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ARCTIC POLICY OF THE REPUBLIC OF KOREA
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- I. INTRODUCTION
- II. BACKGROUND TO THE ESTABLISHMENT OF ARCTIC POLICY
 - A. *Antarctic and Arctic Regions Through the Documentation of the Early 1900s*
 - B. *Expansion into the Arctic Region Through Scientific Research*
 - C. *2012 Measures for the Advancement of Polar Region Policy*
 - D. *2013 Plans to Further Comprehensive Arctic Policy*
- III. KOREAN ARCTIC MASTER PLAN (2013 – 2017)
 - A. *Outline of the Arctic Policy*
 - B. *The General Direction of the Arctic Policy*
 - C. *Detailed Measures Under Each Strategy*
- IV. FUNDAMENTAL ARCTIC POLICY: AIMS AND ACHIEVEMENTS
 - A. *Promotion of International Cooperation*
 - B. *Strengthening of Investigation and Research*
 - C. *The Development and Launching of Arctic Businesses*
- V. CLOSING REMARKS

I. INTRODUCTION

On May 15 2013, Korea obtained observer status at the Arctic Council held in Kiruna, Sweden. The Korean public and media were delighted by the news, viewing it as a stepping stone for Korean expansion into the Arctic. The media paid especially close attention to the economic benefits stemming from the Northern Sea Route (NSR) and related resources.

The United States Geological Survey (USGS) reported in 2008 that the Arctic held approximately 90 billion barrels of oil, 1,669 trillion cubic feet of natural gas, and 44 billion barrels of liquefied natural gas (LNG).¹ The USGS report certainly fueled the hopes and dreams of Arctic expansion for Korea, a nation which depends on imported energy for up to 95% of its needs. Additionally, expansion into the Arctic Region would vitalize the resource distribution industry. Currently, the existing sea route from the Port of Busan to the Port of Rotterdam via the Suez Canal takes 24 days to travel 20,100km. The new sea route passing via the Northern Sea Route would reduce the total navigation distance to 12,700km, thereby making it possible to travel in 14 days. However, contrary to the expectations of the Korean general public and mass media, it is hardly possible for non-Arctic states such as Korea, to freely make use of the Arctic or the Arctic Ocean. The five Arctic coastal states, consisting of Canada, Denmark, Norway, Russia, and the U.S., announced the Ilulissat Declaration, which affirmed the United Nations Convention on the Law of the Sea (UNCLOS) as the main legal regime of the Arctic Ocean.

Through this declaration, the Arctic states claimed sovereign rights and jurisdiction of exclusive economic zones (EEZs), the continental shelf, among other rights pertaining to the Arctic Ocean adjacent to their coastline under the approval of UNCLOS. Therefore, the Korean government established national level policies which respect the sovereign rights of the Arctic Ocean belonging to the Arctic states, promoted cooperation based on mutual trust, observed Arctic climate change, and contributed sustainable development as the prior steps for the expansion into the Arctic region.

Korea has been aware of the humanitarian and national significance of the Arctic and Antarctic since before the millennium. On the one hand, Korea has strived in the field of scientific research by joining the Antarctic Treaty System. On the other hand, Korea has promoted various economic cooperation with the Arctic nations. Korea joined the Antarctic Treaty System in 1986, established the Antarctic King Sejong Station in 1988, established the Arctic Dasan Station in Ny-Ålesund, Norway in 2002, and joined the Svalbard Treaty in 2012. Furthermore, Korea has participated in summits with the Arctic nations since 2008. In 2012, President Lee, Myung-Bak visited Russia, Greenland, and Norway to promote cooperation over the Northern Sea Route, shipbuilding, and energy resources, among other things.

Behind the government actions over Polar activities lie government policies and plans, such as the Basic Plan of Antarctic Research (2007-2011, 2012-2016), Measures for the Advancement of Polar Region Policy (2012), Comprehensive Arctic Plan (2013), and Korean Arctic Master Plan (2013). This article will focus on the background to Korea's 2013 Basic Plan for Arctic Policy, and the remaining tasks that now lie before the Korean government.

II. BACKGROUND TO THE ESTABLISHMENT OF ARCTIC POLICY

¹ See Kenneth J. Bird et al., *Circum-Arctic Resource Appraisal: Estimate of Undiscovered Oil and Gas North of the Arctic Circle*, USGS Fact Sheet 2008-3049, (2008) available at <https://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf>.

A. Antarctic and Arctic Regions through the Documentation of the Early 1900s.

Despite the fact that Korea commenced its economic cooperation with the Arctic nations in the early 21st century on a governmental level, documentation of the Arctic is found in Korean records dating back to the early 1900s. It was at this time that the Chosun Dynasty, the former nation of the Republic of Korea, had lost its sovereign power due to the invasion and colonization by Japanese forces. The novel *Seohae-Poongpa* written by Lee, Sang-choon, a pupil of Joo, Si-kyung, one of the most renowned linguistic scholars of Chosun, contains themes of ocean voyage, shipbuilding and navigation, exploration, and the discovery of the Arctic for the first time in Korean literature history.²

It is interesting that a linguistic scholar from Chosun, suffering under colonial rule, chose to write a novel concerning the Antarctic only three years after the Antarctic expedition led by the famous Arctic explorer, Roald Amundsen. Furthermore, the title *Exploration to the South Pole, Polar Region* appears in the magazine, *Seoul*, published by the Hanseong Book Corporation which was established in May 1920.³ The substance of the article, which focused on introducing Arctic and Antarctic explorers, expressed the following sentiment: rather than waiting and hoping for the world to help us, we too should be bearers of big visions, worthy of contribution to the world.⁴ During the Japanese annexation of Korea in 1910, the resulting suppression of the Korean language, culture, and ideology, as well as the potentially disheartened Chosun people, and the perception of the Arctic and Antarctic by the Chosun intelligentsia, were ways in which to restore and rouse national spirit, without the need for explicit use of the word *independence*.

B. Expansion into the Arctic Region through Scientific Research

The start of Korea's scientific research on the Arctic can be found in the project Basic Investigation Research for Arctic Research and Development, carried out by the Polar Research department of the Korea Ocean Research and Development Institute, which belonged to the then Ministry of Science and Technology in 1993. Thereafter in 1999, two Korean researchers joined the 1st Arctic Expedition of China's Icebreaker, Snow Dragon, carrying out a field study and research of the Arctic Ocean for the first time.

In 2002, the then Korea Ocean Research and Development Institute (KORDI)⁵ became the central player, and pushed to register the institute with the International Arctic Science Committee (IASC). However, KORDI was unable to register it due to the prerequisites for joining the IASC, a non-governmental international scientific organization. Potential member organizations were to be a science committee for each nation or national academy, and thus, the Korea Arctic Science Committee (KASCO) was established in 2001.

In order to carry out research activity on both polar regions more systematically, the Korea National Committee on Antarctic Research (KONCAR) and KASCO were reorganized into the Korea National Committee for Polar Research (KONPOR). Following the push for the advancement of Arctic research and the installation of an Arctic science station, the Dasan Station was the 12th research station to be installed in April 2002, at the

² Lee, Sang-choon, translated into modern Korean by Choi, Youngho, *Seohae Poongpa* (Korean Studies Advancement Center, 2006).

³ Lee, Jong-Joon, "Exploration to South Pole, Polar region", *Seoul*, No.2, (1920), pp. 20-37.

⁴ "We" refers to Korean people under Japanese imperialism, considering that the magazine was published in Korean rather than in Japanese, the founders of the publishing company were Korean intellectuals including independence activists, and the purpose of the magazine was to enlighten the general public.

⁵ KORDI was renamed as Korea Institute of Ocean Science and Technology (KIOST) in 2012.

Ny-Ålesund research town in Svalbard Island. The Icebreaking Research Vessel ARAON, which was constructed with Korean Government funding in 2009, became a turning point for Korea's Arctic research. The ARAON weighs 7,487 tons, has the ice-breaking ability to break 1m thick ice at 3 knots per hour, is ice-resistant, and can endure temperatures of minus 35 degrees.

Since the ARAON has undertaken research voyages in earnest from 2010, it has become possible for Korean research teams to carry out independent and scientific research to cover and embrace not only land based research, but also ocean based research of the polar regions. Excellent research results were achieved and published in the leading academic journal, *Science and Nature*, thereby creating further opportunities for co-research and cooperation with Arctic coastal countries.⁶

C. 2012 Measures for the Advancement of Polar Region Policy

Since Korea achieved status as an *ad hoc* observer state of the Arctic Council, the Korean government has made strategic preparations to obtain permanent observer status. Part of the preparations include the 2012 Measures for the Advancement of Polar Region Policy. In the current global context, the perspective on the polar regions as the 'final frontier to man,' and the strategic value of the area in terms of scientific research and economic resources are widely recognized. The Korean government also recognizes the need to revisit and reconsider its current Arctic Policy, as well as undergo further discussion regarding the direction of future policy. As a result, with the Polar-7 objective, which is leading polar region research internationally, the Korean government has claimed the "Bi-polar" Policy which covers the Arctic and Antarctic, and which aims to customize policy according to the region's characteristics.⁷

The following are the main points of the Measures for the Advancement of Polar Region Policy. First, the foundation of the Arctic policy needs to be built through the legislation of law to build legal grounds to make the best use of the Arctic Ocean for marine transportation routes and maritime resource development. Next, the creation of a masterplan for Arctic policy on a government level. Lastly, expanding scientific research on the Arctic and increasing support for various fields, including liberal arts and industry. Second, Antarctic Policy must be systematically developed by achieving the smooth construction of the Antarctic Jangbogo Station⁸ and the expansion of research on the Antarctic continent and ocean. Additionally, the vitalization of international collaborative research may be achieved by using icebreaking research ships and varied international cooperation, including the exchange of icebreaking sailing technology. Third, through increasing support for the regulation of Polar Region Policy, the foundations of the policy need to be strengthened through the organization of government-wide standing committees to discuss an interdepartmental Polar Region Policy and reinforcement of polar region task forces.

Aside from what has been mentioned above, further measures include the reinforcement of cooperative international infrastructure by expanding networks with directly interested countries, which include the Arctic Ocean coastal states and also non-coastal states. The 2012 Measures for the Advancement of Polar Region Policy formed the basis of the 2013 Measures for the Advancement of Polar Region Policy by the Ministry of Maritime Affairs and Fisheries, and the government-wide Korean Arctic Master Plan.

⁶ The Korean Government is examining the validity and necessity of a secondary icebreaking research vessel.

⁷ Policy Briefing, "Promotion of a customized polar policy for the Antarctic and the Arctic" at <http://www.korea.kr/common/searchPrint.do>.

⁸ The Antarctic Jangbogo Station/ It was completed in February, 2014 as planned.

4. 2013 Plans to Further Comprehensive Arctic Policy

With the achievement of observer status at the Arctic Council, the Ministry of Maritime Affairs and Fisheries⁹ announced on July 25, 2013, Plans to Further Comprehensive Arctic Policy. This consists of three major policy objectives: the formation of Arctic partnerships, strengthening of scientific research and the creation of new Arctic industries, and Four Key Strategies, with the vision of becoming a leading country of the polar region, opening up a sustainable Arctic future.¹⁰

The first of the four key strategies is the ‘strengthening of international cooperation among the Arctic circle’ in order to build the Arctic network. In order to achieve this, the Korean government built up a system of cooperation with Arctic Council member countries, both on a multi-national and on a one to one level. Also, the Korean government actively participated in the Arctic Council and its working group, and at the same time, made efforts to establish a cooperative infrastructure with new observer states, Japan and China.

Second of the key strategies is to strengthen Arctic science research activity. This task involves expanding research using current polar region infrastructure carried by existing polar region laboratories, such as joining the building of the Svalbard Integrated Earth Observing System (SIOS); building up the Arctic-rim environmental change observation system; strengthening research on Arctic climate change and on ecosystem and ocean environment according to climate change; the expansion of the Dasan Station; and the building of a second ice-breaking ship.

Third of the key strategies is launching the ‘Development of an Arctic Business Model.’ In order to support the opening of the new Arctic Ocean routes by Korean shipping companies, the following are provided: training of Arctic voyage experts, incentives such as the discount of port facility fees for Arctic-travelling ships, consultation, market research, and consultation regarding the simplification of transit procedure, among other things.

Last, Arctic Policy laws and institutional foundations must be improved. That is to say, in order to promote the research and activities of the polar regions, there must be an overhaul of the law and the establishment of a department exclusively responsible for the polar regions.

III. KOREAN ARCTIC MASTER PLAN (2013 - 2017)

A. *Outline of Arctic Policy*

With the Plans to Further Comprehensive Arctic Policy as a blueprint, the Korean government led discussions on the establishment of the final Arctic Policy with polar region related research organizations and governmental departments. The research organizations include: Korea Institute of Ocean Science and Technology; its annex polar region research institute, Korea Maritime Institute; and Korea Institute of Geoscience and Mineral Resources. The government departments include: Ministry of Science, ICT and future planning, Ministry of Foreign Affairs, Ministry of Trade, Industry and Energy, Ministry of Environment, Ministry of Land, Infrastructure and Transport, Ministry of Maritime Affairs and Fisheries, and Korea Meteorological Administration.

⁹ The Ministry of Oceans and Fisheries was separated from the Ministry of Land, Infrastructure and Transport in February, 2013.

¹⁰ Policy Briefing, “Arctic Policy Blueprint for Arctic Leading Countries” at <http://www.korea.kr/common/searchPrint.do>.

As a result, in December 2013, the Korean government, aware that the Arctic is primarily the object of protection prior economical merit, resolved to conduct their duty as an observer country by providing local community support and science research for the protection of the environment. Concurrently, the Korean government announced the Korean Arctic Master Plan that includes 31 tasks to be performed between 2013 to 2017 by each government department: eight tasks in the international cooperation field, eleven in the science investigation and research field, ten in the Arctic business field, and two in the legal and institutional field. The Korean Arctic Master Plan is an important document because it is the first governmental plan which contains basic policy conditions with regards to the Arctic region.

The background to the Korean Arctic Master Plan is a self-reflection on policy, stemming from recognized shortcomings. There were various achievements in the Arctic area such as the continuous scientific research through the Dasan Station and ARAON, obtaining observer status at the Arctic Council, securing technological capability and Polar land ships. However, there were also shortcomings. First, there was a lack of information and development on the Arctic environment, as well as a lack of government-level organization to encourage cooperation between research organizations and companies. Second, the legal and institutional foundation as a basis of scientific and economic activity in the Arctic is weak. Also, as Korea became an Arctic Council observer and therefore was able to participate in policy decision procedure for the Arctic, the common interest, cooperation, and government-wide agreement on the need of basic policy condition became the impetus for the establishment of the Korean Arctic Policy, the acceptance of which is required to make coexistence and cooperation possible.

The Korean Arctic Master Plan states its purpose as: (1) “Contributing to international society and the Nation’s [Korea’s] development of the basis of common cooperation on the area of economics, science and technology, Arctic countries, and international organizations,” and (2) “[a]dhering to policy conditions by creating an organization to examine the system, in order for the strengthening of international cooperation, the establishment of a foundation for polar region scientific research, and the creation of new business fields to take place.” To achieve these objectives, the Korean Arctic Master Plan proposes the Arctic Policy’s general direction and measures to launch each strategy, which includes vision and policy objective. Further details will be provided below.

B. The General Direction of Arctic Policy

As shown in the diagram below, the Korean Arctic Master Plan consists of a vision, policy objectives corresponding to the vision, strategies to achieve the policy objectives, and detailed execution tasks assigned to each government-department according to the subject of strategy. See diagram 1 below. The vision of the Korean Arctic Master Plan is the following: “Korea: The Leading Nation Opening up a Sustainable Future of the Arctic.” It expresses the desire for sustainable development of the Arctic, seeks to proactively contribute to the preparations of the future of the Arctic, and at the same time, hopes to further the mutual prosperity of humanity.

The three recommended objectives which correspond to the vision of the Arctic Policy are: (1) the building up of the Arctic partnership contributing to international society; (2) the strengthening of scientific research contributing to reaching solutions to problems shared by the global community; and (3) the creation of new Arctic industries through the involvement of the field of economics.

These policy objectives show the basic direction of the Korean Arctic Master Plan. It can be summarized as follows: (1) joining an Arctic Council working group; (2) developing

cooperative items at a multi-national and one on one level, and forming a trust relationship with Arctic Ocean coastal countries by supporting local communities; and (3) preparation to secure economic profits by developing new Arctic ocean routes, energy and mineral resources, and expanding on fishery fields. As demonstrated above, various needs and considerations are combined in the Korean Arctic Master Plan.

The Korean government has disclosed the focal point through the plan, that is, for Korea to become a nation which shares the obligations of the Arctic’s present and future, and at the same time, become a government which creates new industries, both domestically and internationally. Although the Korean government is making preparations for economic expansion into the Arctic, such as the development of industry and investment cooperation, the government recognizes that building a relationship based on mutual trust with Arctic coastal countries and their communities takes priority through faithfully undertaking the duty of an observer state to first protect the environment and taking action to deal with Arctic climate change.

Diagram 1: The Structure of the Korean Arctic Master Plan¹¹



3. Detailed Measures Under Each Strategy

The first subject of strategy proposed in the Korean Arctic Master Plan is the “Strengthening of International Cooperation.” It is once again subdivided into: (1) expanding

¹¹ Korean Arctic Master Plan at <http://www.mof.go.kr/article/view.do?menuKey=386&boardKey=22&articleKey=4638>

the activities related to the Arctic Council; (2) strengthening the international organization activities related to the Arctic; and (3) vitalizing cooperation in the private-sector.

Regarding the expansion of activities related to the Arctic Council, the following is included: joining the 6 working groups¹² belonging to the Arctic Council and conducting research as co-researchers with the working groups; and planning on joining the Arctic Council's agreements, such as, the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic (selected in 2013) and the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic (selected in 2011). Second, the strengthening of international Arctic organization, the following recommendations are included: attendance of the arctic agenda consultative bodies such as the Arctic Economical Council, the Arctic Circle, and the Arctic Frontiers Conference. Additionally, the recommendations suggest the undertaking of co-research work using Korean research infrastructure, such as ARAON, at the International Arctic Science Committee (IASC) and the International Conference on Arctic Research Planning III (ICARP-III).¹³ Third, the vitalization of cooperation in the private-sector, the following recommendation is included: the development of a climate-change monitoring program and education-training programs related to maritime and fishery, targeting local Arctic communities.

The second subject of strategy is for the 'Strengthening of Scientific Investigation and Research Activity.' Again, it is subdivided into the expansion of Arctic research and activity using Korean infrastructure, the expansion of Arctic research and activities bases, the strengthening of research on climate-change, and the building up of geographic information of the Arctic and the Arctic Ocean.

One of the most notable agenda items with regard to the expansion of Arctic research and activities bases is the building of a second icebreaking research ship that has improved icebreaking ability. Although the Korean research team possess the icebreaking research ship ARAON, it is not practical to dispatch the ARAON to the Arctic or Antarctic as a research sailing ship, and at the same time meet the supply needs of the station. With this, there are plans to organize the Korea Arctic Research Consortium to accelerate cooperation, research, and the sharing of Arctic research information among experts in Korea.

Regarding the expansion of Arctic research and activity using Korean infrastructure, the following points are included: (1) to join the Svalbard-Greenland International as co-researchers; (2) to explore the Arctic Ocean for gas-hydrate; (3) to operate observation facilities for soil freeze/thaw in the Arctic Rim; and (4) to develop original technology for the observation of environmental change in freezing and thawing of the active layer in the Arctic Rim.

Regarding the strengthening of research on climate-change, the following points are included: (1) to develop Arctic Ocean and sea ice data assimilation technology;¹⁴ and (2) to

¹² The 6 working groups: Arctic Contaminants Action Program (ACAP), Arctic Monitoring and Assessment Programme (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR), Protection of the Arctic Marine Environment (PAME), and Sustainable Development Working Group (SDWG).

¹³ IASC, in its founding article, grasps the current status of Arctic research, gives science-technological advice, and holds an international research planning conventions in order to encourage the connections and cooperation among other governments and international organizations. The first report was published in 1995 and second report was published 10 years later in 2005. ISAC commemorated its 25th year anniversary and promoted publishing its third report in 2015, a 20 year term from the first published.

¹⁴ Technology which processes the observation-data of thawing collected by polar region monitoring devices, into form available for modelling/prediction.

research forecasting ability of the abnormal climate of the Korean peninsula caused by climate change in the polar regions. Climate change in the polar region affects abnormal climate phenomenon. In particular, if it becomes possible to predict abnormal climate phenomenon occurring at mid-latitude sites, for example Korea, it will greatly help to predict the weather of the northern hemisphere.

Regarding the building up of geographic information of the Arctic and the Arctic Ocean, the following points are included: the establishment of the plan for building up Arctic geographic information, building up of geographic information for the whole Arctic area, and understanding the current nautical charts of the Arctic Coastal Nations.

The third subject of strategy is The Development and Launching of Arctic Businesses. This is subdivided into developing Arctic Ocean routes, cooperation with regards to resource-development, development of shipbuilding and offshore plant technology, and cooperation with regards to fishery resources.

With regards to the above, the following points are included: the test-sailing of the Arctic Ocean route, discounted port-charges for cargo and vessel passing through the Arctic Ocean, and MOU between Korea and the Arctic ocean coastal nations concerning cooperation with regards to port development. In terms of resource-development cooperation, there are plans to carry out a geological survey as co-researchers by participating in the Arctic Ocean Hydrocarbon Research program, and to take part in the Greenland Mining and Rare Metal Investigation. As a non-member of fishery organizations such as the North East Atlantic Fishery Commission (NEAFC), there are discussions for Korea to join the membership of such organizations for cooperation regarding fishery resources among Arctic Ocean coastal countries.

The fourth subject of strategy is the expansion of the institutional basis for Arctic activities. Korea has already established an act on Arctic activity and environmental protection to execute the Antarctic Treaty System. However, the scope of application of the act is limited to the Antarctic and is mainly focused on approval or regulation of the activities in the Antarctic. As a consequence, Korea is planning to enact a new law that covers all polar region activities including that of the Antarctic and the Arctic. Additionally, there are considerations to develop a new Polar Region Information System that can gather, analyze, and provide data and trends of the Arctic Council members and the observers.

IV. FUNDAMENTAL ARCTIC POLICY: AIMS AND ACHIEVEMENTS

A. Promotion of International Cooperation

Acting as a faithful observer state of the Arctic Council is a major agenda of the Korean Arctic Policy. Korean government officials attend the Arctic Council ministerial meetings as well as the Senior Arctic Officials meeting. The government has established an official pool consisting of about 40 experts to participate in around 10 working groups and TFs under the Arctic Council annually, and translated major reports of the working group into Korean, promoting the Arctic Circle domestically. Furthermore, it has discussed Arctic cooperation reinforcement at summits with Canada, the U.S., Denmark and at the Korea-Nordic foreign ministerial talks, in order to enhance cooperation between the Arctic Council member states and the observer states. Furthermore, the Korean government attended the 3rd Arctic Council Observer meeting and Arctic Council Ministerial Meeting, addressing issues such as communication between the members and the observers, and increasing involvement of the observer states in working groups, among other things.

Korea has actively joined international organizations related to the Arctic other than the Arctic Council. As one of the leading countries in scholarly organizations, especially in

the field of science, Korea has taken the chairmanship of the Pacific Arctic Group (PAG), taken the lead of a joint exploration of the Arctic Ocean, and has taken part in writing and publishing reports for the Third International Conference on Arctic Research Planning (ICARP-III). In addition, Korean scientists in the polar region have served as executive officers of the Inter-Agency Standing Committee (IASC), as vice-chairman of the Forum of Arctic Research Operators (FARO), and as vice-chairman of the Ny-Ålesund Science Managers Council (NySMAC). These scientists have contributed to establishing networks for Arctic researchers, sharing data on Arctic research, and cooperating with the Ny-Ålesund research village in Norway. Also, Korea has actively participated in Arctic Frontiers and Arctic Circle, non-governmental forums related to the Arctic. At the 2015 Arctic Circle, Korea provided a Korean Night event and introduced major Arctic policies and culture of Korea. On the private sector level, Korea threw an educational program called Arctic Academy, inviting Arctic indigenous students to Korea.

The Ministry of Oceans and Fisheries provides infographics, informing key performances of the Arctic Policy. It introduces the four key performances of the Arctic Policy of Korea: (1) the development of the Arctic cooperative system, (2) the development of the private sector network, (3) the expansion of research on Arctic marine environment, and (4) setting up four permafrost observation stations in the Arctic states. The performances will be dealt with in more detail in this chapter.

B. Strengthening of Investigation and Research

Korea is investigating and researching the Arctic through the Korea Polar Research Institute (KOPRI). KOPRI performs multinational and multidisciplinary research. For example, it performs research on Geology-atmosphere-ecological environmental change based on Dasan Station. It also develops Arctic 4-d atmosphere-observation and performs research on the co-relation between the upper atmosphere and climate change. Lastly, it performs research on chemical behavior of Arctic environment pollutants, and monitors new pollutants from Kongsfjorden.

The ARAON is researching the Arctic Ocean, traveling across the Beaufort Sea, Chukchi Sea, East Siberian Sea, Bering Sea, Sea of Okhotsk, etc. At the Beaufort Sea, located at the north of Canada, the ARAON succeeded in collecting gas hydrate and 100 L-km public channel elastic wave through international joint research. It held joint research with Russia and Japan on gas hydrate fields in the Sea of Okhotsk, and drew ocean zone environment maps of the Bering Sea region. Korea expanded its research on the Arctic even into Circum-arctic Permafrost, and set up remote precision measuring systems by securing Station Nord in Greenland, following observation stations in the U.S., Canada, and Norway. Based on this observation system, Korea succeeded in long-term real-time consecutive monitoring of sulfide in the Arctic atmosphere for the first time in history.

It is a part of Korea's Arctic Policy to contribute to the international community and the Arctic nations through research on the Arctic. Korea is willing to predict climate change by developing data assimilation technologies on the ocean and sea ice of the Arctic, and provide information on sea ice environment near the Northern Sea Route by improving short range forecast technology on statistical Arctic sea ice extent, based on satellite-based data. Furthermore, Korea has been actively participating in the production of the Pan-Arctic map, as well as topographic maps, image maps, and digital elevation models of the Arctic Ocean and the Arctic coastal region.

Korea has made efforts to establish solid foundations in order to systemize and improve the existing Arctic research, and as a result, the Korea Arctic Research Consortium (KoARC) was founded. At this consortium, academic communities, industrial representatives,

research institutes, and professional organizations which represent Arctic activities of Korea are gathered and divided into three fields (i.e. science, policy, industry) to communicate and discuss potential interdisciplinary research subjects. The need for a secondary icebreaking research vessel for the advancement of the Arctic research is being seriously discussed. The ARAON is able to endure temperatures of minus 35 degrees, and has the ice-breaking ability to break 1m-thick ice at 3 knots per hour. However, for more reliable research of unexplored frozen ocean and an extended research time, a research vessel that can stand temperatures of minus 45 degrees and break 2m-thick ice at 3 knots per hour is in demand. At present, the government is examining the validity of budgeting for the substantial expense.

C. The Development and Launching of Arctic Businesses

Korea is paying close attention to the NSR, since by using the NSR, the route distance between Asia and Europe would be reduced, distribution expenses would be cut down, and it may be possible to enter into the shipping and logistics market which is closely related to the resources of the Arctic region. In order to seize economic opportunities, a test run was performed for the first time with a vessel that was built by Korea, and a Korean domestic distribution company travelled along the transportation route which connects the Arctic Ocean route and an inland waterway of Russia. Also, Korea is considering providing incentives for shippers and consignors who import shipments through the Arctic Ocean, and is training manpower for polar region route navigation.

Korea is developing joint projects based on an MOU for geographical research, cooperation with Greenland, and an MOU for cooperation and development on mineral resources. For marine resources cooperation, Korea ratified an agreement for the North Pacific Fisheries Commission (NPFC) and arranged a stepping stone of Korean expansion into the Arctic Ocean fisheries organization. In addition, Korea is making efforts to develop shipbuilding and safety technologies for vessels that travel across the polar region, as well as develop offshore plant technologies for deep-sea mining in the polar region.

V. CLOSING REMARKS

Since obtaining observer status at the Arctic Council in May 2013, Korea established and systematically implemented its Arctic Policy. The fact that the Arctic Policy of Korea, which is mainly focused around cooperation with the Arctic states, is progressing favorably, shows that the policy is reasonable, suitable, and agreeable to the Arctic nations. In order to maintain this policy, it is necessary to observe the direction of the Arctic Circle in great detail.

The five Arctic coastal states affirmed UNCLOS as the main legal regime of the Arctic Ocean through the Ilulissat Declaration, demonstrating that the Arctic does not require a universal treaty system like the Antarctic Treaty System. However, a new trend where treaties targeting individual issues exclusively concerning the Arctic is rising. The Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic and, the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, for instance, are newly adopted agreements specially designed for Arctic conditions, despite the existence of the International Convention on Oil Pollution Preparedness, Response and Cooperation (1990) and the International Convention on Maritime Search and Rescue (1979). Furthermore, the Arctic states are preparing a treaty to ban unregulated fishing in the international waters of the Central Arctic Ocean according to the precautionary principle, and the Arctic Council has organized a task force to launch the Agreement on Enhancing International Arctic Scientific Cooperation. This new trend implies that the importance of international law on Arctic Ocean Governance will be amplified, as increased activities in the

Arctic lead to a greater need for the regulation of the Arctic Ocean. Therefore, in order for the smooth implementation of Arctic Policy based on cooperation with the Arctic states, Korea needs to respect and abide by the treaties related to the Arctic, and participate actively in the treaty making processes.

The Arctic nations and indigenous peoples are suffering from the effects of climate change, global warming, and rising sea levels, all of which are the consequences of industrial development and environmental pollution. Changes in the climate and environment of the Arctic affect the entire planet. Thus, all are responsible for the environmental change of the Arctic. The Arctic environment is of great interest and importance to all. Communication between the Arctic states and non-Arctic states is crucial for the effective supervision of the Arctic region. Thus, it is the responsibility of Korea to set up a cooperative system between other observer states of the Arctic Council, for the non-Arctic states to promote environmental sustainability of the Arctic, and to encourage sustainable development in the Arctic region in conjunction with the Arctic nations.