Changing Environments of the Arctic Region and Korea's Arctic Policy
: Restrictions and Prospects

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국문요약

북극 환경변화와 한국의 북극정책 : 제약점과 전망

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최근 지구온난화와 북동항로의 이용 가능성 증대, 자원 개발 등으로 인해 북극은 지정학 및 지경학적 중요성이 부각됨에 따라 개발과 국제협력이 공존하는 지역으로 부상했다. 아울러 북극 연안 5개 국가들의 국제협력에 가장 큰 제약점이 되고 있는 영유권 주장은 실질적인 점유나 실효적 지배가 없는 상태이기 때문에 국제법적으로 적법성 논란의 대상이 된다. 이들 국가들이 북극지역 항로와 자원 개발을 주도하고 있지만 아직 미해결 국경협약이 존재한다. 현재 북극지역은 유엔해양법(UN Convention on the Law of the Sea)에 의해 해역에 대한 개별국가의 주권이 인정되지 않고 연안국들에게 200해리 경제수역이 적용된다.

이런 북극의 특수한 환경을 기반으로 한국은 중국 및 일본과 3국 협력 증진 및 북극지역의 전략적 중요성을 인식하고 다양한 활동을 전개해야 한다. 향후 중장기적 차원에서 한국은 북극이사회(Arctic Council: AC)의 영구옵서버(permanent observer) 국가로서 북극 개발과 제약점을 극복하기 위해 적극적인 참여와 다양한 협력을 추구해야한다. 정부는 북동항로의 상업화와 자원개발, 기후변화 및 환경보호, 지속가능한 발전 방안을 모색하고 역할을 확대해야 한다. 이를 위해 주변국 중국과 일본과 북극 연안국들과의 협력을 강화하고, 북극이사회 활동과 다양한 북극관련 국제기구를 포함해 관계성을 잘 고려해야한다. 궁극적으로 북극의 글로벌 거버넌스 구축과 국제협력 증진을 위해 체계적인 대응방안을 모색해야 한다.

주제어: 개발과 보호, 북극이사회(AC), 북동항로의 상업화, 글로벌 거버넌스, 제약점과 과제

I. Introduction

Currently the Arctic region is composed of Russia, the US, Canada, Denmark(Greenland), and Norway, which are the coastal states of the Arctic Ocean. Furthermore, the Northern territory of 8 countries including Iceland, Sweden and Finland in the surrounding areas of those coastal countries are politically called Lapland[1] Recently, the discussion of international cooperation on the development of the Arctic region and the means of development thereof has seen an increase. However, various restrictions are being proposed. The claim of dominium of the Arctic region from the five coastal countries is becoming the subject of an internationally legitimate controversy due to the fact that there is no practical occupancy or efficient governance. Certain countries enforce control policies on the Arctic claimed by their country through national law. Although these countries lead the resource development of the Arctic region, border agreements are still not properly concluded at this stage. The sovereignty of an individual country over the waters is not recognized pursuant to the UN Convention on the Law of the Sea, and a distance of 200 nautical miles of the economic zone is applied to these coastal countries.[2] Another important issue is that the scale of the Arctic Ocean ice is decreasing at a rate of approximately 4% every decade due to the acceleration of global warming. The natural environment of the Arctic region is greatly affecting the earth's greenhouse effects due to the methane gas released from the tundra region. Due to such rapid environmental changes of the Arctic region, the resource development and

1) Greenland belongs to the territory of Denmark, the Svalbard Islands belong to the territory of Norway, and Franz Josef Land belongs to the territory of Russia.

2) Russia has the longest coastline and is closest to the Arctic region. Russia is also participating in the development of the oil fields and gas fields and the military activities in the continental shelf region of the Arctic. Russia has also performed training in deep sea exploration and nearby waters in the Arctic. Russia submitted a document related to the restrictions of the continental shelf related to the 200 nautical miles of to the UN Commission on the Limits of the Continental Shelf (CLCS) in 2001. Yun, Y. M., Modern Russian Politics and International Relations(Seoul: Doonam, 2011), pp. 127-130.

complete opening of the Arctic Ocean route is expected to further increase in the next 20 to 30 years.[3)]

And so, due to the constant progress of resource development and the use of the Arctic Ocean route at a global level, the possibility of participation and the role of the Korean government and corporations have also been expanding. Korea has recognized the importance of the polar regions and has been making diplomatic efforts to obtain qualifications as a permanent observer of the 'Arctic Council'(AC) promoting international cooperation, which was established in 1996 for the protection of the Arctic environment, the maintenance of biological diversity, the protection of former inhabitants, and the use of sustainable sea resources. As a result, by joining as a permanent observer country in May 2013, participation in the process of establishing international standards emphasizing the sustainable development of the Arctic region has become possible. From a mid-to-long term perspective, it is necessary for Korea to further expand its role and participation in the commercialization of the Arctic Ocean route, resource development, environment protection and expansion of territorial space in terms of strategic elements as a permanent observer country of the AC.

Under this context, this article is to intend to seek a means of enhancing international cooperation from the perspective of global governance and Korea's main policies of the Arctic region to be distinguishable from existing studies by using a method of analyzing representative types of literature research based on the case studies of the Arctic region. Provided below is the composition of this article. It will be analyzed the geopolitical and spatial properties of the Arctic region and the restrictions on developing Arctic resources, and be considered the problems and means of commercializing the Arctic Ocean route and the role of Korea in the Arctic Council. Based on which, counterplan tasks required for a mid-to-long term initiation of an efficient Arctic Policy by Korea will be proposed.

3) www.foxnews.com/science/2013/09/09/arctic-sea-ice-up-60-percent. (Date searched: October 4, 2015).

II. Restrictions and Geoeconomic Features of the Arctic Region

According to the definition of the International Hydrographic Organization (IHO), the Arctic region includes the waters surrounding the Eurasian continent, the Northern American continent, and Greenland. The west side of the Arctic Oceanis connected to the North Atlantic Ocean passing over Norway and Greenland Sea, and the east side continues to the North Pacific through the Bering Strait with a width of 80km.[4] The area of the Arctic region is 40 million ㎢, and occupies 8% of the Earth's surface and 15% of the Earth's land area. According to the 2008 United Stated Geological Survey(USGS), mineral resources, such as diamond, gold, silver, copper, iron, zinc, nickel, and tin, and fossil fuels including coal, natural gases, and gas hydrate, are in abundance buried in the seabed continental shelf. The value of these mineral sources equates to 1.5 to 2 trillion dollars. The total amount of burials in the 400 or so mines equate to approximately 240 billion barrels, which corresponds to 10% of the amount of resources of the entire world. 12 billion barrels worth of oil in the Northern waters of the US and Canada and 4.5 trillion ㎥ of natural gases are buried, and it is estimated that approximately 7 billion barrels worth of oil are also buried in the Chukchi Sea in the western waters of the US. Furthermore, the regions of West Siberia and Barents Sea of Russia, and Alaska of the US occupy 65% of the free weight of all prospectors.[5] The oil and gas produced in the Arctic region in 2009 is estimated to be 16.3 trillion barrels (oil-converted barrels), and the amount of production in 2020 is prospected to increase by 34.4% to 21.9 trillion barrels.[6]

Russia is actively initiating the development of natural gases and oil in the

4) The average water level of the Arctic Ocean is 1330m, and in the central water level, a 4000m of deep sea plain exists. Refer to the following in respect to the Arctic Circle and the Arctic Ocean.www.eoearth.org/view/article/150195/(Date searched: October 3, 2015).

5) Ko, S. M., "Arctic Region Mineral Resource Development Prospects," Korea Institute of Geoscience and Mineral Resources, February 15, 2013.

6) Asia Economy, September 10, 2012.

Arctic Ocean. Russia's state operated oil company, Rosneft, jointly drilled the Arctic Ocean with Exxon Mobil of the US.[7] In 2008, Russia concluded a contract for the development of crude oil with BP, a British oil company, in January 2011, after receiving approval to drill the Arctic waters.[8] The Russian energy company, Novatek, undertook construction of an LNG plant in the central Siberian region of the Arctic Ocean with French and Chinese companies.[9] The US approved the plan for Shell's drilling of the oil field of the waters in the Northern area of the Arctic Ocean of Alaska in July 2012.[10]

The greatest restrictions faced in respect to sustainable 'development and protection' of the Arctic region include 'reinforced dominium, the extended continental shelf for resource development, environmental protection based on global warming, and weakened competition based on non-traditional resource development.' The conflict for the dominium over the Arctic Ocean? particularly by the coastal countries? display the most complex appearance, including the Exclusive Economic Zone(EEZ) and expansion of the continental shelf. According to the UN Convention on the Law of the Sea Agreement,[11] the sovereignty of an individual country is not acknowledged in the Arctic region, and only the EEZ of 200 nautical miles in the five close countries of Russia, the US, Canada, Norway and Denmark are acknowledged. The sovereign right on only the resources within the same waters is recognized. Furthermore, if the objective fact that such bodies of water are connected to the continental shelf of the country, oil or gas, and other minerals can be developed in waters of up to '350 nautical miles.' In order for each country to be acknowledged for jurisdiction on

7) http://barentsobserver.com/ru/energiya/2013/06/sechin-vozvrashchaet-murmanskoy-oblasti-uverennost-22-06(Date searched: October 5, 2015).
8) International Herald Tribune, February 16, 2011.
9) International Herald Tribune, July 26, 2013.
10) International Herald Tribune, May 25, 2012.
11) Due to the effect of the UN Convention on the Law of the Sea Agreement Agreement, Norway ratified the agreement in 1996, Russia ratified the agreement in 1997, Canada ratified the agreement in 2003, and Denmark ratified the agreement in 2004. The US did not ratify the agreement. UN Convention on the Law of the Sea Agreement Article 76 Clause 8.

continental shelves beyond the EEZ, suitable evidentiary material must be submitted to the UN Commission on the Limits of the Continental Shelf (CLCS).[12]

The 'demarcation of the marine boundary line' surrounding the Arctic region causes a change in the governance of the marine territory. This becomes the main aspect of conflict due to the possibility of energy resource burial and the particular standing of the marine territory and effect of the UN Convention on the Law of the Sea, rather than the cooperation between the coastal countries.[13] Currently, the extension of the continental shelf between the coastal countries and the problem of demarcation of the marine boundaries are becoming obstacles. In 2007, after Russia placed a national flag on the Arctic Ocean, the conflict of dominium of the surrounding countries further intensified.[14] The core of the conflict of dominium focused on the Lomonosov (submarine ridge) Ridge, where several islands are gathered. For instance, Russia's Arctic expedition on August 2, 2007 fixed a Russian flag made of titanium at a water level of 4261m and 4302m using small submarines 'Mir' No. 1 and No. 2. At the time, the resistance of the surrounding countries was severe. In this regard, conflict of dominium of the Arctic region is regarded as the 'New-Cold War.' Russia has constructed the large city to develop a mine of copper and nickel in Noril'sk and develop an oil and gas field in Yamal Pen. Russia is leading a plan to resolve the conflict with the surrounding countries and also initiating a policy of extending the continental shelf for developing resources in the Arctic region.[15]

Within this situation, Russia resolved a 40 year conflict with Norway surrounding the jurisdiction of the partial waters of the Arctic waters and the Barents Sea on April 27, 2010. The two countries agreed to an Arctic Ocean

12) Yun, Y. M. (2011) pp. 134-135; futher information see, Donald Rothwell, The Polar Regions and the Development of International Law (Cambridge Univ. Press, Cambridge, 1996).

13) Park, M. H., Arctic Ocean Struggle(Seoul: The Soop, 2010).

14) Russia attempted to find evidence that the East Siberia Chukotka Peninsula is connected to the continental shelf in order to transfer the continental shelf to Russia territory. http://blog.hankyung.com/?mid=blog&document_srl=2482981&vid=pine735(Date searched: August 12, 2010).

15) Osherenko & Young, Oran B, The Age of the Arctic: Hot Conflicts and Cold Realities (Cambridge University Press, Cambridge, 2005).

Border Treaty providing that 175 thousand ㎢ of waters is divided into two equal parts.[16] Currently, Denmark is claiming dominium on the basis that it is located on the extension of Greenland, which is under the territory of Denmark, and Canada is claiming a part of the eastern region, including Ellesmere Island, as its territory.[17] Explorative drilling is also being actively conducted in the Arctic region of Canada and the US.

The US has regularized resource development of the Alaska region to increase the Arctic exploration budget of the US Navy by 40% in 2009.[18]

Canada granted development rights to a global resource corporation for three locations of Arctic marine mines. In addition to these coastal countries, the global oil major corporations, Shell, Exxon Mobil, BP, Statoil, ENI, and Gazprom, are also participating in resource development.[19]

Among these corporations, Shell is the most active in development surrounding Alaska and Greenland, and it has input a polar sail drill ship of Stena in Sweden in the resource development in Alaska since 2012. Statoil of Norway is undertaking resource development in Barents Sea, Canada, Alaska, and Greenland to supplement the decrease in the natural production of crude oil. However, there are cases in which companies have given up on mining even after succeeding in exploration at a high cost. Furthermore, when the development ofnon-traditional oil resource technologies, such as oil sand and tight oil, accelerate and the supply of such technologies increases, it is predicted that Arctic resource development, which has a relatively high cost, may decline. And so, the interest of the international society on environmental protection is based on the progress of the resource development of the Arctic. According to the

16) The New York Times, April 28, 2010; Yang, H. C., China's Arctic Strategy Research," paper was presented at the Korean International Political Science Association Seminar, August 22, 2013.
17) Yun, Y. M. (2011), pp. 134-135; http://www.un.org/Depts/los/clcs_new/submissions_files/submission_rus.htm(Date searched: July 20, 2015).
18) Park, Y. J., "Japan's Policy for Advancing in the Arctic Ocean and Implications in Korea," paper was presented at the Korean International Political Association Seminar, August 22, 2013, p. 7.
19) Samsung Economic Research Institute CEO Information(2013), p. 3.

expansion of the opposing opinion on development, international environmental groups, such as Green Peace or World Wildlife Fund(WWF), argued for the discontinuation of the entire development of oil fields in the Arctic.

Notably in 2010, the leakage of crude oil from BP in the Mexican Port caused great concern. Greenland is currently at risk of prohibiting the excavation of radioactivity emitting substances based on the rare earth resource development project conducted by China pursuant to the Greenland law.

III. Korea's Arctic Policy and International Cooperation

1. The Role of Korea and the Arctic Council (AC)

The Arctic Council was established in 1996 and discusses the pending issues of the Arctic region and leads necessary and vital developments. As an international organization between states of the Arctic region, the AC works on an international level. It is comprised of include a conference, which is a full panel hosted every two years, and the Senior Arctic Official(SAO) hosted every six months, as well as six working groups.

The AC has as its objective the welfare of the residents surrounding the Arctic, protection of the natives and regional traditions, maintenance of biodiversity(protection of the Arctic regional environment and residents' health ecology), sustainable use of the Arctic natural resources and sustainable development of the Arctic region. The actual function of the AC includes the Arctic Contaminants Action Program(ACAP), Arctic Monitoring Assessment Program(AMAP), Conservation of Arctic Flora and Fauna(CAFF), Emergency Prevention Preparedness and Response(EPPR), Protection of the Arctic Marine Environment(PAME), and sustainable development work department.[20]

The AC has led Arctic issues and political discussions, such as sustainable

20) Yoo, J. G., "Pending Issues and Tasks of the Arctic Ocean Governance," Analysis of Main International Problem, Korea National Diplomatic Academy, 2012. pp. 8-9.

development and environmental protection focused on such working groups. The AC additionally leads research into climate change problems, oil and gas resource development and Arctic shipping routes, and Arctic political establishments related thereto. The economic benefits, including the resource development of the Arctic region and the use of the Arctic shipping routes, are led by the five coastal countries of the US, Russia, Canada, Norway and Denmark ? all of whom are member countries of the AC. In addition to the current chairman country of Canada, the eight member countries include the US, Denmark(Greenland/Faroe Islands), Finland, Iceland, Norway, Russia, and Sweden, as well as 500,000 or so permanent natives, and six former inhabitant groups surrounding the Arctic regions. The permanent observer countries composed of the non-coastal countries of France, Germany, Netherlands, Poland, Spain, and England, as well as 9 governmental organizations including the UN and the Food and Agriculture Organization of the United Nations(FAO) and 11 non-governmental groups.[21] According to the expanded strategic and economic values of the Arctic region, it is essential for the AC to obtain qualification as the permanent observer for the reinforcement of Arctic diplomacy.

The non-coastal countries that have been exploring the Arctic from 1980s to 1990s were officially added as permanent observer countries. At the 8th AC Conference held in Kiruna, Sweden on May 15, 2013, countries including Korea, as well as Japan, China, India, Singapore, and Italy became official permanent observer countries. The EU obtained qualification as a 'conditional observer' under the condition that it relieves seal import prohibition policy. The member countries of the AC selected new permanent observer countries, including Korea, by determining the enhancement of benefits of the Arctic region, professionalism, and contribution and performance towards international cooperation related to the Arctic 〈See Table 1 〉.

By obtaining qualification as a permanent observer, it has become possible for Korea to research the exclusive movements of the coastal countries of the Arctic

21) Korea Supporters Association for Polar Research, www.kosap.or.kr/11781 (Date searched: August 3, 2013).

and financially support the Arctic developments as a cooperative country of the Arctic region. Although Korea does not have a voting right in determining the policies related to important issues, Korea is able to exercise all rights and the right to speak at regular meetings at the AC. It has become possible, therefore, for Korea to actively participate in matters related to policies, such as the significant resources and route developments of the Arctic. Its specific role is as follows: first, it is possible for Korea to participate in discussions of the accelerating international society, including regular cooperation and the construction of a negotiation system with the AC, and establishing comprehensive policies. Second, the opportunity for bi-and multi-cooperation with member countries has expanded; it has now become easier for Korea to construct professional networks through various working groups and Korea can actively participate in various activities related to the Arctic. Third, Korea can participate in regular meetings and voice opinions on the main issues. Korea can also participate in 6 work groups affiliated with the AC, such as the sustainable development work group.[22)]

〈Table 1〉 Korea's Advancement in the Arctic Region (1986-2014)

Year	Activity
1986	· The 33rd country to sign the Antarctic Treaty with polar research as the initiation.
1987	· Installed a polar research institute at the Korea Institute of Ocean Science & Technology.
1988	· Began Antarctic research by completing construction at the Sejong base of the Antarctic in February.
2002	· Officially began research related to the Arctic environment and ecology system by installing an Arctic Dasan Science Base in Ny-Alesund in Spitsbergen Island of Svalbard in Norway.
2004	· The Arctic Dasan Science Base became independent as an attached polar research institute.

22) Ministry of Oceans and Fisheries, May 16, 2013.

2008	· Joined the Arctic Council as an observer in May.
2008	· Obtained a position as an ad-hoc observer in November, and is continually active. The government expressed a will to participate in the Arctic development in the international society.
2009	· Hanjin Heavy Industries & Construction began various joint research by drying Araon, Korea's first icebreaking research vessel. The Korea National Oil Corporation performed a fluid analytical research on the production well of the polar region.
2011	· Successfully hosted the 19th Arctic Science Supreme Council held in Seoul in March.
2011	· Continued polar activities related to the international society, such as the rescuing of Russian fish boats by Araon in the Antarctic in December.
2012	· President Myung-Bak Lee visited countries in the Arctic region to conclude an MOU related to shipping cooperation in the Arctic Ocean route.
2013	· The development of the Arctic shipping routes was included in the systematic marine management and the creation of the marine new growth driving force was included as the 13th of 140 government projects of the Park Geun-Hye Administration.
2014	· The Antarctic Jang Bogo Station is under construction and scheduled for completion in June.

Several international meetings have been held with the personality of exclusive governance focused on the coastal countries of the Arctic region in addition of the AC. However, the coastal countries have not deduced a particular agreement other than the argument that there is a need for a new Arctic-related policy:[23] The pursuit of international cooperation by the coastal countries of the Arctic through an international regime. A broad internationally legal frame that can be applied to the Arctic region was discussed at the Oslo meeting in October 2007. For instance, the frame included the collection of the scientific data related to the continental shelf, and the scientific research and protection of the marine environment. Thereafter, the foreign minister of the five coastal countries hosted an Arctic Ocean Conference discussing the issue of jurisdiction of the Arctic in Illulissat of Greenland belonging to Denmark in May 2008. For the first time, a

23) Kim, H. S., "Legal Problems Related to the Restrictions of the Continental Shelf in the Arctic Ocean," Marine Research, Vol. 22, No. 1, 2010, p. 72.

meeting comprised of ministers was held in order to adopt the 'Illulissat Declaration' including the opposition of a new international law in the Arctic, supporting the UN marine law, protection of the Arctic marine environment, and the reinforcement of rights of the nearby countries of the Arctic Ocean. Through this Declaration, these countries agreed not to adopt an additional Arctic Treaty as the Antarctic Treaty, and to respect the UN Convention on the Law of the Sea Agreement concluded in 1982 upon the occurrence of a conflict of dominium of the Arctic Ocean, i.e., to follow 'the decision of the UN.' It was determined that joint cooperation, such as Arctic exploration, would be reinforced through mutual confidence and negotiations between the coastal countries, and the cooperative means for responding to the effects of climate change and various accidents, such as marine safety and oil leakage accidents with respect to the residents of the Arctic Ocean were discussed.[24)]

2. Activation and Restrictions of the Arctic Ocean Route

The coastal countries of the Arctic have used the Arctic sea route as a marine route for transporting cargo for 100 or so years. However, there was a lack of connection with other substitutive routes and a lack of economic efficiency and safety of the Arctic shipping routes, and thus, these routes faced multiple restrictions and difficulties. However, ship sailing is increasing due to the recent development of resource discovert and distribution and transportation in the Arctic.[25)] The main Arctic shipping routes of ship sailing are categorized into the northeast and northwest passages. The Northeast Passage or Northern Sea Route(NSR) is the passage connecting the Atlantic to the Pacific along the North Siberian Coast, which is also the coastal route in Northern Russia. The Northwest Passage connects from the Atlantic to the Pacific along the Northern

24) http://www.sikunews.com/art.html/catid=2&artid=4950(Date searched: August 1, 2013).

25) Hwang, J. H., "Possibilities and Tasks of the Arctic Ocean Routes," paper was presented at theInstitute of Korea-Siberia Center Semiar, September 17, 2010, p. 108.

Canadian waters.[26] Routes using other ice breakers are connected toward the Arctic direction from the Greenland Island coast and the northern Norway coast. The Arctic shipping routes are international routes that are the remains of the thawed Arctic Ocean, which will significantly contribute to reducing the marine traffic of Europe and Asia.[27] Generally, the Arctic shipping route sare known as the NSR. From 2008, the Arctic shipping routes became exponentially opened. The NSR refers to marine transportation connecting Busan and the far east of Russia to the Bering Strait on the east side of the Arctic and to Murmansk on the west side.[28] The connecting line of Busan- Suez Canal- Rotterdam of Netherlands is 20,100 km and takes 24 days. However, if the Arctic shipping routes of Busan-Arctic shipping routes Rotterdam is passed, the distance becomes a mere 12,700km at a reduction of 7000km, which will take approximately 14 days 〈See Table 2〉.

〈Table 2〉 Current State of Arctic Lines

Category	Existing Course		Arctic Course		Effect of Reduction	
	Route	Distance	Route	Distance	Distance	Time
Busan-Rotterdam Port	Suez Canal	20,000 ㎞	Northeast Passage	13,000㎞	7,000㎞	10 days
Busan-New York	Panama Canal	18,000 ㎞	Northwest Passage	13,000㎞	5,000㎞	6 days

In a report called 'Opportunities and Response of Arctic Development', Samsung Economic Research Institute indicated that "the thawing speed of the Arctic is increasing at four times the rate than that expected in the existing

26) Kang, S. H., "Environmental Change and Prospects of the Arctic Ocean," paper was presented at the KMI International Seminar, Seoul, June 23, 2009, p. 22.

27) Park. M. J.& Kim, M. S., "Reflection on the Legal Problem of the Northeast Route," paper was presented at theKorean Society of Marine Environment & Safety Semianr, April 2010; Yun, Y. M. (2011), pp. 130-131.

28) Hwang, J. H. (2010), pp. 108-109; Yun, Y. M., "Russia's Marine Security Strategy of the Arctic Region: Focused on Arctic Ocean Development and Korea-Russia Marine Cooperation," Journal of the East and West, Vol. 21, No. 2, 2009, p. 65

climate model. The area of ice in the Arctic as of September 2012 was the lowest in observed history, which is a mere 22% of the highest in that of winter (15.24 million ㎢ to 3.41 million ㎢)." The report also revealed that "the rapid thawing of the Arctic is increasing the possibility of the development to the searoute and resources," and "the commercial establishment of the Arctic shipping routes will also be moved forward to within the next 10 years," and predicted that a sail of six months will be possible by 2020, and a standard year-round sail will be possible by 2030.[29)]

Thus, the thawing of the Arctic is causing a change in the amount of goods transported based on the use of the route and a change in conditions of transportation in the Arctic shipping routes. The Arctic shipping routesare currently constantly increasing since the first commercial sailing of the Beluga Shipping by Beluga, Germany in 2009.[30)] In 2010, Germany's 100 thousand ton oil tanker Baltika and Norway's iron ore bulk carrier, Nordic Barents, succeeded in their demonstrative sailing. With these two successful demonstrative sailing completed, the policy concerning increasing the usage rate of the nuclear icebreaker in Russia was enforced in Russia in 2011, which also began expanding the use of the Northeast Passage. At the time, the Nordic Barents reduced the rate of five dollars per ton of cargo to a total of 260 thousand dollars.

However, after the toll rate increased to 4 to 5 dollars per ton of cargo in June 2011, the use of the Northeast Passage increased by 9 times to 110 thousand tons in 2010, 830 tons in 2011, and 1.02 million tons in 2012. The frequency also increased from 4 times in 2010 and from 26 times to 35 times in 2011.[31)] In 2011, a policy was implemented to reduce the cost of using nuclear icebreakers in Russia, which increased the use of the Northeast Passage. The

29) Samsung Economic Research Institute CEO Information(2013), p. 1; Lee, S. W. et al., "Change in the Conditions of the Shipping Port and Prospects of Amount of Cargo Volume Based on the Establishment of the Arctic Shipping Routes," Korea Maritime Institute, 2011.

30) Andrew E. Kramer, "Polar thaw opens fuel link to Asia," International Herald Tribune, July 26, 2013.

31) Samsung Economic Research Institute CEO Information(2013), p. 6.

Arctic shipping routes, which are predicted to open in the mid-to-short term by 2030, are predicted to develop the ship and plant industries and increase distribution in an amount that will be comparable to the Suez Canal and Panama Canal. When the commercialization of the Arctic shipping routes is actively initiated, the distance and shipping time will also be reduced. The cost of transporting container cargos will also be reduced by approximately 25% and the development of industrial fields, such as the marine plant will also be made possible.[32)]

The Arctic shipping routes are forecast to be used as the shortest shipping route connecting Europe and Asia, and the western region of Northern America in the long term. The government is emphasizing the use of the Arctic shipping route, which is also suggesting the possibility of commercial establishment rather than the development of Arctic resources. To achieve this, the expansion of indirect social capital is required, such as the security of icebreakers, roads, and port facilities.[33)]

In addition, cooperation with Russia is essential as Russia is leading the use of the Arctic shipping routes based on the increased possibility of the commercialization of the Arctic shipping routes according to the rapid thawing of ice in the Arctic. Currently, Russia is greatly interested in the development of the Far East Port. Russia is in pursuit of a means of resolving the problem of the pileup of cargo due to a lack of ports in that region.[34)] If the Arctic shipping routes are established, cargo in the Suez Canal will be transferred to the Arctic, which will then transfer the role of the hub that has been performed by Hong Kong and Singapore to the Pan East Sea. Professionals have suggested that the hub port of the Arctic shipping routes will allow the processing of more than 30

32) http://blog.daum.net/shbaik6850/16547148 (Date searched: October 3, 2015); Lee, S. W. et al., Change in the Conditions of the Shipping Port and Prospects of Amount of Cargo Volume Based on the Establishment of the Arctic Shipping Route(Korea Maritime Institute, 2011).

33) Lee, S. K., "Current State and Prospects of the Development of Resources in the Arctic Region," Korea Energy Economics Institute Research Report, March 2010.

34) Oh, Y. I., "Opening a New Paradigm of Cooperation for Far East Development with the Opportunity of Arctic Development," Russia-CIS Focus, No. 219, June 10, 2013, p. 1; Samsung Economic Research Institute CEO Information(2013), p. 8.

million TEU of cargo each year. If Busan, which processes the 5th largest amount of container cargo in the world, becomes the hub port, it will bring with it positive and beneficial effects in various industries, such as shipping product supply, ship oil, marine transportation, and finance. Currently, Busan, Far East in Russia, and Najin in North Korea have all been put forward as candidates as hub ports. Once the hub port is determined, a 'sub-port' will be constructed to perform the role of an assisting port. It is highly likely that Vladivostok in Russia or the Far East in Russia will become the hub port or a sub-port.[35)]

3. Korea's Arctic Region Strategy and Tasks

In terms of global cooperation, the government is required to continually initiate Arctic region development strategies within the frame of a national strategy. To achieve this, the Korea Forum for Progress and the Korea Maritime Institute(KMI) hosted an Arctic Ocean Strategic Discussion at the end of November 2011 for the creation of future national wealth.[36)] The Ministry of Oceans and Fisheries plans to develop a business model and to prepare an Arctic Policy Masterplan including the commercialization of the Arctic shipping routes and participation of the coastal countries in the development of resources.

Furthermore, international cooperation was expanded by initiating a Korea-Norway joint research center, and plans to advance into the fisheries industry of the Arctic region and the coastal regions was a main issue.[37)] On September 16, 2013, 'Hyundai Glovis' became the first Korean shipping company to sail an ice-resistant ship, called Stena Polaris(65,000T), rented from Stena shipping in Sweden from Ust-Luga Port in Russia. Yeocheon NCC loaded naphtha(44,000T) imported from Novatek, Russia and sailed for departure to Sapo Wharf in Gwangyang Harbor around October 16 on the Arctic shipping

35) Oh, Y. I. (2013), p. 2.
36) The Korea Defense Daily, November 25, 2011.
37) Ministry of Oceans and Fisheries, March 28, 2013..

route under the protection of a Russian icebreaker. Such demonstrative sailings on the Arctic shipping routes signify contribution to the future development of the Arctic and the activation of the Arctic shipping routes.

Moreover, competition from other countries is likely to further intensify. Once the Arctic shipping routes become activated, we will see the effects of reduced transportation costs based on the reduced sea routes, selection of Arctic resource developments, the expansion of economic territory in the Arctic region, and the activation of related industries. Such demonstrative sailng have increased the interest of local ship owners and cargo owners, and the pursuit for the expanded use of the Arctic shipping routes.

In November 2012, the Ministry of Land, Transport and Maritime Affairs jointly established the 'Polar Policy Advancement Plan' with related departments.[38)]

The Park Geun-Hye Administration even selected the 'participation in developing the Arctic shipping routes and the Arctic Ocean' as the 13th of 140 government projects. The government also proposed a means of fostering Busan(container transshipment hub) and Ulsan(oil hub) as the northern route hubs through 'the 3rd National Harbor Plan(2011-2020).' As stated above, Busan, which is mentioned as the region most likely to see the benefits of the Arctic shipping route, established the Arctic Ocean Route Research Center in 2009. Ulsan also composed an Ulsan Arctic Route Activation Council focused on the Ulsan port construction. Therefore, interest and the response of local Korean governmental groups are expanding and being specified. Furthermore, Gangwon-do established the Pan East Sea Headquarters in 2012. Through which, Gangwon-do is focusing its efforts on establishing a plan to expand the infrastructure of the main ports. Gangwon-do also possesses a geological advantageous position and cargo transportation conditions as a response strategy.

In terms of geological conditions, Gangwon-do has greater advantages than Busan as it is more accessible to metropolitan areas. The land transportation

38) Joint Work of Related Departments, Polar Policy Advancement Mean(Ministry of Land, Transport and Maritime Affairs, et al., November 2012).

distance is superior, with a reduction of 140km, and the entrance of the Arctic shipping routes is faster compared to that of either Busan or Ulsan port. In addition, the number of days of transport and the cost of distribution can also be reduced. Donghae port has the advantage of being able to reduce the number of days of transport by approximately two days and the cost of distribution more than Busan port. Even in consideration of these factors, Gangwon-do is focusing on preparing a counterplan for the Donghae port to perform the central role in the Arctic shipping routes. On June 20, the Arctic Route Gangwon Port Council was established and operated as a foothold, and in early July, an inaugural meeting was held to begin official activities.[39)]

In reality, a few restrictions have been raised with respect to the activation of the Arctic shipping routes. Firstly, it is essential for a 'special ship' to freely use the Arctic routes. Currently, there are no Korean shipping companies that have ice-resistant cargo ships. Hyundai Glovia, which performed the first demonstrative sail, also used an ice-resistant ship provided by Sweden. Since the Arctic shipping route is still considered dangerous, an icebreaker that can break the ice and lead the way ahead of an ice-resistant ship is required. Although Russia has 10 icebreakers, only 6 of them are in use, including the Taimaru and Sevmorput, which have been dry for almost 30 years, and the remaining icebreakers including the Arctics, which has been dry since 1975, are either in repair or being prepared to be scrapped. Russia has decided to dry out an additional 3 icebreakers at the cost of 1.3 billion euros by 2020. Large icebreakers with a width of 34m that can break ice of 3m thicknesses are to be dried out by 2018. Russia's Northern Sea Route Administration(NSRA) announced that the Arctic Ocean can be passed during seasonal sailings when there is no ice without ice-resistant ships from early 2013. Thus, it is predicted that the use of the Arctic shipping routes will become slightly easier.[40)]

Secondly, the higher toll rate and various costs also rais problems. Ships

39) Newsis, June 21, 2013.
40) Seoul Daily Newspaper, October 5, 2013

passing through the Arctic shipping routes must pay a usage fee for the icebreaker as well as a passage rate, wherein the cost of renting an ice-resistant ship and an icebreaker is significant. The cost of renting an ice-resistant ship and an icebreaker are separate. In terms of bulk cargo(coal, oil, iron ore, etc.), 5 to 7 dollars/t must be paid as a standard fee. Even if an empty ship is sailed, a payment must be paid based on the displacement. Hyundai Glovis' oil tanker, which sailed on a demonstrative sailing on the Arctic route with a load of 43,800t of chemical oil product(naphtha) paid the entire 219 thousand dollars at 5 dollars.

Thirdly, the climate of the Arctic region is also a problem. The deep fog and wind while sailing through the Arctic shipping route become obstacles. Deep fog frequently occurs due to the difference in atmospheric pressure in the Arctic Ocean itself, and the shallow sea waters also become hazardous.

The ships sail close to coasts avoiding ice using the Northeast Passage, where shallow waters of a 12m water level must be passed. It is rather difficult for large ships to sail through such shallow water levels.

Fourthly, a cost of 1,200 dollars is required per day for ice pilots. Since pilots accompany vessels from Murmansk to the Bering Sea for approximately eight days, a minimum cost of 9,600 dollars is required. Such costs are higher than those in the Suez Canal. With the added insurance cost, the use of the Arctic shipping routes can cost 20 to 30 thousand dollars. Regardless of the risk of pirates in the Aden Bay between the Indian Ocean and the Red Sea, the insurance cost for traveling across the Suez Canal is more affordable than that in the Arctic shipping routes. Furthermore, past 73 degrees north latitude, standard communication becomes difficult due to the strong energy of the sun and the magnetic fields of the summit of the Earth.[41]

41) The cost of an icebreaker is analyzed to have economic efficiency when it is 9 to 10 dollars per ton. The government must compose a mid-to-long term masterplan focused on establishing an Arctic Ocean route sail procedure, cost improvement obtainment of the safety of ship, obtainment of ship, and fostering of sailors. Oh, Y. I. (2013), p. 2.

Regardless of such difficulties, the government is preparing the means for activating the advancement of Korean corporations into the Arctic shipping routes by providing incentives, and pursuing cooperation with the coastal countries in the Arctic region. Although ice in the Arctic is reducing due to global warming, sailing in the area can only be accommodated four months every year(July to October). In order for shipping companies to gain profit, more than six months of sailings must be made possible. Furthermore, there may be a loss in comparison to the investment if there is a lack of demand in cargo. Accordingly, if a ship using the Arctic shipping route enters or sails from a Korean port, the cost of using the port facilities will receive a 50% deduction as from 2014.

Corporations advancing into the marine and distribution infrastructure business in the Arctic region are to be supported with suitable research and consultation. Moreover, the government plans to implement education programs to develop sailors capable of sailing in the Polar Regions in programs that dispatch professionals between Korea-Russia educational organizations for the purpose of constructing a basis for Korean shipping companies.

The government is also in pursuit of a means of simultaneously establishing a shipping finance organization and a marine guarantee fund to support the management stability of shipping and marine industries.

Shipping finance organizations and marine guarantee fund establishment plans are continually in discussion with the Financial Services Commission and the Ministry of Strategy and Finance. The establishment of the shipping finance organization was an election strategy and was motioned as legislation by the assembly members at the Parliament.[42)]

IV. Korea's Arctic Region Activation Policy and Development

These several tasks and issues raised previously will not easily be resolved in the short term by specific countries, including the Korean government.

42) Yonhap News, June 16, 2013.

Simultaneously, countries should not be focused only on the 'development' of the Arctic region in the mid-to-long term. The issue must be actively approached also in terms of 'protection' by considering the geological properties and restrictions of the Arctic region.[43] In this regard, the global international cooperation strategy of the Arctic region requires an approach in terms of the 'development and protection' paradigm. In order to effectively achieve this goal, the following means are raised for the government: 1) construction of a global governance of the Arctic region through international cooperation, 2) establishment of an exclusive organization to manage the initiation of Arctic diplomacy in terms of national strategy, 3) enhanced cooperation with Russia and commercialization policy of the Arctic shipping routes, 4)pursuit of Arctic Policies with non-coastal countries, and 5)research for the active advancement of the Arctic region and fostering of professionals at an international level.

Firstly, the Arctic coastal countries and the permanent observer countries of the AC must commit to the construction of global governance protecting the Arctic region through international cooperation. The opportunity of Arctic development must be used optimally but within the scope of international laws. In order to keep the monopoly of the coastal countries in check and in order to protect the Arctic environment from the Arctic coastal countries as the Antarctic in the mid-to-long term, a construction of a global governance in the form of an 'Arctic Treaty' must be encouraged.[44] The role of the permanent observer of the AC must be actively reinforced in terms of protecting the Arctic environment. Any policies prioritizing the commercial benefits of resource development and the Arctic shipping routes or a similar national image must not be pursued. In order to construct a system of joint management and a tolerant governance for the protection of the Arctic region's environment, the continued cooperation and assistance of other observer countries should be promoted.[45]

43) Korea Maritime Institute, Arctic Ocean News, Vol. 5, July 31, 2013.

44) F. M. Auburn, Antarctic law and politics (Indiana University Press, Indiana, 1982); www.kosap.or.kr/11781(Date searched: August 3, 2015).

Secondly, the initiation of the establishment of a governmental 'Arctic Policy Control Tower,' which will actively perform the main role in Arctic diplomacy, is important. A comprehensive and systematic Arctic Policy masterplan and the overall general organization related to the commercialization of the Arctic shipping routes and participation in resource development is currently absent in Korea. Such plans must be established and enforced at the strategic hub for the expansion of the marine economic territory. The coastal countries of the Arctic Ocean are establishing a unique selection strategy, and non-coastal countries, such as the EU, Japan, and China, are also individually initiating different selection strategies. With the obtain of the position as a permanent observer in the AC, Korea must establish an 'Arctic Exclusive Organization' in order to actively participate in research and development and to reinforce affiliation with the coastal countries of the Arctic region. A contact channel must be investigated in order to receive approval for sailing from the Russian and Canadian governments claiming authority of the Arctic shipping routes by installing national control towers supporting stable crossings through the Arctic shipping routes.[46)]

Thirdly, the construction of a cooperation system with Russia must be prioritized for the fostering of commercialization in preparation of an early opening of the Arctic shipping routes. Currently, the Russian territorial waters must be used and passed through in order to use the Arctic shipping routes. Thus, in order to do so, the Russian government must be notified and approval must be obtained four months prior to use of the route. Since most Arctic shipping routes will be formed along the northern coast of Russia, it is likely that Russia will be in charge of the practical control of the entry and departure of the Arctic shipping routes. During the initial crossings of the Arctic shipping routes, an icebreaker will be needed, and the country that has icebreakers is Russia. Furthermore, Russia is in charge of important crossings on the Arctic

45) Young, Oran B& Gail Osherenko, Polar Politics: Creating International Environmental Regimes (Cornell Univ. Press, New York, 1993).

46) Samsung Economic Research Institute CEO Information(2013), p. 19.

shipping routes, and is operating the cost of using icebreakers for domestic and foreign ships in graded levels.[47]

A toll rate must also be paid according to the type and weight of the cargo. In addition, the construction of a diplomatic Arctic relationship with Russia and the obtainment of certain infrastructure are desperately required. It is necessary for corporations to participate in construction orders for the modernization and repairs of ports related to the development of the Far East Russian ports and to obtain competitiveness as hub ports or sub-ports of governments and local governments. Furthermore, port infrastructures connected to the Arctic shipping routes must be constructed. Thus, in consideration of the usage of the Arctic shipping routes, it is necessary to approach the matter from a mid-to-long term perspective rather than a short term one.[48] Russia is the country leading the development of the Arctic region and is also reinforcing the advancement of Asia and the Pacific Ocean using the Vladivostok port and the Far East port. The government should not overlook the fact that Russia leads the Arctic shipping routes, and must provide the support needed in order for the connection between the Russian government, related departments and researchers to be successfully achieved.[49]

Fourthly, cooperation and competition must be prepared with China and Japan, who obtained status as permanent observers at the AC at the same time as Korea. Japan has been concentrating forces in the use of the Arctic shipping routes since the end of the 1980s. During that time, Japan has conducted joint projects with Russia and Norway. In June 2012, Japan announced the 'Resource Development Five-Year Plan' including a focal region of the Arctic resource development. China has been in operation of the icebreaker 'Xue Long' since 1999, which has departed on five research journeys. China is also drying a new icebreaker that can accommodate 90 passengers released in 2013. Premier Wen

47) Oh, Y. I. (2013), p. 2.
48) Samsung Economic Research Institute CEO Information(2013), p. 19.
49) Oh, I. Y. (2013), p. 2; www.khoa.go.kr/uoc/study/pole/northpole2.asp(Date searched: August 1, 2013).

Jiabao visited Iceland and Sweden in April 2012, and in June 2012, Head of State Hu Jintao visited Denmark, which pushed forward activities for the advancement of the permanent observers of the AC.[50]

Accordingly, since various economic ripple effects are expected to be seen in the northeastern region with the development of the Arctic shipping routes in terms of the geological adjacency and active strategies of the Arctic Policy, the government must pursue joint cooperation strategies and distinguished strategies by thoroughly reviewing China's and Japan's policies concerning advancement and development in the Arctic region. Innovative change will arise in the northeast Asian distribution industry with the continued increase in trade goods of Asian countries using the Arctic shipping routes in terms of reduced cost resulting from reduced time and distance as well as distribution costs. It is also likely that the marine plat industry related to icebreakers, the shipping industry, and exploration drilling will also develop further.[51]

Finally, the security of professionals in the field and other talented workers must be prioritized. That is, effort must be devoted to fostering talented workers and encouraging the participation of professionals that can lead the research and development of the Arctic region. Professionals in scientific technology, marine economy, marine law, and marine policy must be secured and nurtured. A comprehensive masterplan comprising port repair projects, surrounding city development, industry development, marine transportation, shipping, finance, and distribution, which lead the development and advancement into the Arctic must be composed. Furthermore, there are defects in terms of international laws with respect to pioneering of the Arctic shipping routes. An Arctic Ocean Chart must be constructed, the systematic and clear international regulations must be improved, and the Arctic Ocean advancement projects must be performed in a systematic and organized manner. The 'Arctic Dasan Science Base' and 'Araon'

50) Yang, H. C., "China's Arctic Strategic Research," paper was presented at the Korean International Political Science Semianr, August 22, 2013.

51) Samsung Economic Research Institute CEO Information (2013), p. 6.

should be systematically expanded at the international level. The research region of climate and weather, marine biology, and geology would also benefit from being expanded, and Arctic related seminars, participation in joint international research programs and Arctic Science Council activities should be further expanded.[52)]

V. Conclusion

The Arctic is not a territory of a specific country but is a region of important value. It is a place of risks and opportunity, as well as a place where international cooperation simultaneously coexists. Thus, various policies are necessary in terms of 'development and protection' at a global level. However, as stated previously, regardless of the unlimited potential of the Arctic region, Korea is faced with various dilemmas. Korea has a lack of experience in transporting and selling gas and a general know-how concerning the Arctic region at large.

Furthermore, Korea requires the composition of a team of professionals and professional technology that can exclusively manage research and projects of the Arctic region. Particularly in order to construct regionally-friendly projects, such as academic support for the professional researchers, cultural exchanges and ambition project support, the construction of good relationships with the natives in the Arctic region is also raised as an important task.

The government demands significant financial support based on the route and development of the Arctic region. As the 2012 demonstrative sailing conducted by a shipping business that had previously been suspended due to expense problems was reinitiated in September, it is a priority to obtain ice-resistant ships that can withstand ice or icebreakers that can break ice and create a path for following vessels.

Currently, there are four ice-resistant shipsin the world: the Araon is the only pure research icebreaker in Korea.[53)] A remarkable cost is required to rent and

52) Oh, Y. I. (2013), p. 2.

sail with an ice-resistant ship. In this regard, economic analysis using the Arctic shipping routes must always be conducted ahead in the mid-to-long term.[54] In addition, an issue raised as an important axis of Arctic diplomacy is the environmental protection of the Arctic region, which is the joint task of mankind. Korea must actively participate and support in international cooperation and research based on climate change. The government must actively participate in international cooperation by the AC, such as the prevention of thoughtless development of the environment, scientific exploration, protection of the natives, and environmental protection directly and indirectly affecting environmental change and a lack of food for the polar bears according to the accelerating thawing of the Arctic, as a permanent observer country of the AC.

Finally, the relativity with the Arctic coastal countries should be taken into consideration. Unlike the Antarctic, the five coastal countries monopolize the development of the Arctic through the 'Illulissat Declaration,' which specifies the exclusive rights of the five countries. Accordingly, the relationship with these coastal countries must be continually maintained, and simultaneously, international cooperation must be further reinforced in preparation for the construction of an exclusive cartel. In this regard, the pursuit of new cooperation with non-coastal countries, such as China, Japan, the EU, and international organizations, must be considered a joint task. This becomes the basis that the construction of global governance in a similar manner to that of the Antarctic is necessary. As a permanent observer country of the AC, Korea must actively use the Svalbard Treaty signed in October 2012, pursue cooperation with the coastal countries of the Arctic region and related international organizations, and contribute to forming a joint global management system of the Arctic.[55]

53) Money Today, March 26, 2013.
54) www.khoa.go.kr/uoc/study/pole/northpole2.asp(Date searched: August 2, 2015).
55) Samsung Economic Research Institute CEO Information(2013), p. 18.

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Abstract

Changing Environments of the Arctic Region and Korea′s Arctic Policy : Restrictions and Prospects

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The Arctic Region is a region where important values, risks, opportunities, and international cooperation coexist, so it must be approached with utmost emphasis on development and protection. The five coastal countries' claim of dominion over the North Pole region is the subject of an international legal dispute, as there is currently no actual occupancy or practical governance over the region. These countries lead in the development of the Northern Sea Route (NSR) and resources, but a national border treaty has yet to be concluded. Currently in the Arctic Region the sovereignty of individual countries over the waters is not recognized by the UN Convention on the Law of the Sea, and 200 nautical miles of economic zone is applied to these coastal countries.

Defrosting of the Arctic Region has been accelerating due to global warming, which has led Korea to acknowledge the importance of the pole and prompted it to initiate various activities. In future mid-to-long term projects, Korea will have to expand its participation and role in the strategic sense concerning the expansion of territorial space, resource development, native and environment protection, and significant financial support for the active use and commercialization of the NSR as a permanent observer of the Arctic Council (AC) since May 2013. A responsive plan must systematically be established to enhance international cooperation concerning the construction of global governance, and the relativity of the coastal countries of the Arctic Region must be considered, particularly with cooperation with Russia. In this context, this article is to analyze the geopolitical and spatial properties of the Arctic region and the restrictions on developing Arctic resources, and consider the problems and means of commercializing the Arctic Ocean route and the role of Korea in the AC. Based on which, counter plan tasks required for a mid-to-long term initiation of an efficient Arctic Policy by Korea will be proposed.

Key Words : Development and Protection, Arctic Council (AC), Commercialization of the Northern Sea Route(NSR), Global Governance, Constraints and Tasks

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