that they are better off within the Commonwealth by constantly taking their interests into consideration and by offering a sufficient level of services.

Greenlandic independence would put the US in a strange position. It would probably be a minor nuisance for Washington, but the United States would most likely, adapt to the new situation. An independent Greenland would still need foreign partners—if, for no other reason, to have a source of skilled civil servants—and the US could easily find a way to keep Nuuk within its orbit and maintain its basing rights in Thule. However, that would entail having to deal directly with a possibly erratic government in a newly independent state and it would come with a certain degree of uncertainty. It seems preferable to keep Denmark as a liaison for now.

However, independence is not likely anytime soon. Greenland needs to find alternative sources of revenue to replace the annual bursary from Copenhagen, if it is to become independent while maintaining its current welfare level. A recent analysis shows that this is only possible if sufficient amounts of exploitable oil and gas are found. Other industrial opportunities—fishing, mining, tourism and the like—do not suffice to cover the bursary from Denmark [61].

As it is now, Nuuk is struggling to just keep the economy afloat. As most advanced countries, Greenland suffers under the weight of lop-sided demographics that is likely to push the structural deficit towards 10 percent of GDP by 2030 [62]. A financial collapse would force Greenland to ask for an increase in the annual bursary from Denmark—a move that would entail renegotiating the 2009 Self-Rule Agreement and effectively end the dreams of independence. The government thus aims to attract foreign investments in tourism, mining, energy, and other industries to cover the gap and avoid becoming a Greece-upon-the-Arctic-Circle.

Greenland's search for commercial opportunities has led to tensions with Denmark. Some of Nuuk's initiatives that were meant to pave the way for foreign investments contradict Danish political norms and/or the fundamental constitutional arrangements of the Commonwealth. For instance, Greenland's 2013 repeal of the moratorium of uranium mining (which passed with a slim one-vote majority in the *Inatsisartut*) brought Nuuk and Copenhagen at loggerheads. The repeal was meant to facilitate possible mining projects at Kvanefjeld and elsewhere. Greenland claimed that the question was part of the resource and minerals issue area which has been a purely Greenlandic matter since 2009. However, Denmark claims that the mining and export of uranium also has repercussions for the Commonwealth's foreign, security, and defense policy, which is within Copenhagen's purview. The two governments have since fought a battle of memorandums, press releases, and legal statements over who has final authority in the matter—a battle that has yet to reach a conclusion [63].

Under this issue lies a more fundamental question of Greenland's right to pursue an independent foreign policy. The constitutional arrangement is somewhat ambiguous. The 2009 Self-Rule Law specifies that “the Greenlandic government

can negotiate and establish international agreements on behalf of the Commonwealth of Denmark with foreign states ... if *they only concern Greenland* and only area that are only the jurisdiction of the government of Greenland” [64]. However, as the uranium debacle illustrates, it is difficult to determine when an area *only* concerns Greenland. Some political observers argue that Nuuk is chipping away at Copenhagen’s monopoly over foreign affairs by arguing that more and more areas only concern Greenland. Greenland, on the other hand, argues that Denmark is hogging the issues in violation of the Self-Rule Law [65].

Copenhagen thus walks a tight-rope between Washington and Nuuk [66]. Denmark wants to further American interests in Greenland, while showing the Greenlandic government and population that it has their interests in mind. Climate change provides a specific challenge in that regard. The services that Denmark has to provide in Greenland—most notably military presence and surveillance and costal guard duties, such as search and rescue, environmental protection, fisheries control—become more extensive as Greenland opens for further commercial activity. Danish experts and policymakers have debated how to handle these tasks effectively for almost a decade [67]. The Danish government furthermore goes to great lengths to include the Greenlandic government and NGOs in decision-making and to avoid coming off as steam-rolling Greenlandic interests, while retaining ultimate authority over areas that are considered its constitutional prerogative. For instance, in December 2014, Denmark made an extensive claim to Arctic territory north of Greenland. This was widely interpreted as a gesture to the Greenlandic government that had previously prioritized this issue [68]. Ironically, this means that Copenhagen works to facilitate the industrial development of Greenland and to attract outside investments, even though this will increase Nuuk’s autonomy from Denmark and could eventually lead to Greenlandic independence.

Copenhagen’s primary Arctic goals—keeping the Commonwealth together and facilitating US and EU interests in the High North—informs a range of secondary objectives, including Denmark’s approach to the Arctic region. As a small nation, Denmark risks getting caught in any clashes between the larger states in the region. A militarized Arctic would require large investments in military capabilities and a NATO presence in the region and it would be more difficult for Denmark to preserve its sovereignty and authority in Greenland. Copenhagen has consequently been working to avoid a militarization of the Arctic and to establish, maintain, and develop the region’s well-functioning cooperative order. The 2008 Ilulissat meeting and declaration that established the current state-based institutional architecture was one of several Danish initiatives that were meant to make the region’s key players see eye to eye [69].

Arctic Partnerships and Denmark’s Arctic Interests

Danish policymakers have long been aware that the Arctic can be used to forge new relationships with the Asian countries. The 2011 Arctic Strategy included ‘three Northeast Asian countries, China, Japan, and South Korea’ among the region’s

non-Arctic 'legitimate stakeholders'. The strategy also specified that the Commonwealth of Denmark will 'play a major role in promoting an open and inclusive dialogue in bilateral relations' as other actors turn their attention to the High North [70]. Denmark has thus supported the integration of new Asian actors into the region and has specifically backed the expansion of the circle of observer countries in the Arctic Council [71].

Forging Asian partnerships in the Arctic serves several of Denmark's strategic goals. First, it enables Copenhagen to strengthen Arctic cooperation in general by committing the Asian states to the current institutional architecture that places the five Arctic coastal states and the eight Arctic states at the top of a hierarchy of states. The Arctic Strategy emphasized 'that the three Northeast Asian countries [China, Japan, and South Korea] are joining the consensus among the coastal States that the 1982 United Nations Convention on the Law of the Sea must be the central foundation for the legal regulation of the Arctic' [72]. The Arctic states have long feared that outsiders would claim that the High North is a global heritage that should be governed through an Arctic treaty akin to the Antarctic treaty [73]. A long institution-building process that has spanned over the past decade or so would risk coming undone if these states called the legitimacy of the current order into question and/or established rival institutions. Furthermore, Denmark can also use the Asian states to leverage some of its own concerns within the Arctic. For instance, the Asian states are interested in keeping the Northeast Passage open, a view that Denmark shares, and Danish policymakers hope that they can cooperate to ensure that Russia does not impose extraordinary fees and restrictions on traffic through the passage [74]. Finally, engaging with the Asian states diplomatically about Arctic issues may also increase the awareness of the region within their general foreign policies. The Asian states will typically appoint desk officers and/or an ambassador for Arctic affairs (Singapore and Japan both have Arctic ambassadors) who then push the High North agenda within the foreign policy bureaucracy.

Second, Denmark hopes to translate its Arctic partnerships to influence and build awareness about everything Danish in Asia [75]. Copenhagen believes that the Asian countries will see the benefit of keeping a good working relationship with Denmark and that this will spill-over into other areas. Denmark's Arctic policy is shaped by and shapes Copenhagen's general foreign policy. Denmark's general relationship with the other states delimits how much they can cooperate in the Arctic. For instance, as we shall see ahead, poor Indo-Danish relations mean that Denmark and India do not cooperate as much in the Arctic as they could do. Furthermore, the need to work together with Copenhagen will make Asian companies and government agencies aware of Denmark in other contexts.

Finally, and perhaps most importantly, Denmark aims to attract much needed investments to Greenland as part of its general charm offensive in Greenland. Copenhagen hopes to show the Greenlanders that they are better off within the Commonwealth, by showing that it works tenaciously for their interests, including by bringing industrial opportunities to Greenland. China is seen as a particularly important partner in this regard. Several of the resources that China needs for its booming industry, including iron, copper, uranium, and rare earth elements, can be

found in Greenland. So far, Beijing's interest has not led to major activity, but Chinese investors are involved in several projects, including a large iron mine in Isua [76]. These mining projects have been halted, in part, by the current slump in mineral and energy prices and it seems reasonable to expect that they will pick up steam if prices once again soar.

Danish policymakers and officials are aware of the dangers of this policy. China could use large investments to gain influence over Greenlandic politics. The Defense Intelligence Service's 2014 Intelligence Risk Assessment highlighted that the line between private companies, government, and the Chinese Communist Party is blurred and that private Chinese investments in Greenland may be used to exert political pressure to achieve Beijing's national interests [77]. This is particularly relevant in a small country like Greenland, where a billion-dollar investment will be close to the entire annual GDP. It seems reasonable to expect that the US would prefer to avoid an outsized Chinese influence over a geo-strategically important territory. Denmark can thus be caught between the need to attract investments to Greenland and US interests.

Furthermore, some observers highlight that Greenland's resources, especially rare earth elements, are important for the West. In 2011, a diplomatic dispute over control of the East China Sea reportedly caused China to block the export of rare earth elements to Japan. Some analysts argue that China's near-monopoly of rare earth elements constitutes a security risk for the US and EU and that the Danish government should make sure that the rich deposits in Greenland are not controlled by Chinese companies [78].

Finally, many of the potential mining projects depend on the inflow of several thousand workers in the startup phase. This requires specific labor laws that fall outside of established Danish and Greenlandic norms and legislation. This has been heavily criticized by labor unions that argue that these laws undermine the welfare system in Greenland and by observers who fear that large foreign settlements would lead to ethnic tensions and crime [79].

Establishing Arctic partnerships with the Asian states, though pursued vigorously by Danish diplomats, is a secondary goal in Danish Arctic policy. Of the three strategic goals mentioned above, only the latter—attracting investments to Greenland and thus improving the relationship between Nuuk and Copenhagen—can be said to be one of Denmark's primary goals. Copenhagen is careful to ensure that any of its partnerships do not jeopardize the state's core interests: the relationship to the US, EU, and Greenland, Denmark's sovereignty over Greenland, and Denmark's privileged position in the Arctic. Arctic partnerships with the Asian states are icing on the cake, so to speak.

Copenhagen Looks East

Danish ministries have spent several years considering how they should cooperate with the Asian states in the Arctic. A 2013 SIPRI report, commissioned by the Ministry of Foreign Affairs, was a key document in this process. It analyzed how

China, Japan, and South Korea perceived the High North and how Denmark can strengthen its ties with these states. Unlike Russia and the United States, who both have strong geopolitical interests in Asia, smaller Arctic states can more easily cooperate with Asian states without having to compromise their other interests. Denmark should therefore be a natural partner for the Northeast Asian countries. The key challenge for Copenhagen is to raise awareness of its role in the region. Compared to Norway, Sweden and Finland, most Asian officials were unaware of Denmark's interests and policies in the Arctic. The report recommended several initiatives to raise awareness of what Denmark has to offer in the Arctic, including establishing an annual flagship conference on the High North, exchanging diplomats and scholars, and organizing tours for parliamentary committees [80].

Denmark sees the Arctic Council as the primary venue for its Arctic partnerships. The Arctic Council provides a formal forum for cooperation that nudges states to engage with the actual 'low-politics' issues facing the region, such as environmental protection, indigenous peoples' rights, climate change, and human development. The institution ensures that all states and actors work within the same framework. Denmark believes that cooperation about low-politics issues helps prevent militarization and that it is essential that new participants come to accept this understanding of the region. Danish diplomats also highlight the Arctic Economic Council, a circumpolar business forum, established in 2014, as a crucial venue for concrete cooperation [81].

One of the important challenges facing the Arctic Council members and observers alike is how to define the role of the observers. How can the observers contribute to the Arctic and how can they get a say in regional matters? The Arctic Council is easy to join and many of the new observer states do not have a clear idea about what they want out of their participation in the Council. Similarly, many of the member states struggle to define what they want out of the observer states. Denmark tries to overcome this challenge by working to commit the new observer states to discuss concrete issues, including research partnerships, climate change, and environmental problems. Danish diplomats highlight that many of these states can make a significant contribution in these areas qua their extensive and highly developed scientific research programs [82].

Denmark has so far focused on establishing partnerships with China, Japan, and South Korea. These states were singled out because they had overlapping interests with Denmark, especially when it came to shipping and scientific and environmental concerns in the High North. Furthermore, China, Japan, and South Korea have come further than the other Asian countries in their thinking about the region and they have a somewhat concrete and long-term agenda for what they want in the High North. Danish diplomats highlight that they are impressed with these countries' ability to think strategically about their interests in the Arctic. Simply put, China, Japan, and South Korea have long been aware of the shipping and resource potential in the High North and they have moved quickly to shape a role for themselves in the region. They have been aware that becoming a legitimate member of the Arctic institutional architecture involves getting engaged in a host of other issues, such as climate change, scientific research, and environmental protection

[83]. Finally, one can speculate that Denmark would find it easier to cooperate with China, because the frosty relationship between Oslo and Beijing (which has been cold since Chinese writer and dissident Liu Xiaobo won the 2010 Nobel Peace Prize) makes Sino-Norwegian cooperation difficult.

Danish diplomats emphasize that nothing prevents Copenhagen from working with other Asian states. Singapore and India, the two remaining Asian permanent observers in the Arctic Council, are the most obvious candidates. These states have not yet recognized the same potential in the Arctic as the other Asian observers and they have not paid as much attention to the low-politics areas that Denmark emphasizes as key for the future of the region. Copenhagen supported that India and Singapore became permanent observers in the Arctic Council and would be happy to cooperate more closely with these states. Singapore and Denmark share an interest in keeping Arctic shipping open and it seems that the two countries could find concrete areas for further cooperation. Danish diplomats stress that Singapore has been active in the Arctic Council, especially when it comes to shipping and the rights and welfare of indigenous peoples [84].

India provides a special case in this regard. Denmark and India actually have several areas, where the two countries could work together. To be sure, Delhi is less interested in Arctic shipping compared to the other Asian nations, as no viable routes to and from India would go through the Arctic. However, India needs new areas for investment, especially if it can secure it a steady flow of natural resources for its growing industrial base. Greenland could be an option in that regard. Compared to China's engagement, Indian investments in Greenland would not raise the same eyebrows in Washington, Nuuk, and Copenhagen. Indian investments probably would need some of the same controversial labor right reforms as Chinese investments and one should expect a certain resistance within Greenland and Denmark, but surely this backlash would be smaller than the one facing China. However, the big stumbling-block for Indo-Danish relations remains the Niels Holck-case (known as the Purulia Arms Drop Case in India). Denmark still refuses to extradite Holck (AKA Kim Davy), a Danish citizen charged with illegal arms trading in West Bengal, because he allegedly risks torture in India [85]. Although it is possible that the potential for Arctic cooperation could lessen the tensions between India and Denmark, it seems unlikely that Delhi, Nuuk, and Copenhagen will engage in an expansive Arctic partnership in the near future.

Conclusion and Recommendations

Cooperation with the Asian states in the Arctic remains a secondary issue in Danish High North policy. It is all well and good as long as it does not contradict Denmark's fundamental regional interests—maintaining Danish sovereignty over Greenland and improving relations to the EU, US, and Greenland's Self Rule government. Especially, cooperation with China remains controversial as it may jeopardize Denmark's relationship with Washington.

Asian partnerships have become a part of Denmark's Arctic policy and Copenhagen is likely to expand its engagement with the Asian countries in the years to come, especially within the Arctic Council. For now, Denmark will continue to search for new areas where it can cooperate with China, Japan, and South Korea. These countries have formulated clear strategic visions for their Arctic engagement and they have accepted that one gains influence in the Arctic by showing a genuine interest in low-politics issues, such as climate change, environmental protection, and scientific research. Copenhagen will continue to look for concrete areas and programs where these states can contribute.

Denmark could develop partnership with other Asian countries, most likely Singapore and India. A precondition for this is that these states come further in their strategic thinking and identify concrete areas where they and Denmark can cooperate. Like China, Japan, and South Korea, they need to develop concrete visions for the Arctic region and to recognize that the road to influence requires engagement with the specific low-politics issues that are the focal point of the Arctic Council. Denmark and Singapore have overlapping interests, especially when it comes to Arctic shipping, and the two countries should be able to cooperate. Even though Delhi and Copenhagen actually share certain interests in the Arctic and Indian investments in the Greenland could be an interesting avenue for both countries, the Niels Holck-case remains a stumbling block for closer Indo-Danish relations.

The Danish case provides three broader lessons for Asian states that want to engage in the Arctic. First, these states should develop a strategic approach to the Arctic. They have to figure out what they want out of the Arctic and how they can achieve these goals. When defining these goals, it is important to keep in mind that Arctic governance is mainly about low-politics issues. The states do face high-politics challenges in the coming years, but the non-Arctic States gain influence over high politics, by showing that they have something to offer in the day-to-day work in the Arctic Council working groups. Danish diplomats emphasize that they find it easier to work with states that have concrete and achievable goals for their High North activities.

Second, it is important that the Asian states find a role for themselves within the current state-based Arctic order. Being an observer may not seem as much, but the Asian states gain tangible influence by being at the table. It allows them to gain up-to-date information about Arctic issues and to influence the policy processes through informal channels. The Arctic states fear that the Asian states will challenge the existing institutional order by working for an Arctic Treaty or by setting up rival institutions. They are therefore more than willing to integrate the Asian states in the existing order and to give them informal voice and influence in the Arctic Council. The process of defining what it means to be an observer has begun and the Asian states have much to gain by engaging constructively in that dialogue.

Finally, the Asian states need to develop specific approaches for their cooperation for each of the Arctic states. An Arctic state is not just an Arctic state. For instance, the specific constitutional arrangements that define Danish-Greenlandic relations, shape Denmark's approach to the Arctic. These concerns separate

Denmark from the other Nordic countries with which it is often lumped together. Perhaps the most important lesson for the Asian countries is to develop separate strategies for each Arctic nation and to familiarize themselves with those differences that may seem miniscule from afar, but are quite consequential when one actually has to deal with the states of the High North.

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Russian Perspectives on Asian Approaches to the Arctic

Lev Voronkov

The demise of the communist system in the USSR was a major factor for the drastic change in the geopolitical situation in the Arctic. The Russian Federation has eliminated the basic incompatibility between its political and economic systems, as well as the fundamental values of society, and those of the West. That provided favorable conditions for the development of Russia's international cooperation in the Arctic with other Arctic and non-Arctic.

The discovery of vast hydrocarbon deposits constituted a material basis for the rise in the Arctic's geopolitical importance. The Arctic hydrocarbon reserves are acquiring global importance, attracting close attention from a large number of influential countries located far outside its boundaries, including Asians. This attention is "fueled" by climate change, accompanied by the active melting of Arctic ice. The availability of hydrocarbon shelf production technology is now complemented by the possibilities to get a direct access to the Arctic reserves. Further, the intensive melting of Arctic ice suggests that new global commercial routes may be established within the next decade via the Northern Sea Route (NSR) and the Northwestern Passage (NWP). Such prospects have attracted world's largest trading nations and shipping companies from the Asian-Pacific region.

Resources of the Arctic

The survey "Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle", prepared by the US Geological Service (USGS) in 2008, is to date the most comprehensive assessment of hydrocarbon resources of

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the Arctic region. The overall un-confirmed hydrocarbon deposits are assessed as 412 billion barrels in petroleum equivalent, and the discovered deposits on land in the Arctic contain 240 billion barrels. According to USGS, nearly 90 billion barrels of oil (13–16 % of world undiscovered deposits), 48.3 trillion cubic meters of gas (30 % of world undiscovered deposits) and 44 billion of gas condensate (20–23 % of world undiscovered deposits) in the world are located on the Arctic shelf.

More than 70 % of undiscovered oil resources are located in five Arctic provinces, namely: Alaska and its Arctic shelf; America-Asian basin; eastern shelf of Greenland; eastern shelf of Barents Sea as well as on the shelf between eastern coast of Canada and the western coast of Greenland. More than 70 % of undiscovered gas resources are located in three Arctic provinces, namely: in western-Siberian basin, on eastern shelf of Barents Sea and on Alaska and its Arctic shelf. The major part of Arctic deposits of natural gas is located on Russian shelf of Kara and Barents seas.

Apart from the rich hydrocarbon resources there is a wide spectrum of mineral and biological resources in the Arctic, among them are reserves of copper, nickel, tin, platinum, agrochemical ores, rare metals and rare earth elements, gold, diamonds, tungsten, mercury, ferrous metals, optical materials, ornamental stones, etc.

According to the Statistical Bureau of Norway, the Arctic is the home to 11 % of the world reserves of cobalt, 10.6 % of nickel, 9.2 % of tungsten, 4.2 % of chrome ore, 2.3 % of iron stores and about 2.1 % of coal. 40 % of world production of industrial diamonds, 25–27 % of jewelry diamonds, 40 % of palladian, 15 % of platinum, 7.8 % of zinc, 5.8 % of tungsten, 5.6 % of the stylus, 3.8 % of copper, 3.7 % of phosphate, 3.6 % of silver and bauxite and 3.2 % of gold are produced in the Arctic [1]. The share of the Arctic in the total global fish catch is about 10 %, in crustaceans—5.3 % and in the cultivated marine organisms—7.7 % [2].

There are about 130 species of mammals, 280 species of birds, 450 species of fish, and 860 species of vertebrates, that live only in the Arctic. It is home to diverse marine mammalian-matter, and fish such as the salmon, cod, and Pollock are found in abundance in Arctic and subarctic waters, where commercial fishing of different countries is carried out. A division of these resources and rights for their exploitation are closely linked to the legal status of the Arctic areas where these resources are located. In this connection, the delimitation of the Arctic shelf has emerged as an important issue of global politics.

Any Fight for Resources in the Arctic?

The ratification of the 1982 UN Convention on the Law of the Sea (UNCLOS) by Russia, Denmark, Norway and Canada ensured the extension of their jurisdiction to the 200-mile zone of their continental shelf, as well as to the corresponding Exclusive Economic Zones (EEZ) with natural mineral, hydrocarbon and biological resources, located there. Taking into account that up to 97 % of the Arctic hydrocarbon resources are located within these 200-mile zones, it is natural to

consider that these resources are already divided among the Arctic coastal states. No one state, Arctic or non-Arctic alike, does officially deny these justified rights of the coastal states.

The provisions of the Convention enable the coastal Arctic states to significantly increase—up to 350 nautical miles—the zones of their national jurisdiction on the continental shelf in the Arctic Ocean. To that end, they are to present to the International Commission on the Limits of Continental Shelf (CLCS) conclusive evidence that, in particular, the underwater Lomonosov Ridge, is the continuation of their continental shelves. Apart from Russia, Denmark and Canada claim that they are entitled to increase their continental shelf in the Arctic up to 350 nautical miles. Russia, Canada and Denmark are now gathering evidence to support their claims. Applications of these three countries will be considered within the coming years. In case these are accepted, these countries will have to negotiate a delimitation of the Arctic shelf in the Arctic Ocean. The right to possible exploitation of resources on the floor of the ocean behind the 200-mile (or 350-mile) zones of national jurisdictions will be determined by the International Sea-Bed Authority, established in accordance with the UNCLOS.

There is a possibility for the ‘common heritage of mankind’ zone to emerge beyond the boundaries of national zones of jurisdiction in the Arctic; but there are still some obstacles to this. The US Senate’s latest refusal to ratify the 1982 UNCLOS is a clear sign of the US refusal to set restrictions on boundaries of its continental shelf in the Arctic. In fact, the United States feels free to use the Arctic shelf resources not just on equitable terms with the other Arctic coastal states, but with a certain competitive advantage for itself as the Convention’s financial and restrictive obligations are currently not applicable to the USA until it becomes a party of the UNCLOS.

The boundaries of such a zone cannot be determined and established under these circumstances, as the regime for such a zone cannot have implications only for four coastal Arctic states. These boundaries will therefore not emerge before the final decision is taken concerning the applications of Russia, Canada and Denmark to the UN Commission on the Limits of the Continental Shelf on the extension of their shelf up to 350 nautical miles and before a final delimitation of the Arctic continental shelf is reached. The global commons therefore may not emerge in the Arctic in principle if all of the coastal Arctic states are not parties to the 1982 UNCLOS.

With regard to the biological resources of the sea in the hypothetical area of global commons, commercial vessels of Arctic and Asian states will have a formal right to fish until international agreements on the mode of use of these resources are signed. This hypothetical area, on the one hand, is completely surrounded by the waters (or ice) falling under a fishing jurisdiction of the Arctic coastal states, and, on the other hand, weather and ice conditions are not favorable for round-the-year fishing. These conditions do not allow industrial fishing and the probability of its development in the near future is assessed as very low.

The coastal Arctic states do not have any legal justifications to effectively prevent research activity by non-Arctic states, including the Asians, outside their areas of national jurisdiction in the Arctic. There are no legal grounds for exclusion of

Asian non-Arctic states from preparation and signing of a regional agreement on preservation and management of biological resources. The exception of unregulated fishing in the area should be the main goal of the Arctic and non-Arctic states alike.

Representatives of the five coastal states bordering the Arctic Ocean—Canada, Denmark, Norway, the Russian Federation and the United States of America—met on 28 May, 2008 in Greenland and adopted the Ilulissat Declaration which is the primary for their interaction. The Declaration says that “the law of the sea provides for important rights and obligations concerning the delineation of the outer limits of the continental shelf, the protection of the marine environment, including ice-covered areas, freedom of navigation, marine scientific research, and other uses of the sea. We remain committed to this legal framework and to the orderly settlement of any possible overlapping claims. This framework provides a solid foundation for responsible management by the five coastal States and other users of the Arctic Ocean through national implementation and application of relevant provisions. We therefore see no need to develop a new comprehensive international legal regime to govern the Arctic Ocean”.

In the light of this countries such as China, India, Italy, Japan, South Korea and Singapore were recently granted observer status in the Arctic Council and the member states of the Council considered it necessary to emphasize in Kiruna that “decisions at all levels in the Arctic Council are the exclusive right and responsibility of the eight signatories to the Ottawa Declaration”. Thus, they left no doubts that they intend to solve all problems in the Arctic areas under their jurisdiction without interventions of other states. Moreover, the member states of the Arctic Council expressed unanimous desire to continue work “to strengthen the Arctic Council to meet new challenges and opportunities for cooperation and to pursue opportunities to expand the Arctic Council’s role from policy-shaping into policy-making”.

This implies that there are no reasons to characterize the actual situation in the Arctic as “the fight for resources” on the basis of non-existence of any legal grounds.

Resources of the Russian Arctic Zone

Around 11 % of Gross National Product and around 15 % of the Russian fishery production are produced in Russia’s Arctic zone. This zone supplies almost 22 % of the overall volume of Russian exports, but its share in population of the country is only 1 %.

A large part of the resources of the Russian Arctic zone are located on the shores and on land. Around 70 % of Russian shelf has potential deposits of mineral and hydrocarbon resources such as oil and gas. 25 % of Russian deposits of oil and 50 % of gas are on the shelf. 49 % of them are in the Barents Sea while 35 % are in the Kara Sea. Russia now produces almost 80 % of its natural gas on the Yamal Peninsula. The neighboring shelf of Kara Sea contains 95 % of all Russian shelf

deposits of natural gas. Russian resources of the High North are not only important for the Russian Federation, but also a strategic reserve of hydrocarbons for the world.

The Arctic regions of Russia, namely the Kola and Taimyr Peninsulas, Chukotka, Yakutia (Sakha) and Norilsk contain reserves of apatite concentrate (90 %), nickel (85 %), copper (about 60 %), tungsten (over 50 %), rare earth elements (more than 95 %), platinum (more than 98 %), tin (more than 75 % of proven reserves), gold, silver (about 90 %), diamonds (more than 99 % on the territory of Yakutia, in the Arkhangelsk region and the Taimyr AO) [3]. The Arctic regions of Russia are also rich in chromium and manganese (90 %), vermiculite (100 %), phlogopite (60–90 %), cobalt, coal, antimony, mercury and apatite (50 %), titanium, fluorspar, gemstones, and various gems. While some states are only discovering the resource potential of the Arctic, the Russian Federation has been exploiting them since a long time.

The most abundant fish resources of the Russian Arctic are in the Barents and Bering seas. The fish potential of the Barents Sea is formed by stocks of cod, haddock, pollack, perch, catfish and black halibut and of the Bering sea—by stocks of cod species and benthic biological resources. The biological productivity of the Kara Sea can significantly increase as a result of migration of polar cod, capelin and cod in case of the further warming of the Arctic climate. The number of harp seal population reaches 2 million heads, of ringed seals—35–45,000 heads. The white whale is the most common species of cetaceans in the White and Barents seas. Its population pool is about 20,000 heads. The Russian Arctic is home to about two dozen large herds of deer caribou. The largest herd of deer consisting from more than 600,000 heads is in the Yamalo-Nenets autonomous district of Russia.

Vast size of thinly populated territories with low density of population, the lack of necessary infrastructure and remoteness from the main industrial centers are the main and most important determinants for economic utilization of these resource-rich Russian Arctic regions and for integrating them into national and world economy. According to “Arctic Marine Shipping Assessment Report 2009”, published by the Arctic Council, a lack of critical marine infrastructure in the Arctic will be a significant limitation for future Arctic marine operations.

The Northern Sea Route as the National Sea Artery

A well-developed network of transport and communications in the Russian High North is important for Russian Arctic policy. However, there is no viable transport alternative to the Northern Sea Route in the resource-rich regions of the Russian Arctic zone.

Russia is interested to provide better opportunities to outside commercial operators to utilize its aerial, road, railway and maritime facilities for export–import operations and for transit transportation of cargoes via the Russian territory. That is why the utilization of the NSR as well as of the Trans-Siberian Railway for

international transportation and for export–import of commodities from and to Russia corresponds to Russian national interests and is important for the development of world trade including that between countries of the Asia-Pacific Region, USA, Europe and Central Asia.

The key advantage of the NSR is its length, compared to other routes of maritime transportation, linking Europe, North America and Euro-Asia. Another indisputable advantage of the NSR is its complete freedom from the threat of piracy. For example, the Danish shipping company “Nordic Balk Carriers” used the NSR in 2010 and 2011 for transportation of iron ore to China. The time of delivery of this cargo from Murmansk to China took 23 days, compared with 43 days for the route through the Suez Canal. This allowed the company to save 1000 tons of fuel or US \$650,000 on each shipping voyage. But these advantages, however, are able to fully manifest themselves and be used efficiently by transport companies only in short summer months, when the NSR is comparatively ice-free.

The extensive commercial use of the Arctic resources is closely related and is dependent on the ability of producers to maintain a year-round delivery to consumers. New global trade routes through the Arctic may be a reality only when it is possible to ensure a permanent, reliable and safe shipping in the icy conditions of the Arctic. Otherwise this shipping for non-Arctic actors will continue to remain only seasonal and sporadic, overwhelmingly destinational, not trans-Arctic.

It is forecasted that the Arctic Ocean can be ice-free in the foreseeable future during some months in summer–autumn period, but for most of the year its shipping routes will continue to be frozen. This reflects the most important determinant of year-round human activities in the Arctic. Seasonal exploitation of the sea routes in the Arctic may bring only limited commercial effect. The NSR must be operated throughout the year and policy of its development and commercial use has to be developed accordingly.

Since 1970s, the Soviet Union provided the year-round use of the NSR. The maximum total volume of transportation along the NSR, which amounted to 6.58 million tons, was reached in 1987 [4]. The NSR in the minds of Russians is perceived as the national transport route, because its construction and equipment, providing safe round a year shipping, have been carried out exclusively by the USSR. After the disintegration of the USSR the use of the NSR was discontinued.

Many countries and companies still consider the NSR as a route, which under favorable conditions can be periodically used profitably to deliver goods from/to Russia and from West to East or vice versa (including transit shipping between EU and countries of the Asian-Pacific Region). They predominantly do not view the NSR as a new global transportation lane and as a long-term investment, which has the potential to be exploited all-year-round. Obviously, they count on further warming of the Arctic and, consequently, on future possibilities of longer seasonal shipping in the ice-free Arctic Ocean. Such an approach may not be a reliable basis for long-term strategic decisions, related to the NSR.

The NSR is critically important for the Russian Federation. Russia is highly interested to use the NSR as permanently operating national transportation artery, connecting different parts of the country and Russia as a whole with the world

markets. This route may be opened for international shipping, using Russian services in the High North on commercial basis.

Currently, there are gaps in hydrographic data for large portions of primary shipping route that is used for navigation. There is a need for meteorological and oceanographic data, products and services as in other oceans, plus comprehensive information on sea ice and icebergs. Except in limited areas of the Arctic, there is a lack of emergency response capacity for saving lives and for pollution mitigation. There are serious limitations to radio and satellite communications and few systems to monitor and control the movement of ships in ice-covered waters. The current lack of marine infrastructure in all but a limited number of areas, coupled with the vastness and harshness of the environment, makes emergency response significantly more difficult in the Arctic [5].

Russia will seek to settle all these problems, alone or in cooperation with other interested companies, although the benefits from proper investments, exploitation and maintaining of the NSR are not determined exclusively by the needs of the Russian domestic economy. The NSR may bring impressive benefits also to EU and commercial companies. It is a matter of fact that no one, except Russia, will be able to provide all-year-round operation of the NSR as a global transport route in the foreseeable future. It is also important to exclude any possibilities of using the new global trade routes in the Arctic for smuggling goods, weapons and narcotics, for illegal immigration and other threats of this kind, regardless of weather and climate conditions in the Arctic.

Climate Change in the Arctic

None of the existing projections of climate changes predict the complete disappearance of the ice cover in the Arctic Ocean over the entire year. All of them are talking about a greater or lesser period of liberation of the Arctic Ocean from ice in summer months. The interest of non-Arctic players to the NSR is currently largely seasonal in nature, associated with the possibilities of sporadic and profitable use of the route in some summer months.

There has been no fundamental scientific research on the long-term influence of climate change on the Arctic. The reverse effect of the reduction in the area of Arctic ice on the global climate is not very clear either [6]. One of the key findings of the report “Arctic Climate Issues 2011: Changes in Arctic Snow, Water, Ice and Permafrost”, prepared by the Arctic Monitoring and Assessment Program (AMAP), says:

Over 30 feedback effects between the Arctic cryosphere and the overall climate system have now been identified... There remains a great deal of uncertainty about how fast the Arctic cryosphere will change in the future and what the ultimate impacts of the changes will be... Interactions (“feedbacks”) between elements of the cryosphere and climate system are particularly uncertain... Concerted monitoring and research is needed to reduce

this uncertainty... More work is needed to quantify the magnitude of individual feedbacks, as we do not know yet when feedbacks will happen or what the overall effects of feedbacks will be [7].

Initially, one should proceed from the fact that the impact of climate change in the Arctic does not release potential developers of its resources from the need to work most of the year in adverse winter weather circumstances, including drifting ice and icebergs in summer time. Further, for year-round exploitation of Arctic resources, special technologies and vehicles, which are designed to work in the Arctic winter conditions are required.

The Arctic as a Zone of Peace and Stability and as an Area of Unique International Cooperation

The security issues in this part of the world have begun to acquire a new dimension which is linked to the protection of the Arctic environment and biological resources, prevention of industrial accidents and disasters, search and rescue at sea, safe navigation, provision of favorable living conditions to local residents, etc. These are “soft” security issues in the Arctic and can be effectively resolved only through international cooperation, with due respect for the legitimate rights of the Arctic states and their jurisdiction.

At the ministerial session of the Arctic Council in Kiruna in May 2013 the Declaration “Vision for the Arctic” has been unanimously accepted by the member states. They stated that the Arctic has been transformed “into an area of unique international cooperation” and that mutual understanding and trust, achieved by the members of the Arctic Council, strengthened their cooperation in finding solution to the problems, common for all of them. They see the transparent and predictable rules of cooperation among them as the main condition for rapid economic prosperity of the Arctic regions and for increased trade and investments with priority being given to economic cooperation. The member states of the Arctic Council stated that the further development of the Arctic region as a zone of peace and stability is at the heart of their efforts. The Declaration says “*We are confident, that there is no problem that we cannot solve together through our cooperative relationships on the basis of existing international law and good will. We remain committed to the framework of the Law of the Sea, and to the peaceful resolution of disputes generally*”.

Problems of “soft” security in the contemporary Arctic are acquiring key importance. They could be most efficiently settled by a cooperative approach with neighboring Arctic states, domestic and foreign companies, intergovernmental and nongovernmental international organizations. No one problem of “soft” security in the Arctic can be resolved without a full-scale Russian participation, engagement and partnership.

The Russian Arctic as the Territory of International Cooperation

There is no legal space for non-Arctic countries or international organizations to operate independently of the Arctic states in the zones of their national jurisdiction. Some of the Non-arctic States (India, China, France, Germany, Japan, Italy, Poland, Spain, South Korea, Singapore, the Netherlands, the United Kingdom) are now observers at the Arctic Council. The members of the Arctic Council expressed their readiness to provide this status to all those who are able to contribute to its activities, share the commitment of member states to resolve conflicts peacefully, and obey the rules for observers, determined by the member states.

It is important to emphasize that the commercial companies in the Arctic and non-Arctic states alike are entitled to get involved in Arctic issues in accordance with their interests, under conditions that are determined by the Arctic states in their national zones of jurisdiction. The recently established business forum at the Arctic Council is open for membership for these companies.

Wide deployment of production, storage, transportation and processing of extracted hydrocarbon and mineral resources in the Arctic demands implementation of large infrastructural projects. One should speak not only about necessity to have permanently operating transport routes on land and in the sea and logistic centers in the High North, but also about supply of energy and communication services, monitoring of weather and ice conditions, ability to undertake search and rescue operations and prevention and elimination of emergency situations such as crude oil spills to name a few.

As far as hydrocarbon deposits of the Russian Arctic shelf are concerned, Russia has to make exploratory drillings in order to confirm their existence. If this will be done only by Russian state-owned companies Gazprom and Rosneft, it will take, according to estimates, more that 100 years. Involvement of other Russian and foreign companies in this activity can considerably speed up the process.

Developing the resource potential and transport capacity of the Russian Arctic requires huge investment. Russia alone cannot afford to accumulate necessary financial resources within reasonable time frames to create a proper infrastructure for round-the-year shipping in the High North, modernize its Arctic ports, improve social-economic conditions for labor force, guarantee permanent production of oil and gas on Russian Arctic shelf, develop service economy on land and resolve other problems. The involvement of the world's largest companies in resolving these issues will assist Russia's social and economic development and unlock its resource and transit potentials for the benefit of investors and the world's economy as well.

Several foreign companies are already involved in such activities (Norwegian Statoil, Italian ENI, French Total, Royal Dutch Shell, American ExxonMobil, British BP, Japanese Mitsui, Mitsubishi, Chinese CNPC, Vietnamese Petro Vietnam and others) in Russia. Indian companies have also been invited by the Russian President Putin to get involved in different commercial projects in Russian Siberia and the Arctic. During the visit of Vladimir Putin to India in December

2014 some agreements were reached on the supply of hydrocarbons to India. The closed contracts provide for the beginning of oil supply in 2015 and 10 million tons per year for up to 10 years with possibility of extension of the agreement. India will also get the Russian liquefied natural gas from 2017 at an annual rate of 2.5 million tons.

Conclusion

The respective Russian authorities consider the NSR as one of the most important national infrastructural projects for the coming years, which is open for foreign investments as well. Of course, it will inevitably be time and money consuming process, if Russia has to undertake building of infrastructure alone.

Russia is willing to cooperate with companies of the Arctic and non-Arctic states alike. Such cooperation with Russia can be fruitful and effective only if its partners do recognize the rights of Russia and its jurisdiction in the Arctic, based on the norms of international law and other corresponding treaties and agreements. Of course, Russian federal and regional authorities have to create better investment climate for this as well as better investment attractiveness of Arctic regions for Russian and foreign investors.

The NSR may provide Asian, American and European companies with access to energy and resource base of Siberia and Russian Far East. These considerations may shape the interest of Asian companies in co-financing projects linked to the Russian Arctic. The best option is to involve all interested sides to cooperate for making the NSR operational year-round. This approach will bring benefits both for Russia and for its partners in Europe, USA and Asia.

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Asia and the Arctic: Summary and Takeaways

Kapil Narula

Changing Dynamics in the Arctic

The Arctic region has lately been in the forefront of global strategic interest and academic discourse. The main driver of this change is global warming induced climate change which is resulting in the melting of polar sea-ice in the region. While this has led to a host of exciting new opportunities, there are many challenges for the international community. The prospects of opening of ice-free shipping routes, management and exploitation of living and non-living resources, environmental concerns, claims of the littoral countries to the continental shelves, and rights and interests of indigenous communities in the Arctic are few of the issues which confront the global community today. These have given rise to new geopolitical, geoeconomic, and geostrategic dynamics amongst the Arctic littorals, and have led to the growing interest of non-Arctic states in the affairs of the region.

The relatively ice free summers in the recent past have attracted the interest of commercial shipping operators. The Northern Sea Route (NSR) which had witnessed four years of continued growth in traffic from 2009 to 2013 saw a steep downturn in 2014 and it is observed that there is reluctance by the users to commit themselves to the route. Safety of ships and seafarers navigating across the Arctic waters is another challenge and shipping via the Arctic is unlikely to emerge as an economically viable alternative to traditional sea routes in the near future.

The insatiable need for energy and mineral resources is fuelling strategic competition between among Arctic littorals. While there is a positive outlook for resources in the Arctic region, the exploitation costs are yet to be ascertained. Further, environmental concerns and technological limitations are major hurdles which may restrict the economic viability for extraction of resources in the near

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term. Finally, global energy prices and trends in commodity markets will shape the future of Arctic resources.

The Arctic region is extremely vulnerable and climate change is emerging as the significant stressor on Arctic biodiversity. The adverse impact on the fragile ecosystem of the region and livelihood of the local inhabitants are some of the issues of concern and environmental protection would continue to be the primary challenge for the Arctic littorals.

Conflict over the outer delimitation of the continental shelves in the Arctic Ocean has also been regarded by many as a serious challenge. Over the past 10 years, the Arctic coastal states have taken steps to enhance their military presence in the region. The region is currently peaceful; however the question of a spill-over of a military conflict elsewhere is conceivable.

In the background of the above developments, politico-strategic interests are driving diplomatic efforts by countries to engage with Arctic littorals. However, the response of countries is spread across a continuum; while some countries want to establish a strategic footprint in the region, others are more restrained in their approach and are still calibrating their strategies to the Arctic. However, all believe in keeping the region peaceful, stable, and free of conflict.

Asian Countries Approaches to the Arctic

Increasing opportunities and changing dynamics in the Arctic are attracting attention of Asian countries. Five Asian countries—China, India, Japan, Republic of Korea and Singapore joined the Arctic Council as Permanent Observers in 2013. Their experiences as Observers in the Arctic Council, national interests in the region and the challenges affecting their engagement with the Arctic littorals are relevant. The Asian countries are supportive of the Arctic Council as it is an effective international forum for promoting cooperation, coordination and interaction to discuss Arctic issues.

Although China has not announced its national Arctic strategy, it has an agenda and possibly an emerging Arctic policy. A globalized Arctic is geopolitically, economically and environmentally interesting, as well as strategically important for China. It has been the most proactive amongst the Asian countries in exhibiting its interest in natural resources and sea routes of the Arctic. It is actively pursuing resource diplomacy by entering into joint ventures in exploration and infrastructure development projects with Russia, Norway and Iceland. China claims that its current policy in the Arctic is largely concerned with Arctic governance, law, cooperation and exploitation of resources.

South Korea considers security of the Arctic as an international issue. The country has three primary concerns: the freedom of navigation; the protection of newly opened Sea Lines of Communication (SLOC); and the development of Arctic resources. South Korea is a supporter of the prevailing international policies on the Arctic, and is engaging in maritime capacity-building measures to maintain the

current conflict-free status of the Arctic region. South Korea's strategy is to continue its engagement with the Arctic and it looks forward to reinforcing its scientific contribution in polar research.

Japan has a strong track record of Polar science (mostly natural science), advanced technology, and is a large maritime nation (by both sheer volume as well as expertise in shipping). Although Japan does not have an official Arctic policy, the actual manner to combine and reflect these interests in the form of 'science diplomacy' is under consideration. From a traditional security perspective, Japan regards the Arctic as a distant yet important arena where Japan's neighbours such as China, US and Russia play a 'Great Game' and it maintains a watchful eye on the developments in the region. Japan also intends to secure 'future' rather than 'present' interests in the Arctic.

India may be physically far from the Arctic region, but the impact of the melting ice on global weather system makes it vulnerable to changes in the Arctic. India's engagement in the Arctic is based on science. It has a long experience of working in Antarctica and since 2007 Indian scientists have been actively engaged in research from "Himadri" station at Ny-Ålesund in the Svalbard archipelago. Over the years, many long-term scientific programmes in areas of climate change, glaciology, terrestrial and aquatic ecology and atmospheric sciences have been initiated which have been contributing substantially to the international flagship programmes in the Arctic. India is also seeking multilateral cooperation to further its interests in the region.

Although Singapore is a tropical country, it has four main interests in the rapidly changing Arctic. Singapore's foremost interest is to address global governance issues such as those dealing with ocean management and maritime legal regimes. Secondly, it is concerned about melting sea ice in the Arctic as it faces an existential threat due to rising sea levels. Thirdly, Singapore's world class offshore industries are keen to explore the potential economic opportunities being created by the shrinking Arctic sea ice. Lastly, Arctic shipping lanes are a concern for Singapore as they signal a possible decrease in shipping through the Straits of Malacca. However, Singapore's view is that it will take a long time for the NSR to rival existing maritime routes and it does not threaten Singapore's shipping and port business. Since gaining observer status, Singapore has played an active role on several of the Council's working groups and Singapore advocates that there should be a pan-Asian cooperation in the Arctic, both bilaterally and multilaterally.

Arctic Countries Response to Asian Approaches

The Asian nations are steadily gaining importance for the Arctic countries and they look forward to strengthening relations with the growing Asian economies. The Arctic countries note that resources in the Arctic belong to the coastal states, as they are located within the zones of national jurisdiction. However, they acknowledge

that Asian countries are entitled to make investments in the Arctic in the form of joint ventures or by increasing the stock holding in companies engaged in the Arctic. Countries such as Russia are looking for investments to develop port cities and financing for modernising of port infrastructure to encourage year-round navigation in the Arctic. On the other hand, Danish strategic thinking about Asian partnerships in the Arctic is still in its infancy. Denmark is yet to decide on an Asian partner and has to determine what it wants out of such a partnership. On the other hand, Finland has an Arctic strategy with a global perspective and looks to enhance its engagement with all Asian countries.

The Arctic countries welcome the involvement of Asian observer countries in the Arctic Council but are wary of the aggressiveness shown by a few of them. The active role which the Asian Observer countries can play in ‘policy shaping’ was highlighted; however, the members of the Arctic Council unanimously expressed the view that Asian countries have little part in framing policies for the region.

Pan-Asian Approach

It is evident that the Asian countries have a variety of interests in the Arctic, and the grant of permanent Observer status to these countries is an acknowledgement of their growing capabilities. All five Asian Observer countries have overlapping interest in the Arctic and these countries are keen to avail the emerging opportunities in the Arctic. Their preliminary approach has rightly been to graduate from ‘involvement’ to ‘engagement’ in the Arctic. However, there are two main impediments—lack of enthusiasm, due to suspicion among member countries and poor bilateral relations between Asian countries, which are acting as hurdles in a possible pan-Asian approach.

The role of Observers in the Arctic Council is ambiguous and as it is not defined, countries interpret them differently. The Asian states share a common concern on lack of governance in the Arctic and although framing rules for the region is the mandate of Arctic Council, these countries intend to contribute to the evolving discourse. The Asian countries hope that a robust framework is adopted for the management of the Arctic region.

Policy Recommendations

India’s inclusion in the Arctic Council as an observer country validates India’s growing role and influence in the world. A few policy recommendations for India’s engagement in the Arctic, are enumerated below which can enhance India’s national interests.

- India should leverage its legitimate status as a signatory to the Svalbard Treaty and its expertise in operating in Polar Regions, to further its scientific endeavours.
- India's involvement and its efforts to build long term commercial partnerships in the region should continue for economic and strategic reasons.
- India has a large talent pool and it can contribute human resources for economic activity in the Arctic region.
- India needs to continue its involvement in the Arctic Council and in the form of bilateral and multilateral engagements with Arctic countries. India's recent cooperation with Norway serves as a model for future cooperation with other Arctic countries.
- India also needs to begin looking at formulating its Arctic policy with an eye on the future by remaining abreast of related developments. It may also like to consider engaging Arctic littorals to shape policies in the Arctic.

The conference also confirmed that although there are many challenges to India's engagement in the Arctic, efforts must be made to utilize this opportunity to the fullest.

Appendix A

The Ilulissat Declaration

The Ilulissat Declaration was adopted on 28 May 2008 by the five coastal states bordering on the Arctic Ocean—Canada, Denmark, Norway, the Russian Federation and the United States of America during the Arctic Ocean Conference held at Ilulissat, Greenland from 27 to 29 May 2008. The meeting was held at the political level at the invitation of the Danish Minister for Foreign Affairs and the Premier of Greenland. The states of Sweden, Finland and Iceland and the Arctic indigenous people, which are members of the Arctic Council, were not a party to the Ilulissat negotiations.

The declaration is significant as it blocked any “new comprehensive international legal regime to govern the Arctic Ocean” and reinforced the sovereignty of the five coastal states on the Arctic Ocean. The declaration expressed concern on the significant changes in the region due to climate change and melting ice and its potential impact on ecosystems, livelihoods of local communities and opening of new shipping routes. The declaration reiterated that international legal framework which defines the rights and obligations of these five states is already in place and stressed that management and governance of the region will be undertaken under the existing legal regime. The declaration emphasised on cooperation amongst the states on the issue of protection of marine environment, reducing the risk of ship based pollution, strengthening search and rescue capabilities, enhancing maritime safety, cooperation on scientific research, and enhanced disaster response mechanisms.

The complete version of the declaration can be accessed from the following link. http://www.oceanlaw.org/downloads/arctic/Ilulissat_Declaration.pdf.

The Kiruna Declaration

The Kiruna Declaration was adopted by the Ministers representing the eight Arctic States and the representatives of the six Permanent Participant organizations of the Arctic Council on the occasion of the Eight Ministerial Meeting of the Arctic Council on May 15, 2013 at Kiruna, Sweden.

While highlighting the importance of constructive cooperation in the Arctic the meeting emphasised on the sustainable use of resources, economic development, environmental protection and the unique role played by Arctic indigenous peoples in the light of increasing concerns on rapid changes in the climate and physical environment of the Arctic. The declaration is significant as six new permanent member countries viz. China, India, Italy, Japan, Republic of Korea and Singapore were admitted as new permanent Observer States.

The complete version of the declaration can be accessed from the following link. https://oaarchive.arctic-council.org/bitstream/handle/11374/93/MM08_Kiruna_Declaration_final_formatted.pdf?sequence=5&isAllowed=y.

Appendix B

Asian Countries' Positions on the Arctic

Some Asian countries do not have declared official policies on the Arctic. However, country positions can be inferred from the speeches of government officials and from publications on government websites.

China

The Keynote Speech titled 'China in the Arctic: Practices and Policies' was delivered on October 17, 2015 by Vice Foreign Minister Zhang Ming at the China Country Session of the Third Arctic Circle Assembly. This can be considered as the official position of the country on Arctic Affairs.

It is available at the following link:

http://www.fmprc.gov.cn/mfa_eng/wjbxw/t1306858.shtml

India

The document titled 'India and the Arctic' published on the website of the Ministry of External Affairs, Government of India on June 10, 2013 can be considered as an articulation of the Indian government on the Arctic.

It is available at the following link:

<http://mea.gov.in/in-focus-article.htm?21812/India+and+the+Arctic#>

Japan

The document 'Japan's Arctic Policy' authored by The Headquarters for Ocean Policy on October 16, 2015 gives a detailed position of Japan and its interests in the Arctic.

A provisional English translation of this document is available at the following link:

[http://www.kantei.go.jp/jp/singi/kaiyou/arcticpolicy/Japans_Arctic_Policy\[ENG\].pdf](http://www.kantei.go.jp/jp/singi/kaiyou/arcticpolicy/Japans_Arctic_Policy[ENG].pdf)

Korea

The Arctic Policy of the Republic of Korea was released in December 2013 but was not published as an official document. The Plan was jointly developed by the Ministry of Oceans and Fisheries (MOF), Ministry of Foreign Affairs (MOFA), Ministry of Science, ICT and Future Planning (MSIP), Ministry of Trade, Industry

and Energy (MOTIE), Ministry of Environment (MOE), Ministry of Land, Infrastructure and Transport (MOLIT), and Korea Meteorological Administration (KMA). Korea Maritime Institute (KMI), Korea Polar Research Institute (KOPRI) and Korea Institute of Geoscience and Mineral Resources (KIGAM) were also involved in the development of the plan.

An extract of the same is placed at Appendix C.

Singapore

Singapore has no formally declared Arctic policy until now. The Speech titled 'State of the Arctic—Singapore's Perspective' by Minister of State in the Prime Minister's Office and the Ministry of Culture, Community and Youth Sam Tan Chin Siong delivered on January 19, 2015 at the 9th Arctic Frontiers Conference at Tromsø, Norway, could be seen as Singapore's Arctic policy.

It is available at the following link:

http://www.iarc.uaf.edu/sites/default/files/node/4484/singapore_speech_state_of_the_arctic_singapor_15861.pdf.

Appendix C

Arctic Policy of the Republic of Korea

Overview

- 1993 conducted basic survey and research on the Arctic
- 1999 launched joint research on the Arctic Ocean with China
- 2002 established the Dasan Arctic Science Station in Svalbard, Norway, joined the International Arctic Science Committee
- 2008 applied for observer status in the Arctic Council
- 2009 built research icebreaker Araon
- 2012 joined the Svalbard Treaty
- 2013 joined the Arctic Council as observer, drew up a master plan for the Arctic.

The History

The melting of the Arctic ice will provide new opportunities for growth, but it also poses serious challenges to the livelihoods of residents in the Arctic and its biodiversity. The decreasing sea ice creates new business opportunities in the Arctic in such areas as resources development and commercialization of the Northern Sea Route (NSR). However, the increase in human activities may also affect the marine ecosystem, a vulnerable part of the environment, and threaten the livelihoods of residents, including the indigenous peoples of the Arctic.

Gaining an observer status in the Arctic Council will be a great opportunity to promote shared interests and cooperation in the Arctic. It will also lay the groundwork for establishing relations with the Arctic Council and its Working Groups and Task Forces and for strengthening bilateral or multilateral cooperation with various stakeholders in the Arctic including its indigenous peoples.

The Republic of Korea seeks to establish a policy framework to strengthen the capacity of Korean businesses and contribute to the sustainable development in the Arctic drawing on its strengthened cooperation with the Arctic states. In July 2013, the government decided that Korea needs a master plan for implementing a comprehensive Arctic policy and follow-up measures.

As a result, the Master Plan was established in December 2013. The Plan was jointly developed by seven ministries and administrations.

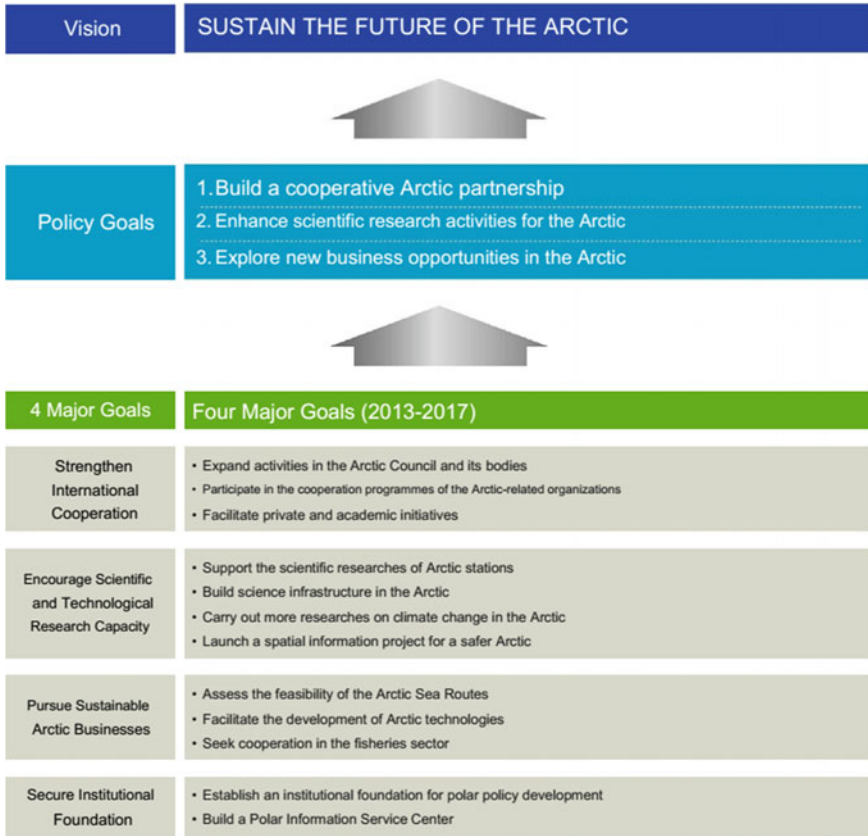
The ministries that are involved are the Ministry of Oceans and Fisheries (MOF), Ministry of Foreign Affairs (MOFA), Ministry of Science, ICT and Future Planning (MSIP), Ministry of Trade, Industry and Energy (MOTIE), Ministry of Environment (MOE), Ministry of Land, Infrastructure and Transport (MOLIT), and Korea Meteorological Administration (KMA). National research institutes such as the Korea Maritime Institute (KMI), Korea Polar Research Institute (KOPRI), Korea Institute of Geoscience and Mineral Resources (KIGAM), etc. also took part.

Vision

The goal of the Master Plan is to contribute to sustainable future of the Arctic by enhancing cooperation with the Arctic states and relevant international organizations in the areas of science, technology and economy, especially by participating in the Arctic Council and its Working Groups. It aims for the ROK to: (a) strengthen international cooperation; (b) build a foundation for polar scientific research; and (c) create new business areas.

It serves as a framework for developing consistent policies, and Korea will have a committee that would put into action the abovementioned three policy goals and review their implementation.

From 2013 to 2017, thirty-one key plans will be established to meet the following four major strategic goals: (a) strengthening international cooperation with the Arctic region; (b) encouraging scientific and technological research capacity; (c) pursuing sustainable Arctic businesses; and (d) securing institutional foundation.



Implementing Programs

Strengthening International Cooperation

Expand Participation in the Arctic Council’s Activities

- Establish plans to follow up on the major decisions of the Arctic Council
- Hold consultation meetings with the Arctic Council’s members states on a regular basis
- Establish plans to participate in the Arctic Council’s Task Forces
- Participate in the follow-up projects to the Arctic Search and Rescue Agreement

Participate in the Arctic Council's Working Groups

- Establish a plan to increase the participation of Korean experts in the six Working Groups
- Develop and participate in joint research projects related to the Working Groups

Cooperate with Observer States

- Increase cooperation activities that contribute to achieving a sustainable Arctic with observer states such as China and Japan

Build Academia-led Research Networks

- Strengthen cooperation with educational institutions such as the University of the Arctic
- Increase joint research with Arctic research institutes
- Establish and operate an Arctic Laboratory in the Arctic Circle

Scientific Research

- Participate in the ICARP-III (3rd International Conference on Arctic Research Planning) within the IASC (International Arctic Science Committee)
- Plan and propose international joint research projects using Korean equipments including icebreaking research vessels

Participate in Other Consultative Forums

- Encourage participation in international forums and consultative society such as the Arctic Frontier and Arctic Circle, etc.

Cooperate in Ship Safety and Marine Environmental Protection

- Develop shipbuilding technologies for the Arctic and for different vessel types (containers, LNG carriers, etc.) and materials technologies that are suitable for operations at very low temperatures
- Set up national safety standards for polar ships, in preparation for the Polar Code

Cooperate with Indigenous Groups

- Carry out cooperation projects to preserve the Arctic's unique history, culture and traditional knowledge

Cooperate with Indigenous Groups

- Pursue cooperation projects to preserve the unique Arctic history, culture and traditional knowledge

Encouraging Scientific and Technological Research Capacity

Expand Research at the Dasan Station

- Start research on geological, atmospheric, and ecological changes in Svalbard, Norway at the Dasan Station
- Broaden participation in Svalbard Integrated Arctic Earth Observing System (SIOS) projects
- Seek to participate in international joint research projects taking place in the Svalbard region

Conduct Comprehensive Arctic Sea Research by Utilizing ARAON

- Conduct research on ways to improve the monitoring of the surrounding environment of the NSR (Northern Sea Route)
- Conduct gas hydrate exploration and deep drilling in the Arctic Sea with Arctic States

Build an Observation System for Environmental Changes in the Circumpolar Permafrost

- Expand research on developing basic and source technologies, identify new areas in which international joint research tasks can be conducted, and launch joint research projects with domestic and international universities and foreign institutes
- Operate research nodes for Arctic permafrost observation and develop related source technology

Expand the Dasan Station

- Pursue expansion of laboratories for soil and geological sample preservation and increase all-sky cameras and field observation equipments for atmospheric science research
- Examine the feasibility of building a new independent station taking into account the possibility of conducting research in new areas

Build an Arctic Research Consortium

- Build a ROK Polar Research Consortium that includes research institutes, relevant universities and relevant business sectors

Build a Polar Research International Cooperation Center

- Jointly establish a Cooperation Center with Arctic states

Strengthen Studies on Polar and Global Climate Change

- Develop a model to identify the causes of Arctic climate change by conducting high-definition atmospheric and marine modeling of the Arctic Sea and reproducing a circulation model of the ocean and sea ice
- Enhance the forecast capacity for changes in the sea ice and the environment around the Arctic Sea routes

Increase Cooperation Projects on Spatial Information Development in the Arctic

- Pursue cooperation with Arctic coastal states and nearby nations to carry out Arctic spatial information development projects

Cooperate on the Arctic Sea Routes

- Cooperate with the Arctic Regional Hydrographic Commission (ARHC) to provide safe nautical charts on the uncharted waters of the Arctic

Conduct Research on Climate Change Forecast Using Arctic Science Infrastructure

- Pursue research to understand the physical processes in the atmosphere, the ocean, and sea ice through field observations of key areas in the Arctic Sea and satellite remote sensing and develop a model to increase understanding and interaction
- Develop data assimilation technology for marine and sea ice data in the Arctic Sea
- Develop new joint research programs on Arctic climate change

Conduct Feasibility Study and Establish Plan for Building a Second Research Icebreaker

- Build a second research vessel with ice-breaking capabilities to perform more specialized and sophisticated functions
- Enhance research to accurately assess the effects on the climate of the Korean Peninsula caused by changes in the Arctic

Pursuing Sustainable Arctic Businesses**Accumulate Arctic Sea Route Navigation Experience**

- Establish and implement follow-up measures to the pilot navigations along the Arctic Sea routes
- Operate a consultative body on energy that consists of ship and cargo owners and bulk cargo between Asia and Europe

- Provide consulting services and market research support to make it easier for Korean maritime logistics companies to enter the Arctic Sea market
- Conduct joint research with leading Arctic maritime nations to seek measures to resolve the shortage of crews and cooperate on the Arctic Sea route operation

Provide Incentives to Encourage Using the Arctic Sea Route

- Implement a plan to reduce the port facility usage fee for vessels that use the Arctic Sea routes
- Provide possible incentives for the vessels that use the Arctic Sea routes

Conduct International Joint Research and Host Seminars to Increase the Use of the Arctic Sea Routes

- Pursue joint research with Arctic states in the fields of resources development, cargo shipping infrastructure, transshipment ports, and the commercial use of NSRs
- Host international seminars and invite experts from the Arctic coastal states

Develop Arctic Sea Operators' Capacity

- Take advanced training courses on ice navigation and participate in trainings programs aboard an ice-class vessel and ice breaker to open a training course on ice navigation
- Develop a safety training course that teaches the basics of glaciers, emergency responses, and survival methods for crews that board polar operating vessels

Cooperate on Developing Arctic Coastal Ports

- Establish a working group of experts from the governmental, industrial, academic, and research sectors

Revamp Korean Ports that are connected to Arctic Sea Routes

- Establish a basic plan for ports to prepare for the commercialization of the Arctic Sea routes

Lay the Foundation for Sustainable Arctic Resource Exploration Cooperation

- Carry out joint programs, including an Arctic geological survey with an international group of experts
- Launch joint exploration of minerals and geological survey with resource-related public entities and institutes
- Host a symposium on ways to increase cooperation in developing mineral and energy resources in the Arctic

Cooperate in Sustainable Fisheries Resource Management

- Strengthen cooperation with the region's major fisheries organizations that are associated with the Arctic and its adjacent seas

- Establish a project group led by the NFRDI (National Fisheries Research and Development Institute), KOFA (Korea Overseas Fisheries Association), PICES, KMI, and KOPRI, and develop a basic plan to strengthen cooperation
- Continue to strengthen bilateral fisheries cooperation with Arctic coastal states

Develop Shipbuilding and Safety Technology for Polar-Class Vessels

- Develop core technology for safe navigation in the polar region
- Develop technology for safe navigation of ice class ships along polar routes and relevant testing technology

Develop Offshore Plant Technology for Deepwater Resources Development

- Strengthen R&D throughout the entire offshore plant cycle to achieve independence in developing core technology and provide relevant support for the industry
- Increase R&D for offshore plants that produce deep-water resources

Securing Institutional Foundation

Establish Institutional Base to Develop a National Polar Policy

- Provide legal ground by enacting a law on Polar Region cooperation
- Establish a Polar Region Activity Promotion Committee that deals with matters related to activities in the polar region, including the establishment of a basic plan

Build Polar Information Service Center

- Build an Information Service System that would collect, analyze, and provide information on international organizations including the Arctic Council, the activities of Arctic States and business activities in the Arctic.

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